The Builder

AN

ILLUSTRATED WEEKLY MAGAZINE,

FOR THE

ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR,

SANITARY REFORMER, AND ART-LOVER.

CONDUCTED BY

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

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

"Architecture can want no commendation, where there are noble men, or noble mindes."——Sir Henry Wotton.

"Our English word To Build is the Anglo-Saxon Byldan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."——Diversions of Purley.

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

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ILLUSTRATIONS.

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Inauguration of Improvements in London.

THE past week has witnessed an unusual number of those events,—if we date them by the formal completion,—which are so rapidly transforming the architectural and picturesque character of the metropolis. The noble basin which has been in course of execution for some four years past in extension of the Victoria Docks has been opened by the Duke of Connaught; the old burial-ground of the Quakers,—believed to be the first place of interment owned by that religious body,—in Baker's-row, Whitechapel, has been converted into a public garden, and as such was opened by the Prince of Wales; and the freeing to the public for ever of the Putney, Wandsworth, and Hammersmith bridges has also been solemnised by the heir to the throne. Thus, three great elements in the growth of a great capital,—namely, provision for maritime commerce, facilities for internal communication, and room for healthy recreation, have each received at once a development, a stimulus, and a royal acknowledgment of their importance.

While the commercial history of London reaches back to the time of the Roman occupation of England, it was not until the present century that any public dock existed in the neighbourhood of the City, with the exception, of course, of the great natural dock of the river. A century ago the sole accommodation for landing and bonding foreign produce was limited to a single spot, called the "Legal Quay," which extended for about 1,400 ft. seawards from London Bridge. In 1773 Mr. J. Sharp suggested the formation of floating docks,—an accommodation for commerce which had been introduced at Liverpool in 1716. In the year 1800 the West India Docks were commenced; in the year following the London Docks were projected; and in the year 1805 the East India Docks were commenced. Mr. Ralph Walker was engineer for all these undertakings, Mr. William Jessop being associated with him in the West India Docks. In 1824-25, notwithstanding the construction of the above docks, the crowded state of the river, and the urgent need of more dock room, engaged the attention of Parliament, and Acts were passed for Collier Docks, South London Docks, and the St. Katherine Docks, of which the last only were carried out. In the five years from 1830 to 1835 the steam tonnage entering the river nearly quadrupled.

The Victoria Docks, to which a basin without parallel for length in the country, or, it is said, in the world, has now been added, were first proposed in 1842 by Mr. Blyth. This gentleman, after pointing out the site, and the advantages connected with it, did not take any further interest in the matter. But his hint was not destined to be forgotten, for it was given to George Parker Bidder, who at that time was undertaking, with the aid of three or four friends, the construction of a line of railway connecting the Eastern Counties Railway at Stratford with the river Thames. Some idea of the uphill work with which Mr. Bidder had to contend may be formed from the fact that this line, before its completion, was generally known by the name of "Bidder's Folly." It proved, however, so advantageous, that the Eastern Counties Railway took it at cost-price. An extension was then projected to North Woolwich. This was reported against by the Board of Trade; but, owing to the able advocacy of Mr. Anstin, before a committee of the House of Commons, the Bill was obtained.

The marsh land on the north of the Thames, between Bugsby's Reach and Galleon's Reach, and bounded by Woolwich Reach on the south, let at the time of which we are speaking for from 6*l.* to 7*l.* per acre. It was partly pasture and partly arable, and before the introduction of steam-boats for the conveyance of cattle, it was useful for the pasturage of cattle so near the metropolis. The land was not, however, valued at more than 100*l.* per acre; and even after the passing of the Act of Parliament for the Victoria Docks, land was sold by auction at that price. But the landowners determined to oppose the railway, unless the whole of their land were purchased; a policy the short-sighted nature of which it now seems difficult to realise. Thus the Dean and Chapter of Westminster received 8,000*l.* for forty-seven acres of land, which was not worth more than 4,000*l.*, in order to get rid of this threatened opposition. The Victoria Company paid for the 600 acres which they purchased, at the rate of 250*l.* per acre; the difference between this price and the value of 100*l.* per acre, amounting to 90,000*l.*, went into the pockets of the landowners.

Mr. Bidder's calculation was to the effect that, taking the land at 250*l.* per acre, it could be excavated for 1,250*l.* per acre, and puddled for 250*l.* per acre, so that the cost of the water area, in that situation, would be 1,750*l.* per acre. The jetty system, which had been adopted at the London Docks, afforded great facilities for working, loading, and unloading ships. The line of railway placed the docks in direct communication, by means of the Shoreditch and Fenchurch-street Stations, with the City; and by the Great Northern line with the Midland, and the whole of the manufacturing districts.

The cost of the works, on the opening of the docks on April 1, 1858, had amounted to 706,462*l.*, which the purchase of the Steel-yard Estate, that of extra lands, and 29,000*l.* spent in Parliamentary expenses, brought up to 938,164*l.* The water area at this time was about 100 acres. It comprised the entrance dock from the Thames, with two pairs of gates, leading into a tidal basin of 16 acres, separated, by a dumb jetty, from the main dock of 74 acres, but communicating with it by a single pair of gates, and terminating with a cut, or channel, at the eastern extremity. The basin and dock together (exclusive of the eastern cut) were 4,050 ft. in length, and 1,050 ft. in width, at high-water level. In addition to the dumb or terminal jetty, four jetties, each 580 ft. long, projected into the basin, being each 140 ft.

wide, and placed 430 ft. apart, except the most easterly one, which had a space of 550 ft. Thus a quay-room of nearly three miles in length was provided, although the length of the basin was only 1,350 yards. In the new basin a simpler arrangement has been adopted, the length of the dock being a mile and a quarter, and the width 490 ft.

The site selected by Mr. Bidder was found to afford the unusual advantage of furnishing an admirable building material out of the excavation which it was necessary to make. The surface of the marsh was below the level of Trinity high-water mark. Beneath a layer of about 12 in. of subsoil occur 5 ft. or 6 ft. in thickness of blue and yellow clays; then a bed of from 5 ft. to 12 ft. of peat; and then gravel, overlying the London clay. The latter formation was found throughout the length of the first dock, at a nearly uniform depth of 37 ft. below Trinity high-water mark; and on that foundation, at the depth of 37 ft. 6 in., the brickwork of the upper and lower gate platform was laid. The gravel formed the solid silicious portion of the concrete of which the walls were built. In the new dock the quantity of excavation is stated at 4,000,000 cubic yards, and that of the concrete made at 500,000 cubic yards. The new dock,—henceforward to be called the Albert Dock,—is connected with the Victoria Dock, which we have described, by a canal of 1,400 ft. in length, and stretches in nearly a right line across the peninsula of the former marsh to Galleon's Reach.

One or two very instructive failures occurred during the construction of the original works, as to which it is desirable that every architect who has to design important works for the valley of the Thames should possess full information. It would be difficult to imagine a more promising foundation, under ordinary circumstances, than the gravel bed lying on the London clay. Over great part of the area of London this bed is to be found. It supports some of our most important edifices. But it is one thing to build a church or a palace, and quite another thing to design a stable hydraulic work. The gravel, as many of our readers well know, is full of water. In dealing with a depth of nearly 40 ft. of water at high tide, the ordinary conditions of stability are greatly modified. If the foundation of a wall or pier be laid on the gravel, the water can find its way beneath. The lifting power which it exerts at high tide is then such as the weight of the wall would be unable to resist. In the case of the lower-gate platform, according to the calculations of Mr. Bidder, the pressure of the water upwards, if it were allowed to percolate beneath the foundations, would be more than a ton on the superficial foot (say 2,300 lb.), while the weight of the brickwork inside, with 10 ft. of water upon it, would only amount to 1,640 lb. per square foot. Hence the importance of taking out all the gravel, so as to bed the concrete and brickwork solidly on the clay; and the advantage, if not the necessity, of covering the horizontal joints with a close sheet-piling.

On Sunday, the 17th June, 1855, at a time when great progress had been made in the works, the north wall of the lock-chamber began to give way, moving forward bodily into the lock, pushing up the thick puddle towards the centre, bending and breaking the tie-bars behind, and dragging the tie-piles forward, and, in some instances, breaking them off. A few hours later the north side failed in the same way, but the brick side-walls and platforms remained unaffected.

This remarkable subsidence, which was dealt with by the construction of solid concrete walls of 18 ft. in thickness, was due to the hydraulic pressure of the water percolating the gravel. From the commencement of the works in 1853 great pumps had been worked night and day. As this continued for two years, the soil was gradually drained of its contained water for a considerable distance, in all directions. It was found that the water in a well situated in East Ham parish, more than two miles and a quarter from the docks in a direct line, was much lowered while the works were in progress, but recovered its level when they were completed. At the time of the accident, the pumping had been discontinued for some weeks, in order to allow water to collect in the dock to the depth of three feet, with a view of thus testing the clay puddle. It was excluded from the lock chamber by a temporary tank. As the ground behind the walls gradually recovered its charge of water, pressure steadily augmented, and as the clay-puddle afforded no good abutment for the footings of the walls, the consequence was readily to be understood; although it was one which few architects or engineers, unenlightened by any such costly experience, could have been expected to foresee.

The effect of the extension of dock accommodation on the growth of London, and on the increasing value of sites in the neighbourhood, is perhaps not very difficult to calculate. It will be in the nature of an additional impulse given to the activity of the builder, but an impulse acting on the actual lines. It is otherwise with regard to the freedom of the bridges. It may be anticipated that this salutary measure will cause a diversion in the lines in which the activity of the builder is now radiating from the great centres of business. This, indeed, is not a thing of to-day or of to-morrow; but it is nevertheless sure. We recommend those who take an interest in the subject to study what is now taking place in the case of Waterloo Bridge. We beg leave to urge upon the Metropolitan Board of Works not to hide under a bushel the great advantages they have secured to London by the most wise plan of the freeing of the bridges. They owe it to themselves to present us with statistics of the present traffic. As far as can be predicted, the result would be most gratifying. On the first opening of these great thoroughfares, indeed, the increase of traffic disappointed our expectations. These showed that we had not made enough allowance for time. To change habits of business, even for a certain gain, is not a thing to be done in an hour. But now that enough time has elapsed to allow the public to become familiar with the advantages of the new routes,—new in as much as they are free routes,—they appear to be fully availing themselves of the service. The activity of the Waterloo-road, just now presents a very striking contrast to that evinced before the freedom of the bridge. Such, we take it, is sure within a few years to be the case with each of the freed bridges. And as the growth of the delta projecting beyond a line of coast gives proof, century after century, of the force and the direction of the current of the river which forms it, so may we anticipate the improvement and the extension of building along those lines of internal metropolitan communication which are now no longer handicapped by a toll.

ORNAMENTAL IRONWORK AT THE SOUTH KENSINGTON MUSEUM.

SINCE the removal of the great casts of Indian architecture from the South Courts of the South Kensington Museum, the collection of ornamental ironwork which has been exhibited at the Bethnal-green Museum during the last few months has been transferred to the parent museum, where, in a fragmentary form, it for many years found a home. Distributed, through want of adequate exhibiting space, in groups or by solitary specimens in out-of-the-way corridors and galleries, few persons could perceive that which is now, since its re-arrangement, very apparent, namely, that we have here a collection of ornamental wrought-iron work of an almost unique character, the like of which we certainly do not remember to have met with in any other European museum. We are accordingly tempted to offer a few general remarks upon the subject of ironwork.

The oblivious history of Vulcan and the Cyclops, the legendary gods of the forge, encircle the birth of the art with poetical imagery. More than a millennium before Christ it is said that the Greeks discovered iron. Homer writes of a furnace urged by twenty pairs of bellows, into which the ore was cast for the shield of Achilles; and Ecclesiasticus, some 700 years later, presents us with a graphic picture of "the smith sitting by the anvil and considering the ironwork. The noise of the hammer and the anvil is ever in his ears, and his eyes look still upon the pattern of the thing that he maketh." Glaucus of Chios, an art-workman of the second century, is stated by Pausanias to have been the inventor of iron soldering. The use of iron on a large scale was known in the fourth century to the Indians at Delhi, as the iron pillar, more than half of which is hidden many feet in the ground, testifies. Interesting as are these incidents hallowing the age of ironwork, they do not advance an investigation into methods of fashioning iron. Examples of workmanship which can be handled and examined more immediately serve such a purpose.

Broadly speaking, iron may be classified under three heads, viz.,—cast iron, malleable iron, and steel. The presence, or comparative absence, of carbon determines the peculiar qualities of the classes of iron. Thus, malleable iron is freer from carbon than is steel; steel than cast iron; and cast iron contains therefore the largest proportion. Malleable iron, which is comparatively soft, ductile, weldable, tenacious, and not fusible at ordinary temperatures, is used for those arts of the forge, the hammer, and the anvil, which group themselves under "wrought iron." Steel is more like malleable iron than cast iron. It possesses all the properties of ductility and tenacity to be found in iron, and, moreover, is highly elastic, capable of being hardened by tempering, and fusible in furnaces. Steel is used for arms of all kinds, blades, guns, armour, and armour-plating, as well as for articles like axles, cranks, and so forth. Through the exertions of men such as Bessemer, Whitworth, Siemens, and Krupp, it is being adopted for use in works of far larger importance than even that of the famous blade "Mimung," or of the Toledo and Ferrara swords. Cast iron, as its name shows, is used for casting or moulding. It is brittle, and easily fusible. The vast variety of uses to which iron, under its three guises, is put, from nails to tubular bridges, and from needles to railways, occupies so great and interesting an area for observation at the present time, that it will be well to point out that the iron works now under discussion are of an ornamental character, occupying but a small space of the extensive historic field of the uses of iron.

The smiths who designed at their anvils like artists in their *ateliers* scarcely exist any longer. In some obscure German town one may, perhaps, meet with such an artificer; but, to all intents, the hand-wrought ornamental, beaten, rivoted, and welded iron is a thing of the past, and will remain so until knowledge of this art is revived, and demand for its practice re-created. A principal reason of the virtual demise of wrought-iron work is traceable to the employment of coal in lieu of wood and charcoal in melting out the metal from the ore. Charcoal furnaces yielded a malleable metal, whereas coal-fed blast furnaces yield pig-iron,—a coarse form of cast-iron. One may, without difficulty, realise the immense change which has come over ironworks since the utilisation of coal for fuel, and the introduction of blast furnaces for smelting.

In Lancashire, Staffordshire, Yorkshire, and Gloucestershire, traces of ancient iron furnaces have been found. Famous ironworks existed in Sussex from very early times. A great bed of iron ore ran from Hastings in a north-westerly direction for some five-and-twenty miles. Roman relics have been found in cinder-beds of disused furnaces. Cæsar mentions iron in the "maritime regions" of Britain. In the thirteenth century we find Sussex supplying iron for the tomb of Henry III. at Westminster; and somewhat later,—

> "Master Haggett and his man John,
> They did cast the first cannon."

The splendid woodlands of Sussex supplied the fuel for the furnaces. So marked, however, was the thinning of the forests for the purposes of fuel supply, that both Henry VIII. and Elizabeth set in operation wood-protective laws. 140 furnaces are recorded as being in use in the seventeenth century, each of which consumed every twenty-four hours from two to four loads of charcoal. Nevertheless, the woodlands of Sussex now bear but few traces of the busy iron trade of a century and a half ago. The sheets of water which are picturesque features in the Weald frequently owe their origin to the ironfounders having dammed the streams into reservoirs, which supplied the water to move the wheels of the hammers and other machinery in the furnaces. The iron trade of Sussex declined in the eighteenth century. Occasionally are still to be purchased delicately-wrought shovels or tongs, snuffers, andirons, and rushlight-holders of the sixteenth and seventeenth centuries; but these and a few monumental slabs in village churches, or finely-wrought decorative screens to be most exceptionally seen, as at St. Paul's Cathedral, are the principal memorials of the south-eastern English iron foundries.

From the peaceful pastures and parklands of Cæsar's maritime regions one may turn for contrast to the grim, Black Country of the midland and northern counties, with its coal-smoke clouds and roar of thousands of deep, broad-throated blast-furnaces, and see there the modern methods of producing millions of tons of

iron per annum. Blast-furnaces, puddling-furnaces, steam-hammers, and rolling-machines, behemoths of foundries and forges, are here in full operation in the production of those sinews of strength which are imparted to modern construction. Sometimes an important piece of ornamental ironwork, for an international exhibition, emanates almost abnormally from one or another of the great Cyclopian centres. The arts of welding, soldering, riveting, tenoning, mortising, and swaging, the uses of the hammer, the chisel, graver, file, and "organarium," a quaint machine for shaping small pieces of iron, as handed down by the writings of Theophilus, Monk and Priest, of the twelfth century, are now but little remembered. This is not surprising when one finds that in the late thirteenth and early fourteenth centuries the blacksmith's art was apparently dying out in France. The late M. Viollet-le-Duc, in his valuable "Dictionary of Arts," makes his ideal thirteenth-century forger grumble at the patrons of art, "who will not give a price for anything that does not glitter. Each day the art of the forge declines." "What forger," exclaims the ideal Hugo, "is there at this day to forge a *penture* equal to those on the doors of Notre Dame?" Expatiating upon the careful soldering of the thin-beaten petals of some finely-wrought flower,—the work of his father,—and upon the deterioration to quality of work, caused by adopting a "subterfuge" like rivets, Hugo complains of the migration of his fellow-craftsmen to English and German towns, for "in these places ironworks are so esteemed." It may be for some reason of this kind that the collection under notice abounds in a great number of German specimens of ironwork.

The value of this collection may be regarded from two points of view. First, in respect of treatment or manners of manipulating iron for ornamental purposes; and second, as to the kinds of articles and objects produced in iron. Works about the fourteenth and fifteenth centuries of Gothic design are formed with sharply-cut rods of iron, chamfered and bevelled, tenoned and mortised invisibly together. Of such there are here a minutely-executed three-faced shrine, and near it a small turret-clock. Of the same period are the decorative hinges which stretch across the width of a cathedral door, covering the greater portion of it with scrolls and conventional fruits and flowers. This kind of work is, as a rule, bolted or nailed down to its background. Chests and coffers are ornamented with plaques and strips of pierced and punched thin sheet-iron. In later times the thin sheet-iron was twisted and shaped into acanthus and other leafy forms, and then deftly applied to conceal the rivets in frame-work. The sequence of soldering, welding, and riveting may also be traced. For pediments of windows and headings to gateways, light iron, fantastically twisted and of a flatteued rod treatment, was used extensively in Germany and Italy in the sixteenth and seventeenth centuries. We find in the collection an admirable example of this kind of work. Long, continuous spirals sprout from the extremities of attenuated grotesque figures. The main stems of the spirale interweave one another, and at different junctures, growing on the stem, are odd bird-like creatures with long, pointed beaks. In imitating plumage neither the French, Italian, German, nor English blacksmith has shown himself a worthy competitor of the sixteenth century Japanese smith, Myochin Mune Larn, whose osprey stands in an adjacent court,—a wonderful compound of laminated iron feathers fitted together with the utmost cunning, and counterfeiting of Nature herself. Placed in one of the glass cases at the side of the court, and with other shields of less importance, is a beaten and chiselled sixteenth-century shield in which a high order of workmanship is shown. In a central medallion is a well-drawn and modelled Medusa's head, with its snake-locks curling about and forming a good distribution of lines over the background. Around the medallion is a crisply-cut laurel-wreath, beyond which comes a narrow band, containing the inscription, "GIORGIUS · SIGMAN · AURIFEX · AUGUSTE · HOC OPUS · PERFECIT · ANNO · DOMINI · MDLII · MENSE · AUGUST · DIE · XXVII." Then comes a broad, encircling space, ornamented with seven wreaths and floating ribands. Within the wreathe are words such as TRIUMPHALIS, OVALIS, MURALIS, NAVALIS, CIVICA, &c. There is another bordering of laurel-leaves, and then an outer frieze of bold relief, typifying the triumph of Rome. In that portion of the frieze which is above the Medusa's head sits Rome the eternal, and on her right and left spreads a series of gods and goddesses,—Jove and his satellites, Mars and emblems of his victories, Ceres or Cybele, and Pax. The background to these foremost figures is rich with arms, bucklers, trophies of flowers and abundance, galleys, heads of battering rams, dolphins, helmets, and other martial insignia. The shield is some 2 ft. in diameter, and was purchased for 270*l*. It is one of the chief objects of this class belonging to the Museum. Near the north end of the court stretch the well-known wrought-iron screens made in 1695 by a Nottingham smith,—Huntington Shaw,—for the king's palace at Hampton Court. These screens are masterpieces of elaborately-foliated scroll-work. The style of design is *rococo*. Masks and embroidered cloths, or *lambrequins*, garlands, floral devices, cyphers, festoons, are the ornamental details applied to the square rod framework of the three principal panels of the screen, which are separated from each other by architectural pilasters of open iron-work surmounted with crowns. Similar work on grills and window frames, of which there are here many good examples, abounds in the Engadine and South Germany. The towns of Nuremburg and Augsburg were famous for their blacksmiths, and so, indeed, has London been. Examples of her blacksmiths' art of the Queen Anne and succeeding Georgian periods are notable as showing the craftsman's nice appreciation of the character of iron in respect of its ductility, its strength, and its lightness.

Amongst the varieties of objects for which iron has been used, one finds in the collection, besides grills and gates, already mentioned, railings, balustrades, and other kindred architectural accessories, articles like nut-crackers, a press for sealing documents, seals, keys, locks, coffers, tripods of dainty twisting hands and rods, stands for braziers, fireirons, and dogs; door-handles and knockers, gondola-prows, and, of present manufacture, handles for walking-sticks, trinkets, buckles, bracelets, necklets, and brooches of blackened cast-iron. These latter, of Berlin manufacture, serve to show for what delicate purposes the art of casting may be employed.

The days of lanterns enclosed in shrines of sharply-forged iron, like those jutting from the angles of the Strozzi and Ricardi Palaces in Florence, are past; and so, too, are those of the flame-tongued dragon gargoyles, Brobdingnagian keys, and other trade-signs; panels of beaten iron with royal arms, initials, crowns, and dates; specimens of nearly all these works are included in the collection.

From the point of view of concentrating attention upon one branch of metal-working, it would have been better had a few specimens of brass and bronze work been excluded from the collection of which they now are a part. The educational value of a collection of ornamental ironwork is considerable. Its points of instruction may be emphasised by simplicity in selection and arrangement of the specimens. At present the grouping is not according to any particular order of date, country, or method of production. Full explanatory labels to supply information about sorts of workmanship are necessary to help the public in drawing comparisons between methods, and in gleaning facts concerning the development, decline, and metamorphoses in the art of ironwork. Without some such directions who is to perceive the particular uses of square bars, chamfered and bevelled rods, round, spiral, and grooved rods, of pierced and punched thin plate-work, of *repoussé* and chased work?

The art of casting iron is becoming better understood, and although cast-iron ornament has not the quality or *cachet* of hammered work, there is no reason why designers for cast work should not, by mastering the capabilities of sand and other moulds, adopt certain distinctive features so as to raise cast iron from its present position of being merely a bad and coarse rendering of decorative wrought iron.

At the same time, it might be satisfactory to see signs of a more general revival of the arts of hammering and fashioning iron on the anvil. Modern wrought-iron work is generally deprived of its freshness in appearance. Details are often beaten from a single matrix, which engenders a monotony. Formal geometric precision is a quality now frequently preferred to that vivacity of irregularity, which charms a minority of people, who see in it the character and craft of the workman.

RECENT EXCAVATIONS IN ASIA MINOR.

THE library of the Institute of British Architects has recently received, through the liberality of Professor Donaldson, an interesting foreign addition,—the first numbers of a work of great architectural and archæological interest, on the series of explorations and excavations carried out in Asia Minor, at Miletus, and in the towns of the Gulf of Latmos, and which, apart from the interest they possess in themselves, continue the unpublished inquiries of Mr. Pullan (of the Institute of British Architects), commenced, it will be remembered, some eight or nine years since, at Priene. The work now published by M. Olivier Rayet, a former member of the French École d'Athènes, and M. Albert Thomas, long an occupant of the Villa Medici, at Rome, is devoted to a detailed account of the excavations made by them in 1872 and 1873, at the mouth of the historic river Mæander, not far from Ephesus.* The whole expenses of the excavation the Barons G. de Rothschild and E. de Rothschild have generously taken upon themselves, the work being published under the auspices of the French Government. It may be easily understood what artistic relics were brought to light in the course of the excavations. Those again, through the liberality of the Barons de Rothschild, now repose in the museum of the Louvre, where they form, among the many treasures of that priceless collection, some of the most interesting and instructive among the remains of antique art. The work which M. Rayet and M. Thomas are now publishing is more than a mere detailed catalogue of these Greek treasures and the history of their discovery; it is a learned and valuable commentary on the interesting period of art to which they belong. The theatre of the city of Miletus, the Agora of Heraclea (of Latmos), has been explored and excavated by MM. Rayet and Thomas; but perhaps the most interesting of their researches have been devoted to the superb temple of the Didymean Apollo, a curious relic of Greek architecture. The parts in which these are described remain to be published.

The first part of their work MM. Rayet & Thomas published nearly three years ago (in 1877). It is only very recently that they have been able to prepare for the press the second and third parts; but the delay in a work executed with such care as this is excusable, the more so when it arises from the lengthy residence on the scene of their explorations of the two industrious authors.

It is at the mouth of the muddy but poetical and winding stream of the Mæander, in the bay which the alluvial deposits of the river have since Classic days filled up with reed-grown marshes, that lies the field of operations of MM. Rayet and Thomas. Winding down from its mountainous source in the south of the antique province of Phrygia, the Mæander (the *Maiandros* of the modern Greeks, as it was of their ancestors, *Buyuk-Mendie* of the Turks) passes, before reaching the Ægean Sea, many a ruined city of which learned notes and figured coins give one a glimpse of the past splendour. Whirling through its soft bed, the river rolls down, as it has done for centuries past, volumes of mud, and these deposits at the mouth have at length filled up the once existing Bay of Latmos. In their first chapter MM. Rayet and Thomas describe at length, and with many archæological details, the true "mæanderings" of the river which has given its name to that familiar figure of speech. The scene as described is picturesque as the muddy river reaches the plain, now so desolate, alone broken by the broad sheets and pools of water and clusters of reeds, the rose-laurels, and the flocks of waterfowl. Even the Roman Campagna, remarks the author, in its wildest portions, does not cause so impressive a feeling of desolation as this plain, occupied in summer by a few nomad Turcomans, with their dark, camel-hair tents, and their half-starved cattle. From the hay, so treacherous with its reefs, the view is more imposing. "To the left the chain of the Mycale, bathed in that milky and transparent light alone known to those who have seen Greece, seems to plunge into the water its steep, light-gray iridescent slopes, on which the shadows of the deep ravines draw their dark lines. To the right the chalky cliffs of the Milesian coast die

* "Milet et le Golfe Latmique: Tralles, Magnesie, Priène, Milet, Didymes, Heraclée, etc.; Fouilles et Explorations archéologiques," etc. Par Olivier Rayet et Albert Thomas. Paris; Baudry. 4to. Part I.

away to the point of the Posidion, lost in the distance. Behind these cliffs Mount Grion shows its dark-green slopes, balancing, as in a picture, the colour of Mount Mycale. In the centre of the scene the towering triangle of Mount Latmos, rearing its crest like the pediment of a temple, stands out on the pale blue of the sky; its northern slopes leaving between them and Mount Mycale a gaping opening, through which the eye can penetrate to the distant tops of the Mesogide, lost in the dim vapours of the horizon. In the foreground, finally, a pointed hill, rising like an island placed at the entrance of a vast gulf, and which a narrow channel would separate to the right from the continent."

Such is the aspect of the coast as it presented itself in the eighth century before the Christian era to the first Greek colonists whose vessels warily approached the coast. In those distant days the sea formed a wide bay from the slopes of Mounts Thorax and Mycale to those of Latmos and Grion, and it was on the waters of this bay—now dry land—that their vessel was borne by the west wind to the point where the emigrant founded, opposite the antique native town of Tralles, Magnesia of the Mæander, Priene, Miletus, Heraklea, of Latmos and Myonte. It is the ruins of these cities that MM. Rayet and Thomas have explored, and the history of which is learnedly told in their work. The bay became in time commercially and politically important, and numerous are the historical incidents with which its name is connected; but from this very period the action of the Mæander can be traced; little by little the land encroached on the sea, the ports lost their importance, and the population shifted its centre further outwards. With the gradual extension of the plain, Miletus, at the extreme point, was menaced with a similar fate to its companions; one by one the cities were depopulated, Heraklea succumbing among the last. From that day, about the fourth century of the Christian era, the slopes of Mount Latmos became a desert, and remained such till the moment when their very solitude caused them to be chosen by the Byzantine monks as a place for retreat and penitence. The filling up of the port of Miletus, remarks M. Rayet, must have taken place about the same time, and closed the long-delayed decay of the city once so excellently situated, so prosperous at the outset of its history, and against which fortune seemed ever to have been adverse.*

The district of Aïdin, which bears this name from a conquering emir of the thirteenth century, and its capital the antique Tralles, form the subject of the second chapter of MM. Rayet and Thomas's work. The well-populated district is beautiful and fertile. No part of Asia Minor, the authors assure us, unites in such a measure material wealth and picturesque beauty. The capital, Aïdin-Guzel-Hissare, the beautiful fortress of the Emir Aïdin, M. Rayet picturesquely describes in all its Oriental beauty of antiquity from the outside, so sadly different from the inside, with its squalor, its filth, and its crowd of busy Spanish Jews; the *Tcharchi*, or bazaar, filled with its trashy German Brummagem, and Swiss or Belgian cottons; alone relieved by the traditional shops of the *samardjis*, or saddlers, and the carpet-sellers.†

This portion of M. Rayet's work contrasts in its simple graphic narrative with the archæological research of the rest of his volumes; the mention of the English "Ottoman Railway Company," which crowds with inland merchandise the goods station of the "beautiful fortress," carrying to a height this contrast.

M. Rayet's archæological tastes are soon exercised in describing the ruins which occupy the plateau that rises above the Frank quarter of the city of Aïdin: these ruins, of which Smith, Sherard, Chandler, Leak, and the other travellers in Asia Minor all speak, are now known to be those of the city of Tralles. Great as is the interest connected with this city, little idea can be gathered from these remains of its past splendour. The destruction of the town is complete; the architectural remains are scarcely recognisable,—a fact which arises in great part from the nature of the building materials used. Stone is rare in Lydia, but clay abounds. The pottery of Tralles was famous. The Lydian brick, 1½ ft. long, and 1 ft. broad, was much esteemed in the past, and at the epoch of the empire the factories of Italy even adopted its dimensions and name, as we see by reference to Vitruvius.

At Sardis and at Tralles even the more important edifices were built of brick,—at Sardis, the palace of Crœsus; at Tralles another palace built for the kings of Pergamus. It is more than probable, suggests M. Rayet, that the greater part of the public and private edifices of both cities were built of the same material, a fact which, in the case of Tralles, is abundantly proved; as for those portions which still exist they are formed interiorly of a very hard concrete composed of stones and mortar, and exteriorly of a casing of bricks, a species of construction usually attributed to the Romans, as largely used by them, though of which the Greeks were undoubtedly the inventors: it is what they termed the *emplekton*. M. Rayet describes how highly valued in Asia Minor are these ancient bricks so superior to those made in the present day; and he amusingly refers to the workmen he employed for his exploration filling sacks upon sacks of the "tonvlais" for their own use.

A lengthy description is given of the theatre at Tralles, the form of which is still recognisable. But the interest of this building, remarks M. Rayet, does not lie so much in its now shapeless ruins; it is in an anecdote related by Vitruvius, and which shows us strikingly the artistic revolution which, under the successors of Alexander, introduced into the decoration of the theatres that long and questionable taste which Roman architecture was later on to urge to excess. In the past days the "back scene," the *logeion*, remained merely an accessory, but Vitruvius's account transports us to the time when this accessory became the principal feature, when the religious signification retired before the superior interest of the scenic representation. It is then that on the "back scene" it became the custom to paint an architectural view, which, as remarks M. Rayet, could not fail in course of time to fall into the hands of artists more desirous to obtain decorative effect than truth, and degenerate into the wildest extravagance (Vitruv. de Arch., VII., v., 5, 6, 7).

The temple of Asclepius, cited by Vitruvius as a Classic model, together with the other monuments of Tralles (in addition to a number of paragraphs devoted to the architect Pythios, and the use of the Ionic order) occupies the rest of M. Rayet's second chapter; the third, fourth, and fifth chapters dealing with the history of the city, its golden days in the third and second centuries before Christ, when most of its monuments were erected, and during which period it probably numbered among its citizens two sculptors, Apollonios and Tauriscos, famous artists in the past, more familiar to the world at large in connexion with the so-called Farnese Bull of the Naples Museum, and to the vicissitudes of which several paragraphs are devoted. The following chapter, which concludes the first number of the work, continues the ulterior history of Tralles, eventually incorporated in the great Roman empire. Tralles from that time ceases to possess a history; what is only curious to study, remarks the author, is the share it takes in the intellectual movement of the Roman world. Those of its citizens gifted with more than ordinary accomplishments leave their home to seek elsewhere fame and riches. Rome especially attracts them, and there it is that will be found the greater number of its most illustrious children in letters, in art, in science.

The list of the Trallian artists of the imperial period is less long than that of the writers; it only presents two names,—the sculptor, Aphrodisius, who worked at the decoration of the palace of the Cæsars at the Palatine, and the architect, Anthemius, the collaborator of Isidorus of Miletus in the erection of Saint Sophia. He alone, observes M. Rayet, would be sufficient to throw a greater glory on his country than all its famous writers united.

Such is a short sketch of the contents of the first number, a very imperfect summary, it can be understood, of the 116 quarto pages of printed matter, the columns of which are supported by a stout base of closely-packed notes bristling with well-selected Greek and Latin quotations, and references to the English, French, and German writers on, and travellers in, that interesting land of historic and artistic wonders, Asia Minor.

Commendation can be given to the plates that accompany this part as careful, instructive, artistic works, which will interest especially the architect in their masterly treatment of detail. Two maps, two photogravures, views of the present state of the ruins, together with a number of plans, sections, and restorations, form the "atlas" to the first number of MM. Rayet and Thomas's work, which does all concerned in its production the utmost credit, not least among them M. Baudry, the prolific publisher.

* The advance of the land on the sea has been calculated to be at the rate of more than five to six hundred yards in each century.

† M. Rayet devotes an interesting passage to the decay of the beautiful carpet-weaver's art in the East. The very colours used are now of Western origin.

HYDROGRAPHIC SURVEY OF ENGLAND.

COMPLETION OF THE ORDNANCE SURVEY.

A GENERAL assent hailed the application to Government, made the other night verbally in the House of Commons, to hasten the completion of the large Ordnance Survey of England. The subject is one of more than professional interest. For the projection of public works,—of drainage, irrigation, harbourage, or land or water inland communication, the importance of the 6-in. survey is of the first order. This is well known to all engineers, surveyors, and practical men. It was, however, rather with reference to the purchase and sale of landed property that the subject attracted attention in the House of Commons. As to that, the argument is as strong as it is with reference to the construction of works. It might have been thought that no opposition could have been raised to a recommendation the carrying out of which would allow of so material a saving in private, corporate, and public expenditure. That saving would probably be underrated if,—on the consideration that where a private survey has to be made for each special object, the large Ordnance Survey, once made, is available for all and for ever,—we calculate that the country gains thirty-three times the actual cost of the survey.

But no proposal, however sound, seems to command universal assent. In one of the morning papers a writer, under the signature "Observer," recommends the very opposite course. He says that some time since it was promised that the Ordnance Survey should be completed in 1879, and that so long as it is in the hands of professional men it will never be finished. This is a view of the status and the character of the Royal Engineer very similar to that to which we lately directed attention as applied to the architect by a writer in the *British Quarterly Review*. It is not necessary for us to take up the defence of an honourable service. But we call attention to the great want of knowledge of what survey means, no less than to that of what architecture means, displayed by writers who seem to think that the best preparation for doing any kind of scientific or artistic work is—to be wholly uneducated in either art or science. Incredible as it may seem, there is a class of men who do, in point of fact, ride that ridiculous hobby.

The great point to which we would wish to call attention, as regards the completion of the Ordnance Survey, is, that the hydrography of the country should be included in the details collected. This has long since been urged by the late Sir Henry James, and by other engineers, both military and civil. The contrast between our want of information as to the water supply and waterways of England, and that which is readily accessible as to those of France and Italy, is most striking. We hardly know where to put our hand on statements of the outflow of a dozen English rivers. While giving all the information as to length of channel, and area of water-shed, which can be gleaned from the Ordnance Survey, the last work of the late lamented Mr. Austed was almost wholly silent on this question of outflow. And that silence was due to the fact that the information has never been collected. As to the rivers of France and of Italy, their several mean, minimum, and maximum flows are stated with precision among the elements of hydrographic survey.

The uneasiness which has been felt in so many parts of the country as to the water supply and drainage has culminated in the case of the metropolis. Of that we have spoken elsewhere. We only now refer to it as part of the existing state of things, and at once a very characteristic and a very unsatisfactory part. It is now an old story for the readers of the *Builder* to be told that the first requisite for dealing with any physical process is a knowledge of the facts. In all inquiries the great difficulty is the collection of facts. In physical inquiry, 99 per cent. of the whole difficulty is often in that primary collection. If we attempt to legislate as to any point connected with the travel of a drop of

rain from the summit of Snowdon, Skiddew, or any other mountein or hill to the sea, without accurate knowledge of the facts of the case, whether as to the sub-aërial or subterranean contour and physical character of the country, we are working in the dark, and willingly working in the dark. We are laying up trouble for the future,—trouble both of a financial and of a sanitary kind. A good deal has of late come to light which proves that we have very seriously underrated the magnitude of the water-supply question, and that we are, perhaps, looking in entirely the wrong direction for the supply of the wents of a not very distent future.

FROM THE BANKS OF THE SEINE.

DUAING the recent Congress of Architects held at the École des Beaux-Arts, the punctuel attendants at the two o'clock meetings passed more than one profitable half-honr in the courtyard of the studious esteblishment of the Rue Bonaparte. The pupils of the school can scarcely complein of a want of instructive matter for observation, for, apart from the large glazed court crowded with casts from all the more famous works of the sculptors of antiquity, there is here, as we believe we have mentioned once before, a full-sized model of a corner of the Parthenon, and the two columns of the Græcostasis at Rome, besides another court of Mediæval and later casts. The open courtyard coutains a number of original treasures of more than passing interest, ranging from architectural details of the Dark Ages, down to the Renaissance, typically represented by the façade of the princely Château de Gaillon. But amidst these relics of the past, the litter of a number of freshly-opened packing-cases and scattered straw, under a large tent, attracted, during the week of the Congress, no small attention. Inquiry proved this to he connected with the "Envois de Rome," the annual arrival of the works from the pupils of the French Academy at the Villa Medici. These "Envois," consisting of casts, statues, pictures, engravings, medals, aud architectural drawings, sent home by the various laureates of the "Prix de Rome" in their respective branches, are annually exhibited at the École in Jnne. On Satnrday last (the 26th nlt.), the exhibition was opened. To say that the show as a whole, from a French poiut of view, is satisfactory, is the utmost that can be said. Among the paintings are two or three original pictures,—in two instances very donhtful and somewhat wild attempts at originality, the figures heing almost colossal; a certain number of obligatory copies of old masters, a fragment from Michelangelo's noble decoration of the Sistine Chapel; a copy of Bellini's glowing Virgin of the Frari, in Venice, together with several careful Academy chalk studies of tbe nude. Among the sculptors, much the same spirit is observahle. Mercié and Carpeaux, as popnlar sculptors, are recalled. It is among the architectural exhibits that the most praiseworthy work is to he found; here it is impossible to find fault with the care, the patient indnstry, the erudition, and the reverential artistic appreciation tbat are shown in many of the drawings. M. Blondel seuds home, on his third year's stay at the Villa Medici, a series of ten large studies of the Temple of Concord,—a drawing of its actnal state,—sections, elevations, and plans of the various parts; a nnmber of studies of the portions still standing, justifying the restored view of the Temple which forms one of the series. M. Blondel's exhibits, in themselves of the highest interest, are the more so when it is remembered that it was during the French excavations of 1817 that the existence of the Temple of Concord was first made known to the archæological world. In the same order of research stands M. Paulin's restoration of the hnge baths of Diocletian,—a careful groundplan of the site, marking, amidst the confusion of the more modern additions of Michelangelo's Church of Sta. Maria degli Angeli, tbe Ospizio Margharita, the old Convent of St. Bernardo, the old cloister, the Palazzetto Massimi, the portions remaining of the classic *thermæ*. At the moment wben the Palazzo Ducale at Venice, thongh being gradually released of its scaffolding, is still not entirely free, the superb drawing of the elevation of the Palace (on the side facing the Piazetta), by M. Nenot, will he looked npon with interest by all who are familiar with tbe gorgeous design of Calendario. Each particularity is marked; most conspicnous to the observant eye, among their nnmerous whiter companions, are the two red marhle columns of the graceful loggia, from between which were reed in the days of the Republic the sentence of death. A grond-plan of the palece completes the Venetian studies of M. Nenot, who hes still two years more to pass in the South. Happy students! Of all the artists sent to Italy, it is the architects who now profit most by their sojourn among the exuherant and inspiring creations which lie scattered over the Peninsula; the changes in style from those of Classic antiqnity to the letest traces of the Renaissance have left each their mark on the architecture of Italy, the mesterpieces of which have not, like those of the sister-art of painting, been torn away and forcibly transplanted to our northern climates. At the risk of offending the painters, one cannot help acknowledging tbat the architects, English and foreign, at all events when they are young, appear more thorough students abroad than their compeions the peinters and sculptors. M. Nenot sends three other drawings of the so-called Temple of Nerva, or Mars the Avenger (*Mars Ultor*), believed to mark the site of the Forum Trensitorium. The studies consist of drawings done to a scale of quarter the size of the original, a capital and hase of a column, the architrave and portion of the roofing, ell heantiful drawings of originals familiar to the profession for the purity of their style. Two drawings of the Pitti Palace at Florence complete M. Nenot's industrious second year's work. M. Laloux sends, as the result of bis first year's residence in Rome, a series of studies of that mysterious so-called "Temple of the Sun," which has puzzled many a worthy archæologist. If M. Laloux does not throw any light on to the history of these gigantic fragments which so pictnresquely adorn the quiet Colonna gardens, his drawings possess a peculiar charm; portions of the architrave, tbe angle of the pediment, nnd the frieze, together with details a quarter the size of the original, give one a very complete iden of the interest connected with these heautiful and mysterious fragments of Classic architecture.

While we nre still under the roof of the École des Beaux Arts, it may not he ont of place to mention the talk in the artistic world that the old École, large as it is, is about to be enlarged. It would appear that its accommodation illsatisfies its requirements. Certainly there is a little crowding in tbe old conveut of the Petits Augustins, which Alexandre Lenoir transformed at the time of the Revolution into a museum of French antiqnities; and although the qniet of the apartment, with its historic memories, still occupied by his son, tbe respected Secretary of the École, is likely to he disturbed, M. Albert Lenoir, will, we feel sure, be one of the first to aid in the extension of the generous art-educational system of which he is one of the administrators. The École, nnfortunately, is more than a school; its overcrowded halls, rooms, and cellars contain an immense nnmber of casts of great value.* The school possesses, in addition, a collection of tbe drawings and restorations of ancient monnments sent from Rome, like those above mentioned. This interesting collection, sufficient in itself to form an architectural museum of greal value, is now, for want of space, hidden from the puhlic in unknown garrets and lnmber-rooms. As for the copies of the old masters sent home from Italy, from Spain, and elsewhere, a large number already crowd tbe great hall, and various illlighted vestibules and corridors; while hundreds, cut off their stretchers, are rolled up and packed away. With the wants of the school increasing every day (time was when there were barely five hundred pnpils—there are now nearly triple that nnmher), it is evident that the old hnildings which served admirably their pnrpose half a centnry ago, are utterly insufficient for the present day. The Chamber of Deputies will shortly he asked to vote a quarter of a million sterling for the enlargement of the school, a request which doubtless will meet with no serious opposition.

The *Salon* has now closed its doors, after having been visited by a considerahly larger number of persons during the six weeks it remained open than the exhibition of last year; many thonsands more official catalognes having heen sold, in spite of the innnmerable other catalogues in French and English, illustrated, honnd, interleaved, and whatnot. In addition, there are several pnhlications at present appearing, in which ere reproduced by photogravnre, at a very small rate, all the pictnres of any note. Notwithstanding that it has been universally admitted that never was there such a had exhibition, never have more certain means been taken of immortalising its weakness.

Coming curiously enough at the time when a correspondent in these columns has re-suggested thet some memoriel should he set up to mark the site of the Great Exhibition of 1851 in Hyde Park, a recent decision of the Paris Municipal Council points out almost exactly in what such a memorial should consist. In anticipation of the great *fête* of the 14th inst. (which, from all appearances, will be one of the events of the century in the nnanimity of the public rejoicings, in which every private individuel is already making preparations to join), the Municipality determined some days since on marking, on the pavement of the Place de la Bastille, the site of the famous prison. The work has already commenced, and in a short time will he traced indelihly, by inlaid stonework, the ground-plan of the old fortress. In the courtyard of the Louvre the same method was adopted some years since to mark the site of the old castle, all trace of which in the subsequent alterations bad disappeared. Something of this simple end inexpensive nature might be done with the site of the Great Exhibition of 1851.

* We remember seeing, many years ago, in one of the lower rooms of the British Museum, the magnificent collection of architectural casts gathered by Sir Thomas Lawrence. Where are these now?

INDUSTRIAL CO-OPERATION.

THE question of industriel co-operation, or participation by the workman in the profits of the employer, is one of very considerable importance, which appears to have received more attentiou on the Continent than it has in England, where, certainly, it has been tried, hut with somewhat doubtful success. A work was pnblished about a year or so ago at Leipsig, written by Herr Victor Böhmert, who took a great deal of trouble to ascertain what had been done in various places towards a practical trial of the experiment; and the subject is one of so much interest that a brief *resumé* of his facts can scarcely fail to be acceptahle to the readers of the *Builder*. Herr Böhmert made inqniries in every European country, and gives particnlars of some 120 cases in which the system has been attempted, deriving his examples as follows:—Germany, 54; Switzerland, 25; France, 17; England, 10; Belgium, 3; United States, 3; Anstria and Italy, 3; Scandinavia and Russia, 3. It is not pretended that these instances are exhaustive of the subject; hut they are, at all events, sufficient to show what bas been done in this direction.

France seems to have taken the initiative in these matters, and the first experiment was made tbere by M. Leclaire, a painter in a large way of hnsiness, who started with nothing in 1826, hut succeeded so well, that in 1842 be was enahled to carry ont his favourite scheme of allowing his workmen to participate in profits. M. Leclaire died in 1872,* a wealthy man, while his *employés* had received over 30 per cent. beyond their salaries, partly in money presents, and partly in deposits in the savings-hank fund. The total sum returned as having heen disbursed in this way hetween 1842 and 1876 is said to have been no less than 1,760,000 francs, and from the fund thus accumulated, forty-five superannuated members enjoy an income of 1,000 francs per annum, while temporary help is also given of 500 francs per annum. By the halance-sheet of 1879, tbe accounts showed that 13,000 francs had been distributed amongst 1,032 participants, and 65,000 francs were to the good in the *caisse de secours*.

Since Leclaire's time, other efforts have been set on foot with success, snch as those of Chaix & Cie., the railway printers; Bord & Cie., the pianoforte-makers; Larochе Joubert & Cie., paper-manufacturers; and Henze, of the tanyards at Coulommes. These and others have all adopted the principle of participation in profits. Another form of the experiment is that of the employer establishing a fund in which each workman shall share according to the valne of his place, either after a certain time of service or of age,—a kind of life insurance, in fact. This system was set on foot in 1850, by M. de Courcy, superintendent of the General Insurance Company, and it has heen adopted by other firms, such as the Bon Marché shops, Hannapfen & Cie., wine merchants, of Bordeaux;

* Some particulars of the career of this benevolent man appeared in our volume for last year, p. 1419, and before.

tha Orleans Railway Company; Godchaux, the printere, &c. Again, there are certain well-known houses which give periodical bounses upon profits, such as Christofle, the goldemith; Fourdinois, the upholsterer; Pleyel & Wolff, the piano-makers; and there are many others who have followed theee examples. In eome ehape or other, then, the effort to interweave the interests of the *employé* with those of the employer have taken very good root in France.

Switzerland, in proportion to its limited extent and the sparseneee of ite population, can show more examplee of participation than any other country, although, as the couditions of labour vary throughout the nineteen cantons and six demi-cantone of the Swise Republic, there has been great diversity in the forms in which the experiments took place. The most ancient, etill met with in some districts, is to be found in the agricultural population, in which the farm-labourer or vine-worker frequently sharee some part of the land with the owner. In commercial and manufacturing pnrsuits, participation meets with less difficulties than in most places, owing to the prevalent equality of civil righte and social conditione. The master often livee or works under the eame roof as the journeyman, and is, therefore, more impelled to interest himself in the well-being of that journeymsu. The Canton of Zurich wae the first to take up the question in 1868, and its example was speedily followed by those of Ceneva, Basle, and St. Gall. One of the largeet and most important firms in Switzerland that have adopted the participation eystem ie that of Geilinger Brothers, cotton-spinners, at Winterthur, though here there is no hard-and-fast line in dealing with the question, the participation of each workman being settled by reference to the foremen and the position which the artisan holds in the establishment. The workmen, however, have experienced steady progreseive benefits therefrom, having received in 1867 an increase of 5 per cent. to their wagee; from 1868 to 1871, but 2 per cent. (owing to depressed times); in 1872 it was 10 per cent.; and in exceptionally favourable years, such as 1873 and 1874, from 12 to 20 per cent. The system was tried in 1869 by the woollen manufacturing houses of Fleckerstein and Schulthess at Wädenewerl and Feldbach (Zurich). In this case the participation wae given through a savings-bank, to the deposits in which bonuses were added. Two large linen-manufacturers at Schaffhansen followed suit, the distribution of profits in 1870 reaching 5,000 francs, while in the next year it went up to the very large sum of 34,000 francs. A certain number of houses in Switzerland have a system of participation, carried out in an improvised manner by preminme and preeents, dependent partly on length of service and partly on the production; and in this category may be mentioned several spinning and weaving establishments at Lorze (Zug) and at Ziegelbruch (Glarus), Rutschi & Co.'s silk-mille at Zurich, Dupasquier's watch establishment at Cortaillod (Neufchatel), and the curryiug and ekin-dreeeing firm of Henri Baymond at Morges (Vaud), &c. M. Spöri, of Barentschweil (Zurich), left by his will 50,000 francs to be divided amongst his workmeu; and Henri Kunz, of Zurich, bequeathed no less than 18,000 francs, part of which was divided amongst the workpeople, and part went to the eick-fund and savings-bank. Very many employers make a regular practice of helping their artisane, either in building housee for them, or making donations of coals, wood, groceries, clothee, furniture, or anything elee that the household happens to want. In some establishmente cows are kept, and the milk sold to the people at such low prices as to be almost nominal. There is no donbt but that the old patriarchal eystem of community of interest is still very prevalent in Switzerland, the effects of which are plainly visible in the rarity of Swiss appearances in the etormy arena of labour quarrels. The feeling has unhappily disappeared in Great Britain, and we very much question whether the adoption of any such system by a large employer would not be viewed at the present day with a conciderable amount of snspicion by the intended recipients. A Swiss firm, which has, of all others, gone most deeply into tha experiment of participation, is that of Billon & Isaac, of Geneva, musical-box makers, which employs abont 90 or 100 workmen. Since 1871 these masters have given up to their industrials 50 per cent. of the net profite in one form or another; and M. Billon has likewise contributed much to the literatnre of the questiou, having writtea a pamphlet in which the whole of their system ie miuutely described. Both MM. Billon and Isaac are fully convinced of ite equity and good policy, and consider that, if carried properly ont, it would do more than anything else to eradicate strikes.

In other Continental countries the participation system has been tried eo far but slightly. Some of the Austrian railway companiee give bonuses to such of their *employés* as appear to be deserving of encouragement; but only one firm, that of Dr. Marchet, a papermaker at Schlöglmühl, in Lower Austria, has made any regular division of profits amongst the men, taking for a baeis the duration of employ, the value of the yearly wagee, and the amount of production. In Italy the experiment hae been tried satisfactorily at the woollen-mille of Signor Rossi, at Schio, although the money is not given in hard cash, but ie spent on various objects of domestic requirement. In Belgium the zinc-mining establiehment of Vieille-Montagne has adopted the system, together with a few houses at Antwerp and Verviers. In Denmark, the Baron Zytphen-Adeler, an extensive proprietor in the north-west of Seeland, has successfully tried it on a large scale amongst hie agricultural labonrers; but only one other manufacturing firm, that of Burmeister & Wain, engineers and shipbuilders at Copenhagen, has followed his example. In Sweden, however, and particularly in Gothenburg, participation has taken root at the eteam saw-mills of Strömman & Larson, the well-known philaathropists, who are ever foremost in applying any scheme which seems likely to benefit their people, and it is said that it has exercised the happiest result in diminishing drunkenness,—the plague of Scandinavia, and of Sweden in particular.

THE PARIS LIBERAL ARTS CLUB.

EVER ready to seize any opportunity that may present itself for tha development of taste and skill, the Parieians have not failed to support the initiators of what promisee to become one of the most pleaeant and useful instittntione of the gay capital. It has often been demonstrated that in the struggle of life new men do not enjoy a fair chance of obtaining a hearing. This is more especially the case with respect to dramatic authors. The coet of putting a play on the stage is so great that managers dare not make the venture unless the author ie well known; particularly ae it is, after all, most difficult to judge a play before it is acted. Painters, engravers, sculptors, are all hampered by the diffionlty of bringing their works before tha public even when they possess undoubted talent. These considerations have led to the creatiou of the Cercle des Arts Libéranx, which, in the ahort space of six months, has already proved an unparalleled euccess. The initiator of thie scheme, M. Devriès, had eoon grouped a hundred meu distinguished in the world of arts and letters as founders of the club. Then the premises, formerly known as Frascati's, in the Rue Vivienne, were secured and traneformed into a moet luxurious clubhouse, at a cost of 24,000*l*. On the 21st of Decemher last, after this large sum had been expended, the doore were thrown open, and a magnificent inaugural entertainment given. Aea curione detail, and to afford some idea of the lavish character of the hospitality, we may mention that no fewer than 1,900 bottlee of champagne were opened on this occasion, and we are further assured that the wine was of a good quality. To nee the stock French phrase, "All Paris had been invited, and all Parie was there." The result of this munificenca is that 1,700 members have already been enrolled in the club, and it now fully pays its own expenses,—a fact which, apart from the private interest of the persone concerned, may be considered a public benefit, for the inetitution may undonbtedly facilitate the development of the liberal arte.

Whatever tha club undertakes is certain to receive the fullest notice at the hande of the French press, and will be reflected more or lees in the journale of Europe. At the present moment it hae opened ite ealoons to an exhibition of painting, and, to encourage the artiete who exhibit, has organised a lottery conaisting of 15,000 tickete of one franc each, to be sold exclusively to members. The coet of thie lottery, the cost of the exhibition, the cloth to cover the walle on which the pictures are hung, the printing of catalogues, tickete, &c., all is defrayed by the club. The whole of the money obtained hy tha lottery goee to tha artists who exhibit. There will be one prize of 5,000 francs, five prizes of 1,000 franee, and ten prizes of 500 francs. None of this money is, however, to be taken out of the club; but the winnere are to select pictures from the exhibition to the value of the same they have won. Thus the artiste are certain that eome of the picturee will be sold, and this, too, without any favouritism, as it is the winnere and not the committee who select the prize-picturee. Apart from the certain minimum sale of 600*l*. worth of picturee, the exhibitors get as much publicity as if their worke were hung in the *Salon*. Indeed, the Parie *Salon* seems on the eve of losing its old character. Varione disputes have brought about the resiguation of half the members of the jury, and the constitution of a new jury for next year promisee to be a matter of no small difficulty. The enormous number of picturee admitted, the carelessness of the selection, all tend to create tha impression that the great French annual exhibition is degenerating to a picture bazaar; on the other hand, the privata exhibitione, ench ae that organised by this club, ara gaining more and more ascendancy, and many of the best painters prefer them to the crowd and confneion of the *salon*. Thus, at the exhibition now held by the Liberal Arte Club, we noticed some admirable paintinge by tha following well-known artiste:—Louise Abbema, Berne-Bellecour, Clairin, Detaille (portrait of a piper of the 42nd Highlanders), eome flowers by Mdme. Eecalier, and portraits by Fantin-Latour, Henner, Lehmann, and Bastien Lepage. Among the younger artists, whose renown the club will help to create, we remarked a good picture by the eon of the great Meissonier, and some admirable engraving by Paul Manron, whose works are familiar to the readers of the French illustrated papere.

When the present exhibition ie over, the olub will organiee a display of all that relates to the decorative arts, such as wood-carving, chasing, carving on glass, painting on porcelain, &c., and every effort will be made to produce as many unknown men as possible. Aleo, during the few monthe of the club's existence, there have been three theatrical and musical evenings. As theee were the first efforts, the representatione were good, but the plays were not new. Ultimately the managere of the Paris and provincial theatree will be able to eee on the stage of the club plays which they have not the courage to preeent to the public. As the press will aleo ba preeent, the authors and the new actors will obtain the long-sought-for publicity, and, when approved at the club, may soon hope to appear before the general public.

Such, in a few words, are the general action and scope of this inetitution, due, we must repeat, solely to private initiative, and principally to the energy and the bold outlay of money on the part of the promoter, M. Devriès. M. de Bonnier, tha author of "Attila," is tha president; M. J. Collin, member of the Municipal Council and of the Academy, is vice-president; and among the committee are M. Berne-Bellecour, the well-known painter, and M. Jules Claretie, the anthor. Among a list of celebrated authore, artiste, painters, composers, theatre directors, &c., who founded the club, the name of M. Charpentier, architect to the town of Paris, holds an important place, for he designed the façade of the club. This conaists of several eplendid oak doors, enrmounted by ceramic ornamentation, and combined with stone carving, in the best Renaissance style. A fine mosaic covere the floor of the entrance-hall, and facing the door there ie a etained-glass window giving an allegorical representation of the liberal arts. The first rooms are the reading-rooms and billiard-rooms, which, when thrown into one, form a long saloon, where the exhibitione are held. Beyond, a room of equal size, is what will be the gaming and card room on ordinary occasione, but which is capable of heing rapidly converted into the theatre; for at the end there is the stage, with all the mechanism for scenery complete, eo that any play can be put on the stage. In the third range of rooms, we have a bright sunny room, with etained-glass roof, and various other apartments; for the club aleo poseeseee a fencing-room, a bath-room, committee-rooms, a green-room, and dressing-rooms for tha actors. The club promises to be a fountain from which much good and neeful work will flow.

Building in the Temple.—No. 2, Tanfield-court, Temple, will shortly be pulled down to make room for a naw wing to the Inner Temple Library.

ELEPHANTS AND TIGERS.

An elephant ie a piece of architecture in himself. See how solid and steadfast hie mighty frame appeare,—huge, immovable, and stately! His legs, resembling columns, rest erect on their firm hases, round and high, supporting a great entahlature and superetructure; and his vast head, in front, heare a likeneee to a lofty tympanum! But he flaps his pendent ears to distnrh the flies, and he ie no longer a rude, domed temple erected in his native forest, hut a living creature. A huilding compact of stone and marhle is a fine thing. A ship of wood or iron is a great marvel, for it is a structure that moves proudly to its destination on an unstable element. But a great edifice which hreathes and lives is still more a miracle.

The tiger, on the other hand, is anything hut a solemn animal. Although his stalk may he majestic, his movement is more like a ripple surging along his hack as the waving of a hillow approaching the ehore and ahout to hurst in fury, or, in a milder mood, the undulation of the tops of long grass under the action of the wind, than the gait of a creature so ahsolutely destructive, nnrelenting, and hloodthirsty. His pace, although graceful, is stealthy, and his strong fore-paws fall noiselessly on the grounds, as if not to hetray his progress. In his colour also, gorgeous in his variegated coat, he offers a marked contrast to the elephant in his suit of sober grey covering his huge form, as he stands quiet and serene in the confidence of his vast strength; while, on the other hand, the great feline, ever restless and suspicious, advances with cautious steps, as if he sought concealment, although resplendent with the most hrilliant stripes,—black, yellow, orange, and white. Different as they are in aspect, none the less so are they in habits and temper; still, however, when they meet on their common ground, of jungle or forest, soldom is it to contend, except under the influence of man.

Of hoth these creatures the art of their native India has naturally made large use; and the very interesting collection, greatly enhanced and expanded of late, of examples in the different hranches of structural work,—carving, painting, jewelry, and goldemith's work, textile fahrics and ornament, and further illustrated hy models and photographs,—which opened recently to the public in the Exhihition-road, as an adjunct to the South Kensington Museum, among its other rich stores of the decorative art of the East yields some most interesting illustrations of the modes of the adoption and adaptation of these animals hy the native designer.

Tigere appear occasionally in these compositions, hut elephants are far the most frequent, especially in architecture, as their great hodies yield solid forms for masses of support, while their trunks, convoluted in a variety of curves, are as accommodating in affording graceful sweeps and flowing lines, as that most used shape of all in ornament, the serpent. The tusks also come in as serviceable points in these compositions, and the large ears also take their part in making up and completing the required contours. The two animals, however, sometimes appear together. In the first room, on entering the apartments of the collection from the Exhihition-road, may, for instance, he observed some hosses, in which these are combined, and very remarkable examples they are of Indian design in architectural carving.

These hosses, which are repeated, are exceedingly well composed, for their purpose of projection and light and shade, out of an elephant's head, fronting the spectator, with his trunk wound round a tiger. Although the parts of each are small from its scale, each hoss is so cleverly put together and compacted that it is pretty secure from damage, at the same time that it presents a hold and spirited architectural detail, representing the great creature in the act of crushing his antagonist. Other subjects are displayed in profile and in lower relief, on either side, forming a running accompaniment and connexion hetween these hosses, which stand out here and there with appropriate emphasis. On the same walls, and close hy this example, are other relievi, representing the hunting and securing of elephants hy means of their domesticated hrethren. These are all Hindu work,—the former heing from the Amher-nath temple in Bombay, and the latter from the temple at Orissa in Bengal,—and are of the ninth or tenth century.

The most striking presentation, however, of the ornamental and structural use of the elephant, which arrests attention on entering thie first room, is the full-sized plaster-cast from one of the four elephant gateways of the Buddhist tope at Sanchi. A small model of the whole structure of the tope, to which these form the entrances, with its circumvallation gates at four intervals, may he consulted in the same room; it displays the adjustment of these in relation to the principal huilding; and it may he recognised hy this, that the artistic interest of the whole design rests chiefly with these gateways, of which carved representations of elephants form the important feature. They are situated high up on these entrances, and are arranged ingeniously, so as to yield support to the superstructure, turning the angles without ahruptness, and twining their trunks so as to comhine and complete the composition. It has nothing in common with classic art, and yet is highly satisfactory.

One of the points of view, indeed, in which Indian structural details are so interesting, is their difference from those of our European schools. They seem to have crystallised and shot up from fresh points of origin, and are composed of elements we do not possess. Not only are these the natural forms of the country, hut also those suggested hy the exuherant imagination of the people; and especially in their temples do these details partake of the character of the extraordinary, and, to our conception, preposterous Hindu mythology. Heterogeneous in comhination, and irrational in motive, human heads and arms are multiplied until they appear hut excrescences, and the hodies of the figures they are joined to are gifted with the most outrageous proportions and adjuncts; and the features of the forms of other creatures and of the vegetahle kingdom are made use of with the same utter disregard of logical propriety or of matter of fact. Yet it cannot hut he acknowledged, and, indeed, it forces itself upon the senses, that all this rank growth and unrestrained luxuriance co-exists with a certain delightful harmony of general effect, which is, not unfrequently, missed in works approached more according to rule and canon in the teaching of our Western schools.

Reticulated with many piercings, their structures look like coral edifices, unexpected in their forms, and accidental in their effects, yet leaving nothing to he desired, and as if the artist had worked hy infallihle instinct rather than hy fallible reason. And the hest authorities, as Fergueson, the more they study the riches of these results, the more they become enamoured of them, because they seem as if they sprang and grew from the teeming ahundance of nature rather than from the logic and pruned exertions of man. If, indeed, the Indian huilders were like the coral zoophytes, and made heautiful things hecause they could not help it, although it somewhat shifts the direction of our admiration, it does not lessen it. However produced these treasures were, we may address our attention to them, and learn, as we are told to do, from the proceedings of the ant. Assuredly the workers of them were no "sluggards," nor did they spare paine; and, when we examine the wealth of the collection in this new department of the South Kensington Museum, in casts, paintings, drawings, carvings, and photographs of these great performances of Indian architecture and decoration, we may well rejoice in their acquisition for the public instruction and delight; and recognise, in contemplating them, that the title of "Empress" seems but correspondent to the rule over a dominion which can array such an Arahian Nights' entertainment of gorgeous ahundance.

Admirably as this collection has been arranged hy Mr. Richard Thompson, it is only hy careful examination that the real qualities of the details of the examples can he done justice to, or the pleasure extracted from them that they can afford, and each visitor may most likely search out hest, for him or herself, the subjects of most interest. To the great beauty and elegance of some of the columns, however, although unlike, except in that they are columns, to anything to he found in our Western Classic styles, we would call attention, especially to that one of Hindu art of the eleventh century, from Kuth, near Delhi, which is on the north side of the first room, and to the other of the same date on the other side, which is of almost equal excellence.

In seeking illustration of our theme in the gallery upstairs, although we may find many artistic data, we cannot admit among these Tippoo Saih's toy-tiger, who cannot even growl, as he was wont to do,—as the machinery for that is out of order,—and we may readily turn from it to the small images from the Hindu Pantheon, which are arranged here and there through the rooms. Among these we recognise, as one of the most remarkable, the effigy of Ganesa, who is endowed with an elephant's head. On the strength of this, Sir William Jones calls Ganesa the God of Wisdom, and in the South of India he is in especial estimation with the learned, as, without worship of this divinity, it is held that no literary fame is attainable. It is a curious comment on this, therefore, that hy the usual Hindu, the elephant itself is hy no means considered as intellectual; "as stupid as an elephant" being hy no means uncommon as a hitter taunt.

This does not, however, appear to have been the estimate of the Hindu architects of the earlier days, or configurations of this creature would not have been so frequently associated with their huildings. Nor, assuredly, is it the verdict of our own country, as in one of the finest groups of modern art, the composition of Asia, at the Albert Memorial, hy the gifted and lamented J. E. Foley, an elephant is posed in submissive dignity as its central form. We, indeed, look upon this creature as of the highest rank of animal intelligence, and, in our esteem, he disputes the place of pre-eminence, in this respect, with our dear and faithful friend and companion, the dog.

Although the tiger is appropriately the attendant of Bowanee, the goddess of the Thugs, with whom murder is a religion, he does not take part in the mythology of the Hindu Pantheon to the extent that the elephant does, as exemplified in the figure of Ganesa; nevertheless he is in degree considered a sacred animal, simply because he is so dangerous and destructive, and religious ideas of this strange perverted nature interpose to protect him! Sport comes in with its aid in the same direction, and some chiefs even "preserve" tigers, thinking little of an occasional woman or child being carried away by the royal game! Some of the fakirs, or mendicant priests, have succeeded in taming this, their occasional attendant *daimon*, to that degree that a tiger will accompany them obediently and harmlessly through the villages at times of festival. To this point of docility they are said to bring him hy deharring him of all raw animal food, and hy a diet of rice and ghee, or vegetahle hutter.

With the docility of the elephant we are all acquainted, and it has hecome almost a hye-word. Although he can scarcely he called an architect, he may have some claims to heing a huilder. There is an anecdote of him in the latter capacity which may be appropriate to these columns, although we need not be responsible for its authenticity, as, for this, it rests on the high authority of the Rev. J. Wood, the well-known classic in the province of natural history. These are his words in speaking of a particular elephant:—"By profession he was a huilder, and was employed in laying stones, under the supervision of an overseer, who came and inspected his work, and, after ascertaining that the task was properly performed, gave the signal to lay another course. On one occasion the elephant placed his foot against the wall and refused to move from the spot when the overseer came to the part of the wall which his hody concealed. The overseer, however, insisted on the animal's moving aside, and the elephant, seeing that his stratagem had failed, immediately set to work at pulling down the wall which he had just huilt, and which was defective in the spot which he had been attempting to conceal from the inspector's eye!"

The elephant of Asia only is in suhjection at present, although formerly, at least along the northern shores of Africa, he was in ancient times equally in servitude. Hannibal even brought his elephants across the Mediterranean, and over the Alps, in his invasion of Italy: and, after the conquests in Africa hy several of the Roman generals, these animals appeared in their triumphs; and consequently figured on the memorial structures which were erected in record of them. It appears an evident mark of retrocession from the former energy and civilisation of Africa that the suhjugation and domestication of this species of elephant since those times has been neglected, and the art of taming them lost, insomuch that the African examples which were brought

over, several years ago, to this country, and placed in our Zoological Gardens, in their infant state, are the first, apparently, for many centuries which have been trained, and instructed, and brought under the dominion of man. It is in our recollection that considerable doubt was expressed, while they were growing up, by the keepers, whether they would eventually prove of a docile nature, and submit to subjection. Since that, however, it has been amply exhibited that they are equally capable of becoming domesticated as their brethren of India; and at holiday times they now take their part, with similar obedience, in adding to the interest of this finest institution in the world of this nature, by stalking about the gardens with easy indifference as to how many visitors are put on their backs. They are of a somewhat different type from those of India, and appear to bear a nearer resemblance than the Asiatic examples to the old genera of trunked and tusked creatures that were so numerous in former ages of the earth, but which have now passed away from the surface of it, and are only at present to be found in fossil remains, or preserved in the ice of the Arctic regions. Their heads are smaller than that of the elephant of Asia, and their ears are larger, and they are somewhat different in build; although loftier in stature, they do not possess the same sage appearance as the Indian species, which has not only been far more used in art, but will hold his own as being, at least in appearance, the more intellectual variety. He is still highly considered in India, not only for his usefulness in carriage, both of men and goods, the lifting of heavy weights, and, as we have seen, for even his building powers, but also for hunting purposes, and generally in State progresses through the country, and as a dignified appendage to rank and royalty. The "points," accordingly, of an elephant are as much a matter of interest in India as those of the horse in Europe; and the following are those which are especially mentioned in a native statement of them:—"Softness of the skin, red colour of the mouth and tongue, an expanded forehead, large ears, the trunk broad at the root, the eyes kindly, the back level, the chest square, the forelegs columnar, the hind-quarters full, with five nails on each foot, each smooth, elastic, and round," and "with these perfections," the account concludes, "the elephant will impart glory and magnificence to a king."

In relation with art, it is evident that he not only, in his frame, suggests fine forms for its details, but that he is in himself a fine subject for decoration. His great shape and power, which enable him to bear aloft in the most stately fashion, the "howdah" on his back, with all the paraphernalia of majesty, his sombre colour offers a fine neutral tint of surface for the contrasted display of the trappings of Oriental magnificence; and he affords an ample field and scope for the most lavish decoration, of which the imagination of the Eastern artist has taken full advantage. In the elaborate ivory carvings also, of which there are several beautiful examples in the upper rooms of the collection of which we have been speaking, he is exhibited frequently in all the dignity of being the chief feature in the processions of foot and horse armaments on festival occasions. And even in the exquisitely-carved sets of chessmen, arranged in ranks on their chequered arena, which we occasionally see, these creatures bear the castles which might be the refuge, and are the defence, of the potentates of mimic warfare. In every aspect, indeed, in nature and in art, which the elephant assumes, he appears a grand animal of dignified presence. And although the Tiger may be more illustrative of the Indian character in rebellion, as displayed at the time of the Mutiny, yet it may, we hope, be trusted confidently that the Elephant will ever remain a characteristic and consistent type of the power of our Indian Empire, and the sagacity of its rulers.

Sheppard's Improved Slide-Rule for Curing Quantities.—Mr. Stanley, of Great Turnstile, is the sole maker of this rule, which comprises a decimal rule and a duodecimal rule. It appears to have several advantages over the ordinary form, and is a very expeditious rule for multiplying quantities. Moreover, it is simple to use. It gives contents of three dimensions in about half a minute to those who master it, and will thus work out quantities quickly and correctly.

THE THREE BRIDGES.

WANDSWORTH, Putney (or Fulham), and Hammersmith Bridges were on Saturday last thrown open to the public, free of toll, by the Prince of Wales. At the meeting of the Metropolitan Board of Works on the previous day a report was presented from the Works and General Purposes Committee stating the amounts agreed upon for the purchase of the three bridges: Wandsworth Bridge.—Purchase-money of the undertaking, as per arbitrator's award, 52,761*l.*; purchase-money for two strips of land at side of road leading from the bridge to King's-road, Fulham, as per arbitrator's award, 550*l.*, making a total of 53,311*l.* Hammersmith Bridge.—Purchase-money for the undertaking, as per agreement, 112,000*l.* Fulham Bridge.—Purchase-money for the undertaking, as per arbitrator's award, 58,000*l.*; cost of arbitration, 10*l.* 10*s.*, making a total of 58,010*l.* 10*s.* The total cost of the three bridges was thus 223,321*l.* 10*s.*

"A Short Account of the Three Bridges over the River Thames, and within the Fulham District, to be declared Free of Toll on the 26th day of June," by Thos. Edward Jones, clerk to the Fulham Board of Works, has been privately circulated. Mr. Jones has brought together in a small compass a considerable amount of information concerning the three bridges in question, Fulham, Hammersmith, and Wandsworth, especially as to the first named. It is curious to read the expressions in Parliament, April 4, 1671, when the Bill for building a bridge at Putney was introduced. One of the members for the City of London said he knew, and could assert positively, that the erection of a bridge over the Thames at Putney would not only injure the important city he represented, not only jeopardise it, not only destroy it, but actually annihilate it altogether! The Bill was lost by 13,—54 voting for it and 67 against it. The question then rested for fifty years. The ignorance which has ruled the world, and which does rule the world, is astounding. The present bridge, built from a design by Sir Jacob Ackworth, was opened on the 14th of November, 1729, O.S. The tolls during the one year ended March 25th, 1879, realised 4,462*l.* The price paid by the Metropolitan Board of Works to the shareholders was, as stated above, 58,000*l.*

The tolls taken on Hammersmith Bridge in the year ending May 28th, 1880, amounted to 6,647*l.*; the sum paid by the Metropolitan Board for this bridge is 112,000*l.*

The tolls on Wandsworth Bridge in the year 1878 amounted to 1,109*l.* The sum paid by the Board for the purchase of the undertaking is 52,761*l.*, with about 500*l.* additional for land.

All the bridges crossing the Thames within the London district are now toll-free.

SOME POINTS IN CONNEXION WITH ILLUMINATIVE GAS.

ILLUMINATIVE gas has, by this time, been in use long enough, one might think, for the general public to know all about it. Some evidence which we propose to give will show how far this is from the truth. Instead of intimate acquaintance with a long domesticated guest, the general public know very little more about the properties of illuminative carbohydrogen than the two facts of its being illuminative when burned, and a dispenser of heat. Certain ratiocinative samples of the general public may have felt constrained to put themselves the question,—how it comes to pass that a gas-jet burning with smokeless flame, when a sufficiency of atmospheric air is allowed to come into operation, immediately begins to smoke so soon as free access of atmospheric air is denied. Certain, but very few, more investigating minds to be found amongst the general public, advancing a stage further in the quest, may have wanted to know how it can happen that illuminative gas, which, as everybody knows, is invisible, can yield visible, tangible, ponderable soot. Beyond this, ordinary popular speculation does not go,—no, truth to tell, nor technical speculation either, as will be made manifest before concluding the note we have in hand. Starting on the groundwork of first principles,—the only starting-point which can open the path to sound conclusions,—we have first to settle in the mind the composition of illuminative gas; and then,—invoking chemistry,—to ascertain what the product, or products, will be when illuminative gas is burned. Ordinary illuminative gas may be curtly described as a gaseous result of chemical union between carbon and hydrogen. The description, however,—true so far as it goes,—must go much farther to comprehend truths belonging to the subject, and without grasping which no useful conclusion can be arrived at. First, there are several gaseous combinations of carbon with hydrogen, all of which may be present in illuminative gas ordinarily supplied, and more than one always is present. Just, however, as science recognises a normal atmosphere as being a mixture of four measures of nitrogen and one of oxygen, an atmosphere never met with out of the laboratory, an atmosphere wholly devoid of watery vapour and carbonic acid, both always present in naturally-existing atmospheric air, together with scores, even hundreds, of other vaporous things present under special circumstances; so science recognises a normal hydrocarbonaceous illuminative gas. This is no other than olefiant gas, to which compound, the nearer approach illuminative gas of corporate supply makes, by so much the more excellent is it. No such thing as pure olefiant gas, however, is or can be supplied by our companies; more, save under penal obligation, the gas companies have overmuch regard for good dividends to supply pure olefiant gas if they could. The illuminative power of any carbonaceous gas is directly proportionate to the amount of carbon in a given bulk. Olefiant gas holds the maximum of carbon in the minimum of space; but by the simple expedient of passing it through a red hot pipe, it is decomposed into other hydrocarbon gases, variously mixed, according to the temperature of the pipe, but all having the common property of holding the original quantity of carbon united with a lessened ponderable amount of hydrogen. Slight reflection will lead to the conclusion that this involves increase of bulk. The operative chiefs of gas-making establishments are only too well aware of this fact, and frequently they turn their knowledge to practical account. Coal distillation effected in a retort very highly heated gives rise to the same decomposition on olefiant gas as transmission through a red-hot tube. One operative chief of a certain gas factory in a certain seaport town told us confidentially that he made a point of supplying expanded (and to the extent of expansion low illuminative) gas for night street-lamp service. He thought to justify the practice by stating that the attenuated gas supplied was good enough for drunken sailors, and that hardly anybody else was about after shop-closing.

Premising that illuminative gas supplied from factories ought to contain nothing else than carbon and hydrogen, though it practically always does contain other things, we will pass on to the consideration of what products, had those other things been absent, would be yielded,—must be yielded, on combustion. Given an adequate supply of air during combustion, the results would be two; simply carbonic acid and water. There would be no smoke, the development of which always means that a sufficiency of air to effect perfect combustion has not been admitted, neither would there be any carbonic oxide, an invisible gas-like carbonic acid, but only holding half the quantity of carbon. In respect to these two products, the most prominent fact to be noted is the production of water. When coal, coke, or charcoal are burned, water is not a product of combustion; but illuminative gas, oil-lamps, spirit-lamps, candles, all yield water. The fuel use of all these, except gas, is limited; but gas-stoves are frequent enough as instruments of ordinary domestic arrangement. They yield no smoke, and on that ground alone the general public take it for granted that they yield nothing to contaminate the air. Go into almost any business office where a gas-stove, from motives of convenience, has been installed, and you shall, in nine cases out of ten, see a pan of water placed on the stove. Water, of all things! You ask the reason,—"To moisten the atmosphere, which, without this precaution, becomes uncomfortably dry, giving us headaches." Yes, hard-headed business man, you have a headache, and no wonder. A hundred pans of water, notwithstanding, you will keep your headache all the same. The gas-stove combustion contributes water enough of its own and to spare. The explanation of headache is the presence of carbonic acid, which might easily enough, together with the second product of combustion,—water,—have been disposed of by a flue. Whenever a gas-stove is burned without a flue it must always be prejudicial, not to say to comfort, but to health as well. Small

excuse can there ever be for not adopting a flue, which is of far easier application than when ordinary coal or coke stoves are in question. We want no metal, no fixing, no elbow-joints. A sufficient length of vulcanised rubber hose is about the best material for the flue of a gas stove. So long as the hose is so arranged as to be always on the ascent, its disposition is a matter alone for taste and convenience. At any rate, ordinary sheet-iron pipes are very objectionable, and pipes of zinc worse still, both for a reason which will hereafter become apparent. We have known builders so ignorant of chemical first principles that they have been in the habit of lighting up numerous gas flares in the chambers of houses newly built to dry them, and thus fit them for more speedy habitation.

Hitherto normal illuminative gas has alone been taken into account, but the gas actually supplied us by the gas companies is a very different matter. This latter, in addition to the components normally belonging to it, always holds adventitious bodies—contaminations. Thus sulphur is always present, not so frequently in the state of hydrosulphuric acid (which can be separated at the works, and mostly is separated), but as a constituent of carbon-bisulphide, the problem of abstracting which still awaits solution. Besides sulphur, ammonia is frequently present, carbonic acid and carbonic oxide generally. Sulphur is the element we have most to dread. The first result of the burning of sulphur is sulphurous acid, unpleasant in smell (that of a burning match), and a powerful bleaching agent. Unfortunately, sulphurous acid is not permanent. With a rapidity more or less dependent on circumstances, it absorbs oxygen from air and becomes sulphuric acid,—oil of vitriol. No assurance is needed to impress the fact that oil of vitriol is rapidly destructive to almost everything it touches. Especially destructive is it to bookbindings, hangings, paper, brass, iron. And pictures—what must be the effect of continually administered small doses of vitriol to them? The reader's own intelligence shall furnish a reply. We beg him to remember that given the constituents of illuminative gas as we have put them, the results of its combustion must be as we have indicated. They are neither to be evaded nor avoided! they are integral, inevitable. Ventilation is the only resource to fall back upon; but even ventilation, if perfect, would not wholly countervail the evil.

TYNEMOUTH AND NORTH SHIELDS.

ONE of the districts in the North of England which has united steady modern growth to ancient repute is that at the mouth of the Tyne, and no part more sustains that statement than does that of the joint towns of Tynemouth and North Shields. The former of the two has antiquity, and though North Shields as an important town is of modern date, yet it had existence before it acquired the distinction or the municipal government of a town, though as a humble fishing village. It may be well worth while to glance at the position of the parish of Tynemouth at the time when Parliamentary honour was conferred upon it of distinct representation and of a municipal corporation, and to see what it now is. In 1834 Tynemouth boasted its one good street, which during the bathing season was "a place of fashionable resort," and the walks in the vicinity presented, according to one of the chroniclers of the day, "many pleasing and romantic views." The principal object of interest was the castle of Tynemouth, which, though "shorn of its just proportions by the heavy and dilapidating hand of time, still presents remains of great architectural beauty." There were mineral springs and beautiful residences near, but the trade of the place was small and scant, though the growth of North Shields had swollen the population of the parish greatly. North Shields had a large trade in coal; it had also roperies, tanneries, potteries, chain-cable manufactories, and shipbuilding was also carried on, but the ancient and once chief trade of Shields,—that arising from the saltpans which gave names to so many places near,—was then decaying, and was "confined to only two establishments." The old church of Tynemouth was then the one place of worship for episcopacy, except the chapel-of-ease shortly before built in the market-place; but there were churches or chapels for the Roman Catholics, the Wesleyans, Primitive Methodists, Independents, "United Secessionists," the Society of Friends, and the Hebrews, so that Dissent in its many phases appeared to prevail in Shields. The Tynemouth General Cemetery in Rosella-place had been recently opened; the early gas-works,—commenced so soon as 1820,—were in operation with the still earlier waterworks; whilst in almshouses, dispensaries, schools, and institutions, there was an ample testimony to the public spirit of the little town. Though the borough was just being municipally created, the lord of the manor held "courts leet and baron at Easter and Michaelmas." The harbour is described as a mile and a half in length, and "in spring tides it has sufficient water for vessels of 500 tons burden." Under the then new Parliamentary franchise there were 700 electors; and whilst North Shields had a population of 6,744, the entire parish of Tynemouth contained 24,778 inhabitants. A list of the traders shows that three old banks,—Chapman & Co., the North of England Joint Stock, and Sir M. W. Ridley & Co.,—furnished financial facilities; there were five "coal-owners," including the "Right Hon. Lord Ravensworth & Co.,"—one of Stephenson's "Grand Allies,"—seven shipbuilders are enumerated; but except for one "magnesia manufacturer," the chemical trade only figures in its retail aspect. The railway system had not been introduced; there were five or six coaches, an omnibus, and some gigs, which did the bulk of the conveyance of passengers. A number of carriers served the town; there were three sailing vessels conveying regularly to London; and three steam-packets, in addition to those crossing the river and running up to Newcastle. This, then, was the state of North Shields and Tynemouth at the time when the "House of Correction" was at Tynemouth; when the "Tradesmen and Mechanics' Library" was in Stephenson-street; and of the waterworks "George Rippon" is described as the "proprietor."

Electorally and in the population there is a very great change in the borough of Tynemouth now. In the 4,303 acres, the population of the Parliamentary borough was stated as 38,941 in 1871, the inhabited houses being 5,385, and the number of the electors being, in 1877, not less than, 5,384. Those of the populace who were assessed to the income-tax were assessed at the large amount of 475,000*l.*, exclusive of the incomes derived from public bodies. As of yore, North Shields and Tynemouth form a great shipping port. In a year 500 vessels leave for foreign ports, with a tonnage of 250,000. To North Shields 469 vessels belong,—about one-half being steamers,—the total tonnage being 142,191 tons, and it is thus one of the largest of the shipowning ports of the kingdom. Not less than 437 "boats" are registered under the Sea Fisheries Act as belonging to North Shields, and it is supposed that these furnish employment for nearly 900 men and boys. It is not a ship-building port of note, from eight to ten small vessels being its yearly contribution to the total built in the kingdom; but from the figures above given, it is evident that North Shields takes high rank amongst the shipping ports of the kingdom. It still exports large quantities of coal,—from 30,000 tons to 50,000 tons monthly,—and it occasionally sends slight quantities to London and to southern ports; but the great bulk of the trade in this branch of coal-shipments is on "coally Tyne" from the higher ports on the river. The southern side of the lower reaches of the Tyne may be said to be especially the manufacturing side; but at North Shields there is also a very extensive commerce now carried on; and some of the manufactures indicated as on a small scale in the past of the town have grown with its growth.

Not the least interesting of the changes has been that of the river Tyne, which, within the last two score years, has been transformed from what it was into one of the chief commercial rivers of the world. Magnificent piers at the mouth of the river have been extended for thousands of feet into the sea; most important and costly works of dredging have been carried on; and a portion of the deepened and improved river has been converted into docks with facilities such as place it high amongst the ports of the world, and have given it a premier position in certain classes of trade. In a sentence, this result may be told in the fact that, whereas in 1850 the depth of water on the bar of the Tyne was only 6 ft., it is now upwards of 20 ft. deep at low water. As to dredging, it may be said that in 1857 the Lords of the Admiralty suggested that the Tyne Commissioners should be compelled to remove 400,000 tons annually, but over twelve times that amount have been removed in a year since. In one year,—in 1866,—not less than 5,273,585 tons of material were dredged. These works, added to the gigantic works of river improvement, have brought about that change in the state of the Tyne that we have indicated, and have also caused a large increase in the revenue of the Commission, and brought up the trade of the Tyne until now only the Mersey exceeds it in the export trades amongst the rivers of the world. Very naturally a share of the benefits reaped from this expanded trade has been derived by North Shields, and Tynemouth, as one of the residential places of the North, has shared in the benefits. As a pleasure resort, the latter boasts the possession of "one of the prettiest ruins in the North of England" in its priory of Early English style, with portions of a prior structure shown here and there, of Norman architecture. Recently,—two years ago,—it added to its attractions a magnificent aquarium, with summer and winter garden. The latter is 216 ft. long by 50 ft., the height to the centre of the arched roof being 50 ft. The aquarium occupies a lower story, and the basement floor is a refreshment-room and promenade entered from the beach. Detached from the main building is a skating-rink, 200 ft. by 125 ft., and from the proportions the whole buildings form, it may be readily believed that the total cost was above 80,000*l.* It is evident, therefore, that Tynemouth is placing itself in a position to attract visitors to itself as a sea-side resort. Of it and of its sister town it may be said that, as in the past, they have grown, and as the trade of the trading portions has grown, so in the future it may be hoped that, with that good regard to sanitary well-being and local government which has distinguished them, there may be continued prosperity, extension, and improvement.

ART TEXT-BOOKS: "GOTHIC AND RENAISSANCE ARCHITECTURE."

THE book thus entitled* is one of the series of text-books of art-education which are being brought out under the editorship of Mr. Poynter, R.A. It is not, as we learn from the preface, especially intended for architectural students, but rather for the requirements of those who are preparing for the professional pursuit of other arts, or who make the study of art part of a liberal education. The author has aimed, therefore, at giving the broad facts of the history of architecture, the principles which underlie it, and illustrations of its most typical examples.

A difficulty in treating Gothic architecture in this manner, in a brief and concentrated style, arises from the fact of the very close relation of early Gothic with Roman architecture, and the gradual and almost insensible manner in which the one passes into the other. In the early days of Gothic criticism, when it was imagined that the Crusaders saw pointed arches in the East, and came home and imitated them, the demarcation of the subject was simple enough; but no one who comprehends the history of architecture during the period between the decline of the Roman and the rise of the Mediæval world will now undertake to say in any positive manner where and when Gothic architecture precisely begins; the whole thing was a process of gradual development.

This continuous development is almost necessarily placed on one side in the present book, which is the continuation of a companion volume dealing with Classic and Early Christian architecture. This last-named volume, though naturally placed first on the series, is not yet published, but will follow, and it is only by comparison of the two that the development of Gothic architecture from Roman materials can be made out so as to be intelligible to the student. But in any case it seems a pity to have broken the subject in the middle, thereby confirming to some extent the popular idea that Gothic was a new birth of the Middle Ages. Renaissance architecture, which is included in this volume, has, on the other hand, no connexion whatever with Gothic, and may be rightly described as a kind of new birth in the art. It might have been possible to make the development of the subject more logical and intelligible to the reader (who is pre-supposed

* Architecture: Gothic and Renaissance. By T. Roger Smith, F.R.I.B.A. London: Sampson Low, Marston, & Co. 1880.

to be a person little informed on the subject, and seeking a statement of the outlines), by partially dropping the chronological arrangement and treating Classic and Renaissance architecture in one volume, and early Christian and Gothic in another. The skipping over of fifteen centuries between Classic and Renaissance would, in fact, have been nearly the correct representation of the position; for the Renaissance in architecture at all events, really was an ignoring of all the intervening centuries and their work,—a going back to where the Romans left off, and making a fresh beginning from that point. By such an arrangement of the subject, therefore, both Gothic and Renaissance, would have been brought before the reader in connexion with the origin of their respective development. As it is, the one volume does not explain itself without the other, and the second half of the present has little connexion, artistically or critically, with the first half. If it were thought there were insuperable objections to this, it might have been possible to divide the subject differently, and give Renaissance an extra booklet to itself, rather than group it with Gothic. Renaissance architecture, no doubt, immediately succeeded Gothic, but in this, as in so many successive series of events in this world, *post hoc* is not by any means *propter hoc*.

In pursuance of the intention of rendering the subject generally intelligible in its outlines, the method has been adopted of giving a general sketch of the characteristics of Gothic architecture first; then tracing its development in England (as the phase of its history best adapted for illustrating it to English readers), and subsequently following some of its specialties of form and development in other countries. This seems a logical and intelligible method. A glossary of terms is prefixed to the volume, but in regard to this there has been some little oversight. The glossary is headed on the pages, "Gothic Architecture," and it mainly refers to Gothic, but it contains also a few items which refer only to Classic architecture ("Architrave," "Attic," &c.), while there is no glossary of Renaissance architecture at all. We presume that the glossary of terms in Classic architecture is to be found in the other volume, and that this glossary is intended to supply the words used in this volume; but, then, it should have been printed separately as a glossary, and not headed "Gothic Architecture."

In the general article on the architecture of the Middle Ages, Westminster and Salisbury are illustrated as the typical cathedrals, and Jacques Coure's house, Warwick Castle, and some of the Grand Canal Palaces, as specimens of Domestic architecture. In treating of the development of the style in Great Britain, the author adopts Rickman's nomenclature, merely referring to that of Sharpe, which, though to our thinking much more intelligible and precise, has never established itself through the fact that it was not proposed until Rickman's had become a part of Gothic speech, so to speak. The analysis of the development of Gothic in England contains descriptions of all the principal features of a Gothic building, put very clearly; but we do not find always that the reason for some developments, the causes of which are very clearly traceable, is given in a sufficiently obvious manner. For instance, the gradual development of the clustered pier, and the subsequent absorption of the shafts into the body of the pier as mouldings, is described; but we do not find the real origin of the clustered pier, the artistic necessity of having separate supports for sub-orders of mouldings in the arch, quite clearly made out; the development of arch moulding and pier would have been better treated in connexion with each other, in order to bring this point prominently forward, whereas the two things are mentioned in separate chapters. Those who understand the subject already will see from one or two expressions that the relation of parts is present to the mind of the author, but it will not be obvious to readers who are coming to the subject with no previous knowledge. We mention the point because it might easily be amended in another edition. On the rest of these chapters of analysis no comment is necessary except that they describe the leading features of the style with a sufficient number of illustrations to render it intelligible. It is not quite correct to say that when the pointed arch was introduced for vaulting, "all difficulties vanished." The difficulties, both of the springing of the ribs from the cap, and of the uniting of their mouldings, meeting at various angles at the ridge, remained, and the former was not finally got rid of till the fan-vault was invented, which made all the curvatures and angles equal. More stress also might have been laid on the difference in principle between the constructive employment of the ribs in earlier vaulting, and the merely decorative use of them in the fan-vault. The fact that the ribs in the latter case are superficial is just alluded to in passing, but the unlearned reader will hardly appreciate the full significance of the change from this description.

The characteristics in which French Gothic differs from English are well brought out and illustrated in the chapter on "French Mediæval Architecture," and the peculiar richness of Belgium and the Netherlands in civic structures, showing some of the finest qualities of Gothic architecture in a different form from that of the cathedral, is duly recognised and illustrated. Among the illustrations of the hook, the Town-hall of Middleburgh is given as a specimen of this class of buildings less familiar to average readers than some of the really finer buildings of the class which have been so much illustrated. Two other illustrations we have reproduced, as we suppose the author selected them, partly on the same account; they are not so well known but that they may be new to a good many of our readers. One of these, from Batalha, the author introduces as an illustration of the fact that "many works of the great Gothic period are as elaborate as they could be made," while the style has in other instances equally illustrated the extreme of simplicity. The doorway from Thann is a good example of the hard, precise, finished manner of German Gothic, with sculpture of apparently a high-class of excellence. The bit from Westminster Abbey may serve as a contrast in style with this, as well as being a favourable specimen of the execution of the illustrations. Mr. Roger Smith does not omit to point out the essential inferiority and vulgarity of the German Gothic ornamental detail, in spite of its elaboration of design and workmanship. The Gothic of Italy forms, of course, a separate chapter, which is one of the best illustrated in the book; and Spain is also separately but briefly treated. This part of the subject closes with a chapter on the "Principles of Construction and Design in Gothic Architecture," which are very well set forth, in a manner intelligible to every reader. We observe that in speaking of Gothic as being in the main the style in which construction is exhibited, the author comments on the fact that the stone vault, the most noteworthy and characteristic feature of the interior design, "makes no sign" whatever on the exterior, save in the presence of the buttresses which are there to support it. But it does not very readily appear how it could do so, except the timber roof were removed, and the vault made the external covering; which has, of course, been suggested as the true treatment of the stone-roofed building, but then the question is half a practical one in this case. The wall ribs might in some cases be indicated externally also, certainly.

Renaissance architecture is a much simpler subject to treat than Gothic. Its relations to the past are clear and well defined, and the aims of its architects are perfectly obvious; the more so because their tone and temper of mind were essentially modern, and what we can precisely comprehend and enter into at the present day; whereas we can only imperfectly understand the temper of the Mediæval builders, their aims or their system of working,—we are too far removed from them in time and in habits and associations. The special characteristics of Renaissance architecture are very well set forth, and in most of the critical remarks we entirely concur. The paragraph on the essential difference between Gothic and Renaissance architecture, in regard to the relation of design and construction, suggests a conclusion with which much recent criticism is at variance. We may quote the passage as a specimen of the style of the analytical portion of the book:—

"The concealment, both of construction and arrangement, is largely practised in Renaissance buildings. Behind an exterior wall filled by windows of uniform size and equally spaced, rooms large and small, corridors, staircases, and other features, have to be provided for. This is completely in contrast to the Gothic principle of displaying frankly on the outside the arrangement of what is within; but it must be remembered that art often works most happily and successfully when limited by apparently strict and difficult conditions, and these rules have not prevented the great architects of the Renaissance from accomplishing works where both the exterior and interior are thoroughly successful, and brought into such happy harmony that the difficulties have clearly been no bar to success. There is no canon of art violated by such a method, the simple fact being that Gothic buildings are designed under one set of conditions and Renaissance under another."

We are not quite prepared to endorse the conclusion that there is really nothing to choose in regard to propriety and correctness of principle between these two totally opposite systems of architectural design; but the position assumed by the author has its reasonable side, and is not without its usefulness as a set-off against the rather extreme manner in which the Gothic principle has sometimes been recommended as the only one consistent with reason and good taste. It is well observed that Renaissance architecture aims at producing an impression by the effect of the building as a whole; if it does not please as a whole, it is rarely felt to be in any way successful. We conceive, too, in the remark that there is something in the manner of applying Classic details in Renaissance architecture in some cases which is rather Gothic than Classic in feeling, and was the unsuspected evidence of the surviving influence of Gothic taste on men who imagined that they had deliberately cast everything Gothic behind them. This was, in fact, the very reason for Michelangelo's disapproval of Sangallo's original design for St. Peter's; he said it was not true Classic. Michelangelo himself was too determined and thoroughgoing a character to take any half-views or fall in with any half-tastes, and accordingly he imposed "the order" on his great building regardless of the effect of scale. The author's critical view of St. Peter's is somewhat too favourable for our sympathy. The building is really an instance of what a powerful effect mere size has in architecture, in despite of bad and mistaken treatment. But in most respects the view given of the Renaissance school of architecture in this book is marked by admirable sense and judgment. No chapter on principles of construction and design is added to this part, as it is to the Gothic portion of the book. Is that a tacit admission that, after all, there is not much of "principle" in it?

ST. MILDRED'S, BREAD-STREET, LONDON.

IN connexion with the efforts of those who are seeking to interest the public in the safety of the City churches, we give a view of the interior of St. Mildred's, Bread-street, which was built from the designs of Sir Christopher Wren, in place of a previous church destroyed by the Great Fire of 1666. It was commenced a year after that event, and not finished until 1683. It differs from the majority of London churches, inasmuch as it is covered with a large cupola. The building is a parallelogram, with an ordinary tie-beam and king-post roof, the cupola, rising on pendentives, being formed within it. Where necessary for the rise of the cupola, the tie-beam, instead of being attached to the foot of each principal rafter, is raised about half-way up, and becomes, in fact, a collar-beam. The pulpit and sounding-board are well carved by Gibbons, or one of his pupils.

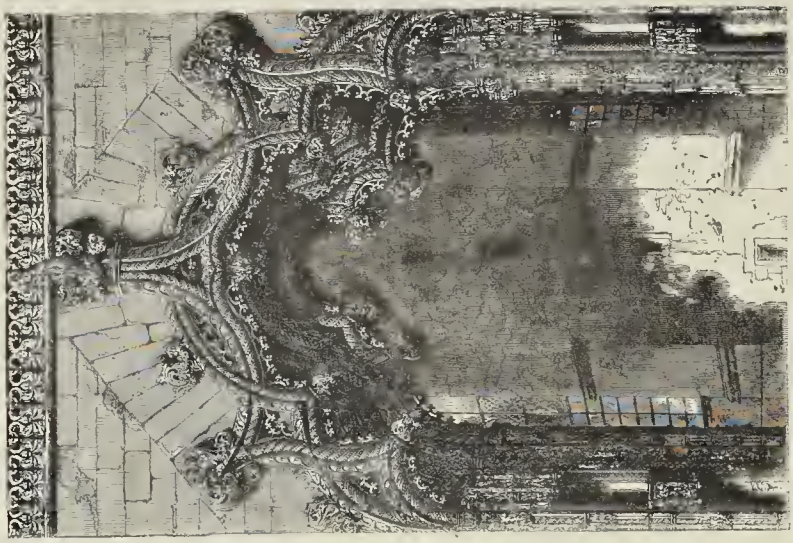
According to Godwin's "Churches of London" (vol. ii.), the cupola, as Wren left it, "was disfigured by ill-executed cherubim in high-relief, placed in pairs, and supporting crowns," but these do not now exist; they were probably taken away in 1856, when, according to an inscription in the church, the building "was repaired and beautified."*

The previous church dated from about A.D. 1330, and had been repaired throughout in 1628.

THE ENTRANCE LODGE AT DENZELL, BOWDON, NEAR MANCHESTER.

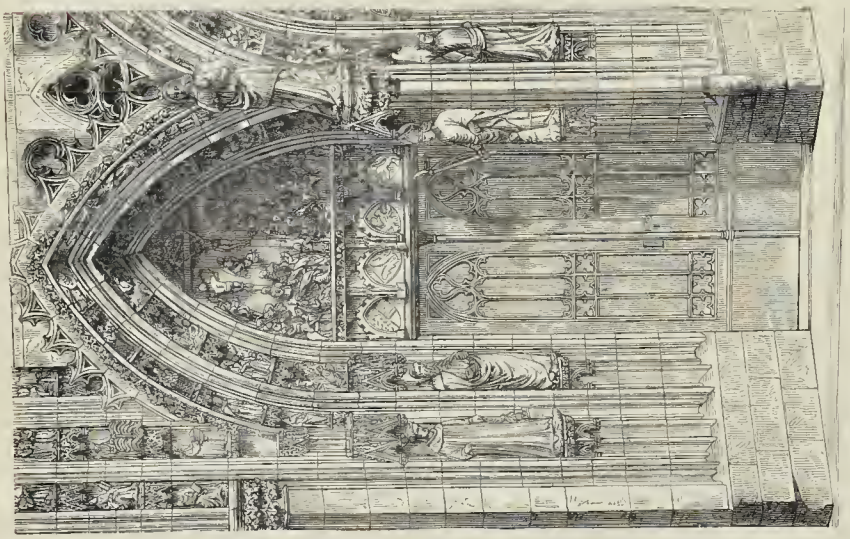
THE lodge, of which we give a view, was built for Mr. Robert Scott, of Yorkshire stone, with Manley stone dressings, and has cost about 900*l*. Messrs. Clegg & Knowles were the architects, and Messrs. Robert Neill & Sons the contractors. A view of the house itself will be given on another occasion.

* The drawing we have reproduced was made from sketches sent us by Mr. Randolph Payne, architect,

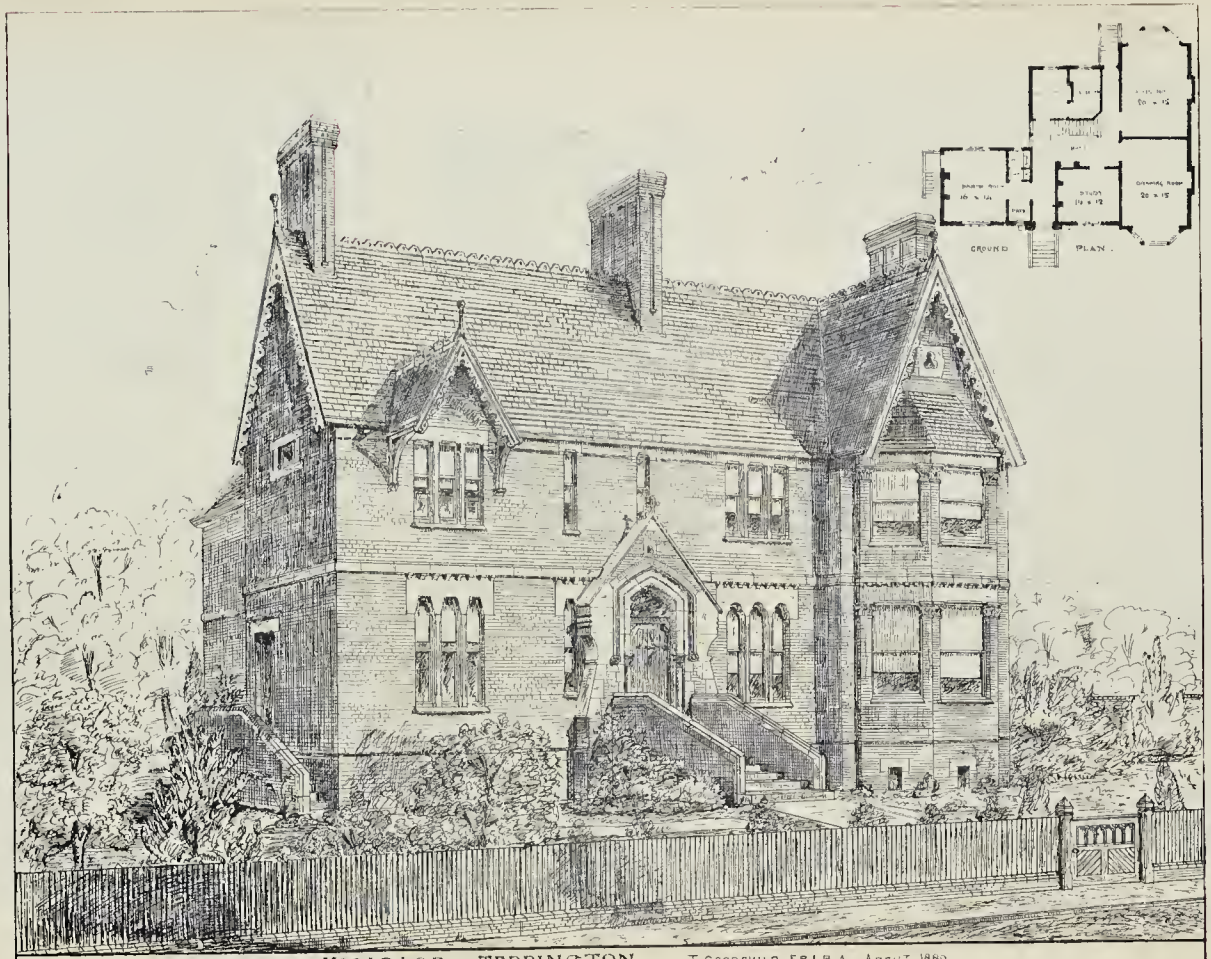


Doorway from Church at Batalha (begun 1385).

Sculpture from the Entrance to the Chapter-house, Westminster Abbey.



Western Doorway of Church at Thann (Fourteenth Century).



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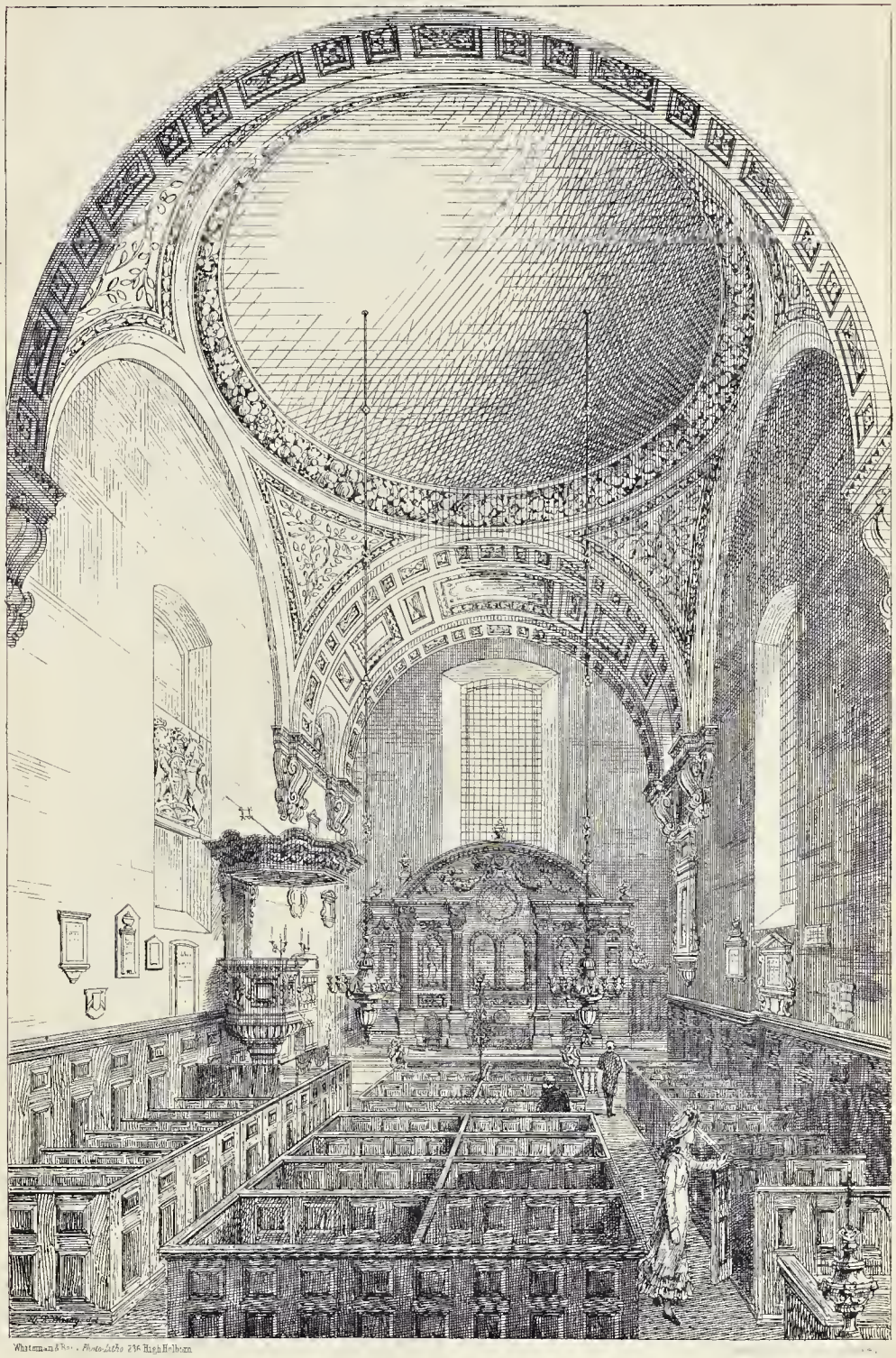
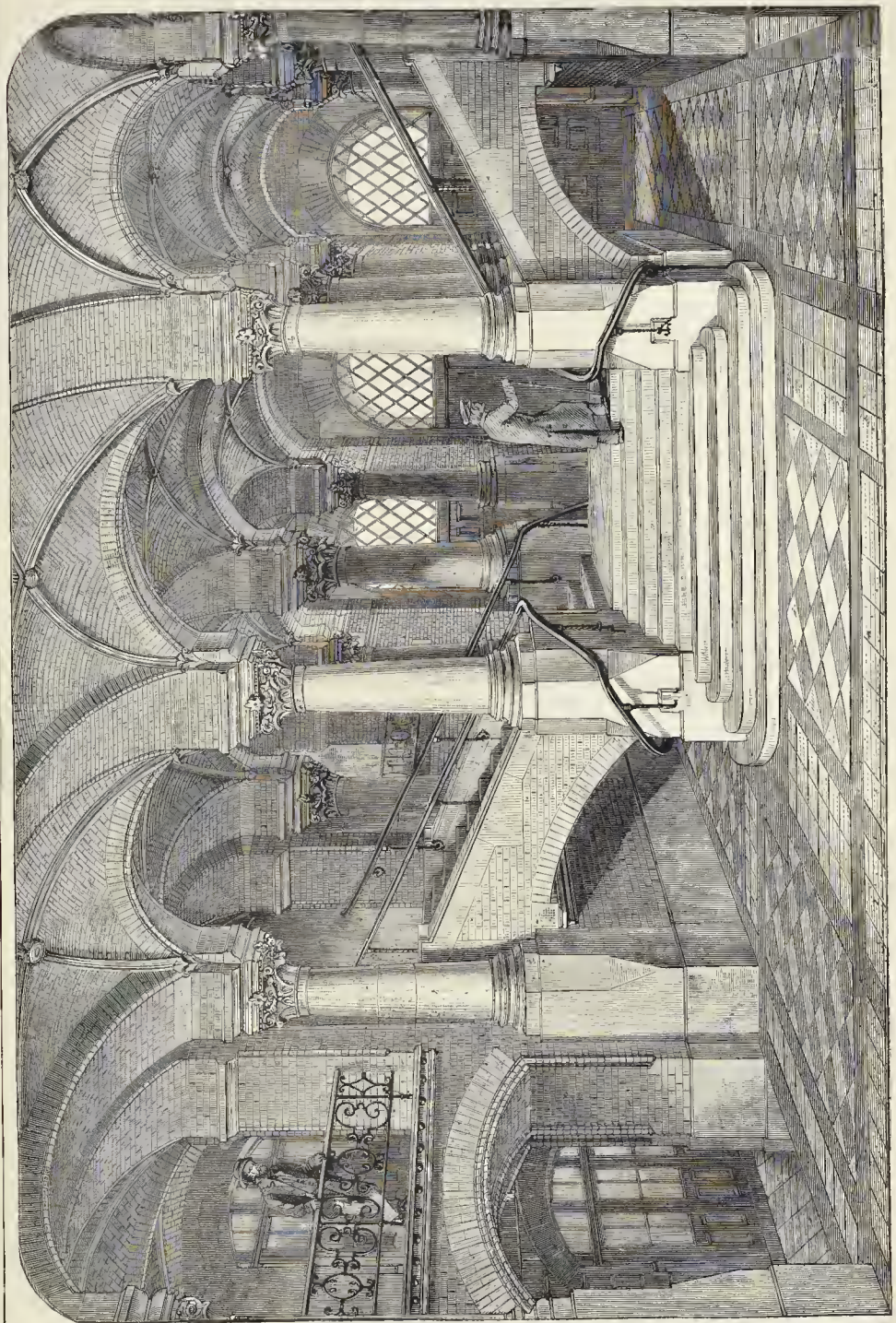
CHELSEA HOSPITAL FOR WOMEN, FULHAM ROAD, LONDON.—Mr. J. T. Smith, Architect.



Whiteman & Son, Photo-Litho 236 High Holborn

THE CHURCH OF ST. MILDRED, BREAD STREET, LONDON.—Sir Christopher Wren, Architect.

Whitecombe & Hass, Photo-Lith. ENTRANCE LODGE AT DENZELL, BOWDEN, NEAR MANCHESTER. MESSRS. CLEGG & KNOWLES, ARCHITECTS. Norman & [illegible], Printers.



VESTIBULE, JOHANNISSTIFT, LEIPZIG.—Herr Lipsius, Architect.

CHELSEA HOSPITAL FOR WOMEN, FULHAM ROAD, CHELSEA.

THIS hospital was founded in the year 1871 for the reception and treatment of gentlewomen in redneed circumstances and respectable poor women and others suffering from those distressing diseases to which the female sex is liable, irrespective of social position. They are received upon the principle of requiring a small weekly payment from those in a position to afford it, while to the actual poor gratuitous treatment is freely given.

The recommendation of a subscriber entitles in and out patients to treatment without any charge whatever, except, in the case of in-patients, payment for the washing of their personal linen. When a patient is too poor to do so, this is also provided for ont of the Samaritan Fund. The discomfort, from want of space, experienced by the suffering women who crowd the out-patient department, led to arrangements for obtaining a new building. The applications for admission are five times more numerous than the beds now available.

The land for the new hospital, situated opposite Nevill's-street, in the Fulham-road, was purchased in May, 1878; the plans have been prepared hy Mr. J. T. Smith, of Parliament-street, and we give a view of the building determined on.

The foundation-stone of this building will be laid by her Royal Highness the Princess of Wales at half-past three o'clock on the 16th of July next.

The works throughout will be plain and substantial. The fronts will be faced with red brick, with Mansfield-stone to upper members of cornices. The floors will be of fireproof construction, finished with 1¼-in. iron-tongued pitch-pine polished.

The whole of the joiner's work and fittings will be in polished pitch-pine. The walls will be in Parian, painted and stencilled. There will be open fireplaces to the rooms, fitted with asbestos gas-stoves, with pitch-pine and marble chimney-pieces, marble fenders, and tile hearths. The large yards, corridors, and staircases will be warmed by hot-water coils, and the whole of the rooms will be fitted with lavatories supplied with hot and cold water. The building will be seven stories in height, and there will be a car-lift from the lowest to the upper floor, supplied hy Mr. Baldwin, of New York. The windows will be glazed with plate glass, having coloured glass in the bottom sashes, the height of an ordinary curtain. The sash-frames will be made to allow the bottom-sashes being raised 4 in., for inlet of air at the meeting-rails. The ventilation will be hy separate 5-in. tubes (two or more to each room), carried from the ceiling to above the roof with Boyle's ventilators at ceiling level.

TEDDINGTON VICARAGE.

THE old vicarage-house, having been found unsuitable for the new vicar, it was determined to dispose of it, and erect a new one on a site three-quarters of an acre in extent, in Manor-road, overlooking the Manor House grounds, and near St. Mary's (the old) Church.

The house now illustrated is in course of erection, and is built of red bricks, pointed in black mortar, with dressings, mullions, strings, and copings of Westwood-ground Bath stone, the roof being covered with Broseley tiles, and everything throughout is intended to be of a thoroughly substantial character.

The general offices are in the half-basement, while all the reception-rooms and the Parish-room are on one level on the entrance-floor. The first-floor contains six bedrooms, with bath and dressing rooms.

The contractor is Mr. John Piller, of Teddington, and the architect is Mr. T. Goodchild, Adelphi, London.

The parish of Teddington has recently been divided into two portions for ecclesiastical purposes; one having the church of SS. Peter and Paul, while the other has the original mother church of St. Mary, recently restored. It is also proposed to provide for the immediate wants of South Teddington,—an out-lying district next Hampton Wick,—by the erection of an iron church.

The New Hall of the Scottish Corporation, Crane-court, Fleet-street, will be opened on the 21st inst. Professor Donaldson is the architect.

AN ABODE FOR THE AGED.

THE JOHANNISSTIFT, LEIPZIG.

AT the eastern end of the Hospitalstrasse in Leipzig, the eye is arrested hy a large edifice, with a projecting central portion, surmounted hy a slender spire, over the threefold portal a clock, and above this a window in coloured glass; the building is flanked by extensive wings. Notwithstanding its great size, it will at once appear that the building is neither a castle nor a factory, neither a prison nor a monastery. We may soon guess its object, for is not the sill of every window lighted up hy white curtains, and enlivened hy a row of flower-pots? And behind the well-trimmed pelargoniums and lobelias, the fuchsias and petunias, do we not see many a venerable human face? Pinks, also, and stocks, are not wanting, and many an aged man nurses an ivy, and many a silvery headed woman rests her eye upon a myrtle. We are in front of an abode of humanity and civic virtue, a foundation which is to be to old men and women of Leipzig, after a life's work, a home at once quiet, free from care, and yet without depriving them of the full enjoyment of civil liberty,—the new Johannisstift of Leipzig.

This foundation arose out of one of the nineteen thousand "lepers' houses" which were established in consequence of the steady advance of Eastern leprosy towards the West during the Crusades. Those "leprosoria" received usually many and rich legacies and donations from the relatives of the unfortunate inmates, and by the time that the disease had disappeared in the fourteenth century, the Leipzig Hospital of St. John had accumulated large funds. The property and buildings were then appropriated to their present purpose. The possessions of the foundation grew by careful acquisition or utilisation of freehold land to such an extent that, when the old buildings were no longer sufficient for their requirements, a round sum of 400,000 thalers (60,000*l.*) was at disposal for new buildings without reducing the ordinary income applied towards furthering the object of the foundation.

The Johannisstift offers to its inmates board, lodging, and firing, and at the same time complete quiet combined with perfect liberty for intercourse with the outer world. A claim to be received into the Johannisstift is possessed solely by Leipzig citizens and their wives, as well as those having acquired civic rights, who, with unblemished reputation, have attained their sixtieth year, and who are willing to subscribe to a duly-attested agreement, by which they promise to behave peacefully and decently, to obey the regulations of the trustees, and to abstain from all trading, as well as from disposing of gifts of the foundation (articles of food, firing, &c.). Each person admitted has besides, once and for all, to pay into the funds of the hospital a sum equal to 30*l.*, and to appoint the foundation the inheritor of whatever he or she may be possessed of at the time of death. Most persons entering the institution may easily agree to this last condition, for rich people do not seek admittance, but such old inhabitants of Leipzig from among the artisan class as are disabled for work by old age. They bring with them, besides the entrance bonus, very little more than their furniture, clothes, and so forth. In some cases deserving of especial consideration, the rules as to age and capital are relaxed. But should an inmate of the foundation inherit property during his stay, so that he could live independently, he is at liberty to leave the institution at any moment; he is, however, bound to refund for every year of his residence a sum equal to 12*l.*, and should the original investment of 200 thalers (30*l.*) not cover the expenses incurred, he must pay up the rest. Such cases happen frequently; indeed, widowed inmates have left the institution to enter once more the state of matrimony.

Even the register of deaths of the house affords some pleasant insight. Nothing speaks more favourably of the care with which the aged are attended to than the spans of life recorded. It happens very rarely that an inmate dies much *below* eighty; most exceed that limit. And this was the case even at the time when the farmers of the institution contracted also for the food, and the same fare was provided for both servants and inmates. This practice was abolished some time ago; the farming branch is now entirely separated from the foundation, the lands being all let, and the buildings of the old Hospital of St. John converted to other purposes, and rebuilt. Trading of any description has been entirely discontinued; the sole object of the institution being now the care of aged people.

The erection of the new Stift was under the supervision of Herr Lipsius, of Leipzig, architect, his plans having been selected for execution. Practical usefulness was his first aim; but he did not lose sight of the desirability of conveying by his design the object of the institution.

The completed buildings cover a space of 184,000 square feet (nearly 4¼ acres). They are situated among the hundreds of small "family gardens," the property of the institution, in the Johannisthal, one of the most original, pleasant, and healthful grounds of Leipzig, which, unfortunately, are more and more entrenched on by communal and government buildings, and destined ultimately entirely to disappear. The principal building, consisting of a centre block, two connecting buildings, and two corner pavilions, is 478 ft. long; each of the two wings is 230 ft. long, by a depth of 50 ft., with a height to the ridge of the roof of 82 ft. The height of the centre block from the pavement to the ridge is 100 ft., and to the point of the spire 165 ft.

On both sides of the principal building are, isolated, to the left, farm buildings, including stables, pig-styes, slaughter-house, wash-houses, ice-cellar, and steward's rooms, as well as mortuary, dissecting-room, and auction-room; on the right the disinfecting-house.

The materials employed are granite, Postelwitz sandstone, and about five million bricks. The roof of the principal building, of an area of 74,000 square feet, is covered in with glazed tiles, the centre portion more richly decorated, the other parts simpler, in red, brown, black, green, and yellow tiles. The most troublesome work presented itself at the beginning, by the sloping nature of the ground, the latter being 24 ft. lower in the Johannisthal than in the Hospitalstrasse, towards which the front of the building is turned. No less than 4,320,000 cubic feet of material had to be brought here for filling up the ground. Notwithstanding all difficulties and delays, the work was completed in three years, and when, finally, the architect handed over the finished building to the trustees, he was able to announce that nearly 5,000*l.* less had been expended than the amount of the original estimate for its erection. The cost was 374,600 thalers.

Entering the building, we notice at once the fact that everything has been arranged to suit the age of the occupants. Ascending six stairs, the large vestibule is entered by the centre one of the three principal doors of the centre block, the vestibule taking up the whole height of the ground and first floors. Three similar doors on the garden side correspond to the front entrances. The stairs rise to the right and left upon arches to the first-floor of the principal building, and lead, in the first place, to ante-halls, being well suited for resting-places. Besides this principal staircase, of which we give a view, there is one in each of the two wings.

Above the vestibule of the centre block is the general hospital ward, and over this, again, the chapel in form of a basilica. In this manner the centre portion divides the building in such a manner that, should a separation of the sexes be thought desirable, this might be introduced at any moment. Let us ascend one of the staircases leading to the corridors. Here are, on both sides, the doors to the rooms of the inmates, a niche being opposite to each door, for placing a wardrobe. At the intersections of the corridors, in the centre of the pavilions, they are enlarged to rotundas, affording for the very aged capital resting-places, especially during bad weather. The openings also in the corridors, which admit side-light, are constructed as if made for social gatherings, being provided with fireplaces for the old people to make their coffee, as well as tables, sinks, and water-supply; they are also used for weighing and serving out the food.

The pains taken to ensure cleanliness are striking. The water-closets are separated from the corridors by double doors, and are disinfected. Their contents, as well as that of the refuse-shoots, for which are special pits, pass to the same destination as the waste from the baths, the kitchen, bakery, the sinks, the hospital-ward, &c., viz., to the large collecting tank in the basement. From this the whole disinfected mass is pumped to the disinfecting-house and into the settling basin, raised 8 ft.

above the floor, whence the clear water runs into the street sewers, while the solid settlement is raised into a still higher basin, and thence taken away as valuable manure. The system here pursued, on a large scale, is that of Süvern.

It is well known how difficult it is to induce old people to open the windows to allow of the admission of fresh air. They are entirely relieved of that necessity, fresh air being introduced through screened openings behind the stove, to be opened and closed at pleasure, and ensuring ventilation with the corridor. The ventilation of the corridors, vestibule, chapel, sick-ward, kitchen, privies, &c., is ensured by suction-tubes in connexion with the chimney-flues, which take away the foul air, while fresh air, heated up to 12° R. in winter, is introduced direct. The warming of the admitted air is done by six *caloriféres*, by Kelling, of Dresden. The rooms themselves are warmed by stoves, a space in the cellar or the loft being provided for each inmate for keeping the firing material furnished to him. Although gas is laid on all over the building, it is not supplied to the inmates, who burn oil-lamps.

Provision is made against fire, hose in connexion with the water supply being laid on throughout the whole building. There is also a lift for the very aged, or for those to whom moving up and down stairs is troublesome. The chapel is pretty, and the old people are much pleased with it.

A wonder in its way is the large kitchen, placed under the vestibule. It is 51 ft. long, 46 ft. wide, and 15 ft. high. The kitchener or hearth in the centre is the delight of all housewives who see it. Excepting for the large roasting ovens, which are placed at the sides, not a spark of fire is required for cooking; everything is effected by steam, which is supplied to the kitchen, the baths, the bake-house, and the four-horse-power steam-engine (for the disinfecting apparatus and the lift), from a boiler of a surface of 90 square feet, and a pressure of two atmospheres.

Two meals are supplied to the inmates, dinner and supper, and sent up to the different floors by the lift, and served out in the sidelights before mentioned. In order to give the old people some employment, they have to make their own coffee, which is not supplied to them; but an excess of bread rations, for the sale of which provision is made in the establishment itself. Thus the inmates enjoy rest, pleasure, and a little work. A man may also pursue his former trade or employment if he be so minded.

There are 214 single rooms, 54 double rooms for married couples, and 6 large rooms for several persons, which will together accommodate from 380 to 390 inmates.

THE CABINET MAKERS' ASSOCIATION.

THIS society was established in 1865. For a great number of years local societies had existed both in London and the provinces, but this was an attempt to effect a federation, if not a complete amalgamation, of the several independent societies in the various branches of the trade. The effort was so far successful that, by the end of 1874, as many as twenty branches had become affiliated.

The most notable event in connexion with the Alliance Cabinet Makers' Association, the name by which it is now known, was the prosecution of the five cabinet-makers in 1874, by Messrs. Jackson & Graham, for picketing their shops in Ogle-street, in the western district of London, during a strike. The men were convicted, and sentenced to "be imprisoned for one calendar month," by Baron Cleasby. The defence of these men cost the society 685*l.* 10s. 9d.; 154*l.* 4s. 5d. was spent in providing for the wives and families during their incarceration, and 137*l.* 18s. 5d. was presented to the men on their release from Maidstone gaol.

The rules of the society are open to revision every three years; when they were last amended the basis of future work was clearly laid down. The entrence-fees are fixed at a uniform rate of 4s.; the contributions are:—For trade, funeral, and emigration benefits, 5d. per week; for sick benefits, 2d. per week additional up to 35 years of age; and 1d. per week extra for every five years beyond that age. Insurance of tools against loss by fire is also extra, according to the amount for which they are insured.

The benefits are:—Out of work allowance, 12s. per week, with 1s. per week additional for every child under 13 years of age; funeral benefits range from 3*l.* to 7*l.* 10s., according to the period of membership, the increase being at the rate of 10s. per year after the term fixed, when they are entitled to the 3*l.* The amounts payable at the death of members' wives vary from 3*l.* to 5*l.* Strike-pay is 1*l.* 1s. per week, with 1s. per week additional for each child under 13 years of age. Travelling relief is given at the rate of 1½d. per mile. Sick benefit is 12s. per week for twelve weeks; by the payment of 2d. extra per week members are entitled to 8s. per week for another twelve weeks, should the illness continue.

The fourteenth annual report, 1879, just issued, consists of 84 pages, 34 of which are devoted to branch accounts; the remainder are taken up with tables, summaries, and miscellaneous information for the guidance of the members. At the close of the year the Association had 40 branches, seven of which were in London. In 1877 there were 48 branches, a decline of four in each of the last two years; the number being now the same as in 1876. The total number of members in benefit is 1,412, a decrease of 325 during the year. In 1878 there was a decrease of 299, a total loss of 624 in two years; for the whole of the previous nine years there was a steady increase annually. The cause of this decrease is stated in the report to be the slackness of trade, members working only three or four days a week, and many travelling in search of work.

The total receipts for the year (general fund) amounted to 3,054*l.* 14s. 7d., being an increase over 1878 of 415*l.* 10s. 1½d. The following were the chief sources of income:—Contributions, 2,105*l.* 12s. 1d.; sick fund, 368*l.* 18s. 9d.; insurance, 153*l.* 4s.; entrance fees, 60*l.* 1s. 6d.; the balance was from miscellaneous items.

The total expenditure for the year was 3,631*l.* 2s. 10d., an increase over 1878 of 890*l.* 10s. 5d. The principal disbursements were:—Out-of-work allowance, 1,852*l.* 13s. 11d.; strike pay, 557*l.* 17s. 10d.; sick benefit, 329*l.* 7s. 8d.; fire insurance claims, 119*l.* 16s. 7d.; funerals, 75*l.*; emigration and migration, 33*l.* 7s. 7d.; total, 2,968*l.* 3s. 8d.

Independently of the above 301*l.* 0s. 5d. was received by the local branches, and 307*l.* 18s. 5d. was expended; of the latter amount 234*l.* 6s. 3d. was paid in salaries to officers; 48*l.* 16s. 10d. rent of meeting rooms; 9*l.* 10s. was advanced to widows, and 2*l.* 0s. 9d. was spent in books for the library.

The executive accounts are given separately; the chief items of expenditure were:—Rent of offices, gas, &c., 10*l.*; secretary's salary, 58*l.* 10s.; meetings of executive committee, 33*l.* 5s. 9d.; treasurer, 1*l.* 10s.; deputations, 45*l.* 13s. 9d.; there is a further sum of 13*l.* 16s. 7d. put down for branch deputations; and 18*l.* 4s. 7d. expenses connected with disputes. The remainder was for printing, stationery, postages, telegrams, money orders, and sundry small items, including 7*l.* 10s. 3d. granted to the London Trades Council and to the Trades Union Congress Parliamentary Committee.

In this society there is usually a special collection in aid of the London hospitals annually, but this year, presumably in consequence of the depression in trade, it does not seem to have been contributed. In 1878, the amount so collected was 23*l.* 19s. 8d.; the year previous it was somewhat higher. Members are entitled to letters of admission when needed, in consideration of this yearly subscription.

The balance in hand at the end of the year was 693*l.* 5s. 6d.; at the end of 1878 it was 1,274*l.* 0s. 3d.; including the books and property of the association, the total worth of the society is stated to be 950*l.*,—this is exclusive of arrears due from members.

During the last twelve years the society has paid in benefits the following amounts:—Out-of-work allowance, 4,272*l.* 12s. 5d.; strike pay, 3,001*l.* 10s. 6d.; sick benefits, 1,705*l.* 10s. 11d.; funerals, 421*l.* 10s.; loss of tools by fire, 394*l.* 4s. 6d.; emigration and migration, 254*l.* 19s. 4d.; total, 10,050*l.* 7s. 8d.

For the purpose of aiding the members in their efforts to acquire a knowledge of art-workmanship, and of promoting a taste for its higher principles, libraries are formed in connexion with the several branches of the association. The books are lent out to the members on the meeting nights of the lodges, and all fines for the non-return of the books within the date specified, or for injury to them, are spent in purchasing additional books for the library. The total number of books belonging to the union, as stated in the catalogue, is 1470; the works are of a miscellaneous character, embracing art, science, history, political economy, and general literature.

The members of the society claim that they are entitled to a higher rate of wages than the artisans belonging to many other trades, on the ground that it requires a longer time to acquire the art of cabinet-making, and to become skilful in the craft, and also that the course of instruction is more costly than in most other trades. They furthermore contend that having to find an expensive chest of tools, and that these have necessarily to be continually replaced by others, either from the excessive wear and tear, or because of the frequent changes in the character and style of the work upon which they are engaged, and the nature of the material upon which they have to work, they are justified in seeking some higher remuneration. During the past year, it is asserted in the report, they have succeeded in the majority of cases in resisting attempted reductions of wages, and in maintaining the customs and privileges of the trade.

The society is a small one in comparison with many others, but it shows that it can adapt itself to the special wants and requirements of the members, and of the trade, by its efforts to develope a taste for artistic work, and by the promotion of technical instruction amongst its members. In this respect, at least, some of the older and larger societies might do well to follow the example set them by the "Alliance Cabinet-makers' Association."

THE SCULPTURES OF LYSIPPOS.

GREEK ART OF THE HELLENISTIC PERIOD.

MR. NEWTON'S seventh lecture * on Greek Art to students of University and King's Colleges was delivered on the 23rd ult., and treated of what he styled the Hellenistic Period, comprising the three centuries between the accession of Alexander the Great and the reign of Augustus. The last of the great sculptors of Greece was Lysippos. His statues appear to have been exclusively in bronze. His great celebrity might be partly due to the fact that his name came down to us associated with that of Alexander the Great, whose portrait he alone among sculptors was allowed by that king to make. Among his works were two colossal statues, one of Zeus (Jupiter), the other of Herakles (Hercules), in the city of Tarentum. An allegorical figure represented Kairos, "Opportunity," with a long forelock, while he was bald behind, in one hand a pair of shears, in the other a pair of scales. At Rhodes he made the Sun god, Helios, in a chariot group. He made statues of Alexander himself and of some of his companions in arms who fell in the battle of the Granikos. There are several extant busts or statues of Alexander, none of which, however, can be traced with any certainty to an original by Lysippos. He also made ideal portraits of great men of past generations, of whom no traditionary likeness had been handed down, such as the fabulist Æsop. Among his statues of athletes was a celebrated one, afterwards transported to Rome. This figure was represented scraping himself with a strigil, and was hence called the Apoxyomenos. In the Vatican is a marble statue believed to be a copy of this celebrated work. The Farnese Hercules, which we knew from an inscription on its base to have been the work of Glycon, is also thought to have been derived from an original of Lysippos. Studying the canon of Polycletos, conjointly with nature, he constructed a new canon of proportions. To him was attributed the saying that Polycletos made men as they were, but that he made men as they ought to be, a saying which had been variously interpreted, and which seemed to point to some deviation from the normal type of the human figure as established by Polycletos, designed, perhaps, to correct the optical impression produced by statues on a colossal scale. If we turned from this meagre account left us by the ancients of the art of Lysippos to the extant monuments of his period, we had the lion erected by the Greeks after the battle of Chæroneia, B.C. 336; the sculptured column from the temple of Artemis (Diana) at Ephesus; the Dionysos (Bacchus) from the Choragic monument of Thrasyllos, B.C. 320; and a colossal figure of

* For summaries of preceding lectures see last volume of the *Builder*, pp. 644, 678, 774, 806.

Victory on the prow of a ship, found in the island of Samothrace some years ago, and now in the Louvre. Professor Conze, in his recent work on Samothrace, had given a restoration of this statue, and pointed out its striking resemblance to the Victory on a prow on the coins of Demetrios Poliorcetes. It was highly probable that this type on the coin and the statue found at Samothrace both commemorated the great naval victory of Demetrios gained at Salamis B.C. 305. If was after the siege of Rhodes by this same Demetrios that the Rhodians erected that colossal bronze statue of the Sun god which, from its immense scale, ranked as one of the seven wonders of the world. Pliny told us that it was 100 ft. high, and that few men could with both arms reach round its thumb. It was probably finished B.C. 284, and was thrown down by an earthquake fifty-six years after its erection. Its position at the entrance of a harbour at Rhodes is marked by some enormous blocks of stone near the fort of St. Nicholas. The tendency of art in the Hellenistic period was mainly towards the colossal and the sensational; but there was also a strong realistic tendency, shown in the portrait busts and heads of that period, and in what is told us about Lysistratos, the brother of Lysippos, who is said to have cast a man's face from the life, and then worked that up into a perfect likeness. The realistic tendency shows itself strongly also in the Pergamos school of sculpture which was created by the Attalid dynasty. The statue commonly called the "Dying Gladiator" and the group in the Villa Ludovici called Arria and Pætus were probably part of a great composition representing the victories of Attalus and Eumenes II. over the Gauls. A smaller set of figures, representing groups of Gaulish and Greek combatants, had been identified by Professor Brunn as copies of a set of sculptures dedicated by Attalus, at Athens, to commemorate his triumph over the Gauls. The group at Naples, commonly called the Farnese Bull, represented the tragic incident of the punishment of Dirce by Zethos and Amphion, and was, in spite of much restoration, a noble composition deserving of more notice than it had received. It was probably the original work which Pliny states to have been the work of two artists of Tralles, and to have been brought from Rhodes to Rome. The great work of the Rhodian school was the Laocoon. There was good reason to believe that we possessed the original group known to Pliny. The sculptures in high relief recently obtained by the Germans at Pergamum, and now to be seen in the museum at Berlin, were certainly works of the same school as the Laocoon, and were remarkable from their dramatic and almost modern character.

THE ROTHERHITHE NEW BATHS AND WASHHOUSES.

THE erection of new baths and washouses for the parish of Rotherhithe has just been commenced, and the foundation-stone was laid by Mr. F. C. Carr-Gomm. The new building will be situated at the corner of Gomm-road, Lower Deptford-road, and, besides the basement, will consist of two spacious floors. It will be faced externally with white Suffolk bricks, with Portland stone and terra-cotta for dressings and ornamentation. It will contain two spacious swimming-baths, the first-class bath being 90 ft. long and 30 ft. wide, the depth varying at each end respectively from about 3 ft. to 7 ft., and enclosed along the sides of the baths there will be fifty dressing-rooms. The second-class swimming-bath will be 84 ft. long and 30 ft. wide, fitted with forty-seven dressing-rooms. It will be the same depth as the first-class bath, the sides and the bottoms of each being lined with white glazed bricks. Besides the swimming-baths there will be twenty-six first-class and twenty-four second-class private baths, all fitted for hot and cold water. The washhouse department, situated at the south-west corner of the ground-floor, will have every accommodation for washing purposes, being provided with twenty-four washing-compartments, each having hot and cold water and steam, with drying-closet and steam wringing and other machines. The laundry portion will contain mangles, ironing-board, and other machinery and fittings; and there will also be a second laundry for the exclusive use of the establishment itself, from which lifts will communicate with each department. The women's private baths, which will be fifteen in number (seven first-class and eight second-class), will be on the first floor of the building, with a distinct and separate entrance from the Gomm-road frontage. The entrance to the waiting-rooms, swimming-baths, and men's first and second-class private baths will be in the centre of the Deptford Lower-road frontage. The superintendent's apartments and the commissioners' board-room will also be on the first floor of this frontage, whilst the engineer's apartments will be on the first floor of the Gomm-road frontage. The engineering and machinery will be in the basement under the wash-house, and will consist of a powerful engine, the boiler-room containing three boilers, each 24 ft. long and 6 ft. in diameter, for hot water and steam. Attached to the engine-room there will likewise be engineer's workshop and other necessary apartments. The whole of the floors throughout the building will be fireproof.

The architects of the building are Messrs. G. Elkington & Son, and the general contractor is Mr. William Shepherd, of Bermondsey New-road; Messrs. J. & F. May, of High Holborn, being the contractors for the engineering works. The entire cost of the buildings will be about 25,000*l.*

THE ANTIQUE SCULPTOR.

HE brooded awhile, then seizing
Mallet and chisel, he made
A chase in the block of marble
Within which his fancy play'd.

He had before him no model,
But the form his mind's eye drew,
Yet out of that block of marble
The image he sees will hew.

Deftly with mallet and chisel
He toils with unrest alone;
Month after month to embody
The child of his brain in stone.

As seed in the soil in spring-time,
As bud bursting into flower,
Peering out that block of marble
The image grows hour by hour.

Tireless and anxious, the sculptor
Still labours, and with effect;
The statue at last is finish'd,
And the hero stands erect.

The world has honour'd the artist,
And his work has won him fame,
But Art is the greatest gainer,
Art, honour'd in his name.

Our artists fashion a model,
But the ancient sculptor knew
How, out of the block of marble,
The child of his brain to hew.

Work not for the age, O Sculptor,
But carve for all time to come,
And live like the great Art-workman
Of ancient Greece and Rome.

C. C. H.

COPYRIGHT IN CAREFULLY-PREPARED STATISTICS.

AN important copyright case has lately been decided by the Master of the Rolls, in Ireland, which will interest not a few of our readers. Mr. William Fleming, whose useful "Index to the Railway System" we have reviewed on several occasions of its annual issue, sought an injunction to restrain Mr. Charles Eason, publisher of the "Almanack and Handbook for Ireland," from including in that work tables of railway statistics, which were, Mr. Fleming alleged, pirated from the "Index." Six counsel, four of whom were Q.C., argued the case. The Master of the Rolls, in giving judgment, said that the case was one of very great importance, not only to persons involved, but as to the declaration of the law. The little book first published by Mr. Fleming in 1877 was apparently very unattractive, because it contained only a bundle of figures; but, when studied, it carried conviction to the mind. The Master of the Rolls said that it was on reading the article in the *Edinburgh Review*, which was referred to in the case (that on railway profits and railway losses, published in 1876), "that he, for the first time, became enlightened on the subject of railway profits and railway losses to an extent he could not here sufficiently describe." His Honour stated further that the "Almanack" of Mr. Eason had been in existence for some time before the publication of the "Index," and had contained railway statistics in a form that made them perfectly useless. But after the publication, by Mr. Fleming, of his tables, Mr. Eason had taken six tables from the "Index" and incorporated them in the "Almanack," adding several other railways. His Honour entirely acquitted Mr. Eason of any idea that he was stealing Mr. Fleming's property; but had come to the conclusion that the whole of the tables complained of had been bodily copied from the "Index," and that no clearer case of infringement of copyright had ever come before a court. The value of Mr. Fleming's book was shown in a special note about it in the *Edinburgh Review*, and it was also alluded to as valuable and interesting by other publications, among which the *Builder* may be named. The judgment was that Mr. Eason must be restrained from selling, or offering for sale, any copy of the "Almanack and Handbook for Ireland," containing any portion of the tables formulated by Mr. Fleming, and must, in addition, pay all the petitioner's costs up to and including the present hearing. The case is fully reported in the Dublin papers. The words we have cited are those of the *Freeman's Journal*.

OBITUARY.

The late J. J. Lyons, Architect.—The death of this gentleman took place at his residence at 1, St. Dominick-street, Dublin, on the 22nd ult., after a few days' illness, from inflammation of the lungs. The deceased was one of the pupils of the late Mr. J. S. Mulvany, the son of the biographer of James Gandon, the architect. Mr. John J. Lyons early started in practice for himself, and having a literary taste, contributed for a time to this journal. His first journalistic periodical ventures in Ireland were short-lived, and he then started the *Dublin Builder*, designed as a monthly professional organ. After a few short years his connexion with that journal ceased, and the *Irish Builder*, under new conduct, took up the interests of its forerunner, extending its advocacy to a wider range of representation. The early professional career of the deceased architect was promising, and he secured some profitable commissions in a varied class of work, though little of a very high character; but for several years past his commissions were intermittent, and his practice was of the most limited and cheerless nature. He had his failings, and was conscious of them to a certain extent, but he seemed powerless to overcome his one besetting sin, which his friends and early patrons deplored. The deceased, though he never might have become a great architect, could have lived a useful and fortunate life, but it was not to be, and his story, as with many others, is that of a wasted life. But as unto Cæsar we should give what belongs to Cæsar, let it be stated to the credit of Mr. Lyons that in his earlier years he had the true interests of his profession at heart, and exercised his abilities to elevate the status of his profession in Ireland. It was through his efforts the dead or dormant Royal Institute of the Architects of Ireland was revived many years ago, and its scattered elements were brought together. After its resuscitation, he acted for some time as secretary to the Institute; but unhappy days came soon, the particulars of which we have no intention of giving here. The deceased was the eldest son of the late Mr. John Lyons, who formerly held an appointment in connexion with the Four Courts, Dublin. A wife and some children survive the deceased, who passed away at a comparatively early age;—sinned against, perhaps, as well as sinning; and who is there without fault to cast the stone at his erring brother?

CASES UNDER THE METROPOLITAN BUILDING ACT.

HEIGHT OF ROOMS IN ROOF.

AT Hammersmith Police-court John Harvey, a builder, was summoned by Mr. Knightley, the district surveyor of Hammersmith, in respect of rooms which he had constructed in five houses in Hawthorne-terrace, Shepherd's-bush, contrary to the Act. The defendant said they were box-rooms, and not intended for habitation. Mr. Knightley said the rooms were approached in the usual way by staircases. There were windows in the rooms. The defendant pointed out that there were no grates in them.

Mr. Partridge held that the rooms were not habitable, and made an order to stop them up.

ROMAN VILLA AT MORTON, ISLE OF WIGHT.

BY MR. C. ROACH SMITH.*

THE discovery of the Roman villa at Carisbrooke opened a new prospect for the archæology of the Isle of Wight, which is now widened by the disclosure of another, on the slope of an elevated field called "Ten-Acre Field," on Morton Farm, near Brading. For this we are indebted to Captain Thorpe, whose tastes happily led him to investigate the early remains in the neighbourhood of his residence at Yarbridge. Captain Thorpe, having secured permission and co-operation from the tenant, Mrs. Munns, directed excavations which have laid open several apartments of a building which must have been of considerable extent; but, at present, its entire dimensions are unknown, as the excavations have not gone beyond the property in the holding of Mrs. Munns. In the course of a few months it is probable that further researches will be made, as Lady Oglander, the proprietor of the adjoining land, has kindly countenanced the projects of a few ardent antiquaries anxious to complete the researches so auspiciously commenced.†

The villa, although in itself it may present no very novel features beyond a pictorial pavement with unusual designs, is of the highest interest as regards the Roman history of the island; and no one with an educated mind can stand upon its ruins and look around him without being inundated by a train of reflections on the state of Vectis after its subjection by Vespasian, in command under Claudius; how soon it became Romanised; and upon what terms the conquerors made their yoke so light that they lived in security in the midst of a subjected warlike people, who, unless with the loss of freedom they had gained more than an equivalent, might have overpowered the new settlers at any moment. No military force, it would seem, was permanently allotted to the Island; and, therefore, it must be presumed that the arts and civilisation of the intruders were welcomed here as in the whole of the South of Britain. Then, what was the condition of the inhabitants under the new government exacting tribute, the grand incentive to the mighty and expensive armaments sent from far Italy to remote Britain? No doubt, as Tacitus remarks, peace was achieved by making the petty kings and rulers instruments for the subjection of their own people by immunities and honours. The province became soon, in every respect, more productive and prosperous, and the people more contented and happy than when, with nominal freedom, they were subjected to constant wars under rival and restless rulers, such as the native princes are represented to have been.

The villas at Carisbrooke, at Combly (on the north of Arreton), and at Morton, give indications, over a wide extent of ground, of the state of Vectis under the Romans. Then, as now, we may assume, flocks and herds grazed the hills and meadows; the ploughman ploughed the fields, the sower sowed, and the reaper reaped them. Then, as now, the duties of the seasons followed each other with fluctuating success; there were imports and exports; among the latter very probably chalk from the long-disused pits which lie along the downs throughout the island. The deposits of coins of Arcadius and Honorius, at Cliffe and Wroxhall, are a testimony in another direction of late occupation; and it is impossible to say what may yet lie buried when so much hitherto unsuspected has been brought to light in so short a space of time.

The pavements are very inferior to those of many villas; we may say to most of those published by Lysons, Artis, and others, such as have been found at Woodchester, Cirencester, Frampton, Lydney, Pitney, Thraxton, Bramdean, Bignor, and London; and, indeed, they may be called of a third class. One, however, presents certain novelties as regards the subjects, not the execution, which is inferior, although not wanting in spirit. It is square. On the western side are two gladiators, one with a trident, the other with a net, in combat. The corresponding design to this has been destroyed. On the north is an animal like a fox, under a tree, which, if intended for a vine, as has been conjectured, is a very poor representation. A building with a cupola completes this picture. On the south, by the side of a small edifice with a flight of steps, stands the figure of a man with the head and feet of a cock, and on his right, at a little distance, two griffins. In the centre is the head and bust of a Bacchante; and similar figures fill the two angles which are preserved. Each of these holds a sceptre or staff, at the top of which is a small cross, such as is held by deities or nymphs in the Pitney pavement. One of the other rooms is floored in a chequer pattern; and another with plain white tesseræ; the passages and borders in coarse red. From the fragments preserved it is evident that the wall of one of the rooms was painted in a superior and elegant style with birds and foliage.

Acquaintance with the ornamentation of Roman villas decides that much was left to the experience, means, and imagination of the *tessellarii*, or professed workers of these figured floorings. The same subjects are continually found repeated in widely-distant localities; sometimes treated with consummate skill and taste, and elaborately pictured. In other instances, as in the Morton villa, there is an incongruity assignable to the causes to which I have alluded.

The remains of the arch of a hypocaust are to be seen below the westernmost room, not yet fully excavated; and in the walls are fine tiles *in situ*. From the large quantity of broken flue tiles, it is apparent that some of the other apartments were heated. These, as well as the large flanged tiles used for various purposes, show skill in the making and burning quite as great as that evinced in the Roman tilework of Italy itself; and this uniformity is universal. The same remark may be made on the mortar; and to a certain extent on the pottery.

The villa was roofed with a thin slaty stone, roughly cut into hexagons, and fastened with iron nails. It could have been only of one story in height, but width commensurated; and it will probably be shown by further excavations that the building was extensive, and surrounded with the usual appendages to the *villa rustica*. The situation is extremely fine. The downs at the back stretch from Brading to Arreton; on the left, across the lowland (over which Captain Thorpe believes he has discovered an ancient ford), is Yaverland and the sea, with Sandown and Shanklin; and in the front and to the right a wide extent of the picturesque island scenery. At no very great distance on the border of the marsh land runs a bridle road to Arreton, which, it may be safely assumed, was a *via* in the time of the Romans.

The excavations have disclosed but few objects of art such as are frequently found under similar circumstances,—a proof that no sudden calamity overwhelmed the villa, but confirmatory of its having been tenanted, probably for a long time after the Roman period. From a quantity of ashes and the blackened state of the white tesseræ, it appears that a fireplace had been made in one of the rooms. When it became utterly deserted most of the building materials were carried off; and then, for centuries, it remained a ruin, until the slow and sure processes of nature covered the foundations and allowed the unsuspecting plough to do its annual work. The skull of a female which has been exhumed may be attributed to an early Modiæval interment.

Only four coins have been found, all in small brass. The earliest is of Gallienus; two of Tetricus; and one of Allectus, with the reverse LAETITIA AVG., a galley; in the exergue, Q.C. The coin of Allectus, intrinsically of no great value, could but contribute to reflections while standing upon the ruins of this nameless villa, with the deep blue sea in the distance, upon which sailed the fleet in the last hours of his sovereignty over Vectis and Britain, powerless and unable to help when it might have turned the scale once more in his favour.

Mr. Nicholson has had a photograph taken of the ornamental flooring; and Mrs. Thorpe has made coloured drawings.

* This will form a portion of part iv. of his seventh volume of "Collectanea Antiqua," not yet issued.

† At the head of these are Messrs. J. E. Price, F.S.A., and Cornelius Nicholson, F.S.A., and, it is hoped, Captain Thorpe.

ROTHERHAM BATHS COMPETITION.

SIR,—Can you or any of your readers tell me the result of the above competition? On the 5th of May last a "committee in council" selected six out of the designs sent in. These were to be on view (to members of the Corporation only) for a fortnight, and then the committee were going to make a selection. Since then I have heard nothing,—rather a lengthy fortnight. Considering that the designs have been in since the 25th of March last (over thirteen weeks), I think it is high time, and only fair to the respective competitors, that the decision of the committee should be made known without any further delay.

AN INTERESTED PARTY.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

A SPECIAL general meeting of the donors and subscribers to this Institution was held at the offices, 27, Farringdon-street, on the 29th of June, Mr. B. C. Fox (of Mr. E. Conder's) occupying the chair, in the absence of the president, who was unable to attend. At this meeting Mrs. Sarah Ann Coulson and Mrs. Mary Ann Olver (being the only eligible candidates) were duly elected to the full widows' pension of 20*l.* per annum without ballot, the liberal support accorded to the Institution on the occasion of the annual dinner at the Guildhall Tavern, on the 6th of April last, fully warranting the committee in adopting this course. The meeting closed with a vote of thanks to the chairman.

DWELLINGS FOR THE POOR.

THE Charity Organisation Society have re-appointed their Special Committee on Dwellings for the Poor, to inquire and report on the working of the Artisans and Labourers' Dwellings Act. At the first meeting of the committee it was resolved,—That a sub-committee, consisting of Sir U. Kay-Shuttleworth, Sir Curtis M. Lampson, Mr. H. R. Brand, M.P., Mr. Ernest Hart, Mr. T. Hughes, Miss Octavia Hill, Mr. W. M. Wilkinson, Mr. R. D. Wilson, be appointed for the purpose of collecting and circulating amongst the general committee the documentary evidence already on record, and of arranging for the attendance of expert witnesses to confirm and supplement such documentary evidence.

It was agreed that evidence should be taken more especially on the following points:—(1.) The causes of delay in carrying into effect the Artisans and Labourers' Dwellings Improvement Act, 1875. (2.) The causes of expense in carrying out the Act. (3.) Overcrowding.

Since then the Rev. D. Greatorex, of St. Paul's, Whitechapel; Mr. Gladding, the chairman of the District Board for Whitechapel; Mr. Catliff, secretary to the Metropolitan Association for Improving the Dwellings of the Industrial Classes; Major-Gen. Scott, managing director of the Victoria Dwellings Company; Mr. Wm. Glasier; Mr. Moore, secretary to the Improved Industrial Dwellings Company, and others, have given evidence.

LARGE SALES OF BUILDING LAND.

DURING the past week there have been several extensive sales of plots of building land on estates which are being laid out for building purposes immediately around the metropolis. Amongst these the British Land Company held a sale a few days ago, at the George Inn, Maze-hill, Greenwich, of seventy-one plots, on one of their estates, situate close to Greenwich Park and Blackheath. The estate was said to command extensive views of the river, and to afford good sites for the erection of residences, the stipulations being that the value of the houses to be erected on the estate was to be not less than 500*l.* and 750*l.* Mr. W. H. Collier conducted the sale, and of the entire number of plots offered forty-four plots were sold at prices ranging from 100*l.* to 240*l.* each plot, the entire proceeds of the sale amounting to nearly 5,000*l.* On Thursday week Mr. Collier also offered for sale, on behalf of the same company, twenty-five plots of building land on one of their estates at Dulwich, situate near Lordship-lane, Honor Oak, and Peckham Rye. The several plots offered were stated to have frontages of about 60 ft., and an average depth of from 300 ft. to 320 ft. Thirteen of the lots offered were sold at prices varying from 225*l.* to 280*l.* each, the whole realising upwards of 3,200*l.* No house is to be erected on any of the plots of a less value than 400*l.*

On Thursday evening, the 24th ult., a sale of freehold building land, on the St. Thomas's Estate, Brentwood, was held by Messrs. Protheroe & Morris, at the White Hart Inn, Brentwood. The property offered was until recently a nursery, but has now been laid out for building upon. It consisted of fifty-three plots, having frontages of 20 ft. and a depth of from 80 ft. to 120 ft. each, the value of the buildings to be erected not to be less than 300*l.*, 400*l.*, and 500*l.*, respectively. In addition to the plots of building land above named, there was also offered in one lot a freehold residence and shop adjoining the estate, with garden, nine greenhouses, and a peach-house, in full bearing.

This last-named lot was sold for 1,600*l.* Nearly the whole of the different plots of the building land were sold, those facing the high-road averaging 10*l.* per foot frontage, and those facing the several new roads 6*l.* 10*s.* and 4*l.* 15*s.* per foot frontage.

Last week a sale likewise took place of seventy-nine lots of building land on an estate laid out for the purpose at Wood Green. The several plots were described as having frontages of 20 ft. each, varying in depth from 70 ft. to 120 ft. Mr. R. J. Collier conducted the sale, when sixty ont of the seventy-nine plots were sold, the prices ranging from 50*l.* to 70*l.* per plot.

On Monday evening last Mr. R. J. Collier also held a sale of forty-eight plots of building land on an estate at Edmonton, the several plots having frontages of 16 ft., with an average depth of 90 ft. The whole of the plots offered, with two exceptions, were sold, the average price realised for each plot being about 25*l.*

SALE OF BANKING PREMISES IN CORNHILL.

On Friday, the 25th nlt., the leasehold building in Cornhill, which is occupied by Messrs. H. S. King & Co., bankers and East India agents, was offered for sale at the Auction Mart, by Mr. Frank Lewis, by direction of the Court of Chancery. The building, which has recently been erected, is very lofty, consisting of six floors, besides a basement. The premises are held direct from the Grocers' Company, on a lease for a term of which nearly seventy years are unexpired, at a ground-rent of 1,100*l.* per annum, and underleased for the whole term to Messrs. King & Co., at the annual rent of 2,100*l.*, showing a profit rental and a net income of 1,000*l.* a year. The property having been bid for up to 13,750*l.*, the auctioneer opened the sealed document containing the reserved price fixed by the Court of Chancery, on which he declared that the property was sold, observing that the purchaser had secured an excellent bargain in obtaining upwards of seven per cent. upon the purchase-money during the next seventy years the 1,000*l.* of net annual income being clear of all charges on the property, as the occupiers are under an engagement to do all repairs and insure. It transpired after the sale that the property had been purchased by Messrs. King & Co., the under-lessees.

THE "INNER CIRCLE" RAILWAY COMPLETION SCHEME.

The action by the Metropolitan "Inner Circle" Completion Railway Co. *v.* The Metropolitan Railway Co. and The Metropolitan District Railway Co. (tried in the Exchequer Division on the 28th of June, before Baron Huddleston, without a jury) was to recover more than 50,000*l.* upon an award. The defendants, upon several grounds, disputed the validity of the award.

The plaintiffs' case was based upon the Metropolitan and District Railways (City Lines and Extensions) Act, 1879, which provided that the two defendant companies should jointly or severally, on or before the 1st of October, 1879, pay to the Link Line Company, meaning the plaintiffs, or deposit for them with the London and Westminster Bank, such sum or sums, not exceeding, in the whole, 50,000*l.*, as might be agreed upon, or, failing agreement, as might be settled by arbitration, in respect of disbursements and liabilities, *bonâ fide* and properly incurred by the plaintiffs in projecting and obtaining the several Acts of Parliament relating to their company, and in giving effect to the powers conferred by such Acts, together with a reasonable remuneration for the directors and officers of the plaintiff company. The parties could not agree as to the sums to be paid or deposited, and an arbitrator having been appointed, on the 27th of September, 1879, he awarded that the defendants should jointly or severally pay or deposit 50,000*l.* in respect of the matters mentioned in the Act, besides paying the costs of the reference and two-thirds of the costs of the award.

The defence was that the arbitrator had exceeded his jurisdiction, that the award was uncertain in its terms, and that the arbitrator had awarded sums which were not within the meaning of the Act of Parliament.

At the conclusion of the arguments,

The learned Judge held that the plaintiffs were entitled to 52,490*l.* 14*s.* 9*d.*, but stayed execution to enable the defendants to appeal.

Oscott (near Birmingham).—The "Northcote" Hall, at St. Marie's College, Oscott, near Birmingham, is now about to be completed, from the designs of Messrs. Pugin, of Westminster. The cost will be about 2,500*l.* Messrs. W. Sapcote & Son, of Camden-street, Birmingham, are the contractors.

SURVEYORS' CHARGES AND TAXED COSTS.

In a case in the Common Pleas Division, Harstous *v.* Scott, heard before Mr. Justice Grove on Friday, the 18th nlt., the plaintiffs, who are surveyors, sued for 50*l.* 1*s.*, balance of account for services rendered to the defendant in connexion with a claim made by defendant against the London and Blackwall Railway Company, which was referred to the arbitration of Sir Henry Arthur Hunt, C.B. The defendant by his pleadings set up that the plaintiffs should be paid only that portion of their claim which he had received from the railway company on taxation of costs, but he did not appear, nor was he represented at the trial.

Mr. Justice Grove, in directing the jury, observed that although he could understand, under some circumstances, a solicitor agreeing to take taxed costs, yet it was most improbable and somewhat absurd to think that a surveyor would make any such arrangement, as taxation between party and party was quite independent of his charges, and was a proceeding in which he had no voice.

The jury gave a verdict for the plaintiffs for the full amount.

INFLUENCE OF CHURCH ARCHITECTURE.

With reference to a brief notice in our last issue of a lecture given by the Rev. J. Sheepshanks, Mr. Thos. D. Barry says he was misunderstood by the reporter. Mr. Barry writes,—"The lecturer, in the course of this paper, made observations to the following effect:—'The people loved to worship in buildings the very *atmosphere* of which seemed to lift them above the petty and grovelling things of their worldly life.' Also, 'there is *an atmosphere* about a *truly devotional church*, which, without the calling in of any illegitimate means, *makes salutary impression upon the people*, and disposes their minds to prayer.' And again, 'a *devotional building* disposes men's minds to reverence.' It was on the statements that mere material beauty or proportion had anything to do with *saving impressions* or *devotional reverence* that I joined issue with the lecturer, believing as I do that no building can be called a *devotional* building, or that there is any connexion whatever between mental or sensuous aspirations, and spiritual worship, or 'the disposition of the mind to prayer.' Respecting the glorious churches of the Middle Ages, I expressed a hope that when a cathedral was built in Liverpool, it should be in our own National style, and on the lines of those beautiful structures which we have around us. I agreed with all that the lecturer claimed for beauty, proportion, and suitable ornament, but differed (as did many others) with the 'atmospheric influences' attributed to merely æsthetic excellence."

STRENGTH OF STAFFORDSHIRE BLUE VITRIFIED BRICKS.

The issue of careful experiments showing the strength of building materials is always interesting and useful. We therefore print the following results of experiments made by Mr. Kirkcaldy to ascertain the resistance to a gradually-increased thrusting stress of six bricks received from the Cakemore, Causeway Green, &c., Brickworks and Colliery Company, at Rowley Regis, near Dudley:—

Test No.	Description.	Dimensions. Inches.	Base Area. Square In.	STRESS IN POUNDS WHEN Cracked Slightly.	Cracked Generally.	Crushed, Steelyard dropped.
0 2,100	Blue Brick. (No recess.)	2·85. 8·75 × 4·20	36·75	238·400	354·000	425·820
2,098	do.	2·85. 8·75 × 4·20	36·75	233·500	350·600	422·560
2,097	do.	2·85. 8·75 × 4·20	36·75	229·200	344,000	418·220
2,096	do.	2·85. 8·75 × 4·20	36·75	211·000	332·000	414·400
2,095	do.	2·85. 8·75 × 4·20	36·75	208·000	321·000	409·330
2,099	do.	2·85. 8·75 × 4·20	36·75	202·400	318·600	387·940
	Mean		36·75	220·417	336·700	413·045
	Lbs. per square inch			5·997	9·161	11·239
	Tons per square foot			385·6	589·1	722·7

Bedded between pieces of pine three-eighths inch thick.

A QUESTION OF LIABILITY FOR PAYMENT.

CASLAKE *v.* BYWATERS.

In the Queen's Bench Division, on Monday last (before the Lord Chief Justice and Mr. Justice Bowen), Sir Hardinge Giffard, Q.C., moved in this case (mentioned in last volume of the *Builder*, pp. 776, 809) for a rule *nisi* for a new trial on the ground that the verdict, which had been given in favour of the plaintiff for 1,346*l.*, was against the weight of evidence, and also on the ground of misdirection.

The plaintiff is a plumber and mechanical engineer, and the defendant is a well-known builder. The case arose out of the construction of the Junior Army and Navy Club, which had been built under a contract between the defendant and Captain Elliot. With reference to certain parts of the work,—among others an iron staircase,—there were stipulations that these should be taken out of the hands of the defendant, the builder, and should be done by other persons named by Mr. Dudley, the architect. It was stipulated that the defendant should pay for such works and receive a profit of 15 per cent. on the net cost. The plaintiff first brought his action against Captain Elliot, who went into liquidation, and upon this he abandoned that suit and instituted the present one. Mr. Justice Stephen, before whom the case was tried, refused to construe to the jury the contract between Captain Elliot and the defendant, and, as the latter contended, if his Lordship had not refused to do this it would have appeared that the liability was to have been incurred by Captain Elliot and not by the defendant.

The Court granted the rule *nisi* on both grounds.

Sir,—My attention has been called to a letter from the defendants' solicitors published in your last issue, the statements in which greatly surprised me, and many others who heard the evidence. I will not remark upon the course taken by a firm of solicitors who publish a letter while, as they state, "steps are being taken to review the verdict." But I may state that one of the questions left to the jury was, "Did the defendants employ the plaintiff?" and the jury, after very little consultation, came to the decision which your paper reported, and which to every person who heard the evidence must have appeared the only just verdict they could give.

ARTHUR T. HEWITT, Solicitor for the Plaintiff.

BAD BUILDING IN EDMONTON.

On Monday last, at the Edmonton Petty Sessions, Mr. W. R. A. Cole, of High-road, South Tottenham, was charged, upon four summonses, with infringing the bye-laws of the Edmonton Local Board of Health, inasmuch as he was erecting four houses in Town-road, within the district of the Board, the walls of which were not properly bonded and solidly put together with mortar or cement. William Gimson, of Bayceaux Villa, Gipsy-hill, Norwood, was also charged, upon eight summonses, four with a similar offence as that alleged against Mr. Cole in respect of four houses in course of erection in Jeremy's Green-lane, and the remaining four that the walls of the said houses did not rest on solid ground, concrete, or other solid foundation, as required by bye-law 101.

Mr. Houlder, clerk to the Local Board, conducted the proceedings. The summonses against Mr. Cole were taken first.

Mr. Houlder stated that the walls of the houses in question were built of very inferior materials. Small pieces of bricks had been used, and the mortar was largely in excess of the quantity required to execute work properly. Bonding together meant that bricks should bond each other, but in the present instance they did not do so. There was so much bad building going on, that the Local Board were compelled to interfere, and they hoped the Bench would inflict such a fine as would induce builders to comply with the bye-laws, so that houses which would become detrimental to the health of the inhabitants as well as dangerous to those who resided in them might not in future be erected.

Robert Harrison, assistant-surveyor to the Board, said the walls were constructed of bats and smaller pieces of bricks. There were eight or nine courses without any tie whatever. One course of bonded bricks was laid every few feet, and the intervening spaces were filled up with small pieces. The work was intended for Flemish bond, but there was no real bond at all.—By Defendant: The mortar was of fair quality. A builder was entitled to erect concrete walls, but the system of construction which was being pursued certainly did not render the walls as strong as concrete ones.—By Mr. Houlder: The bonding ought to be every other course of bricks.

Mr. Grindle, chief surveyor to the Board, said the

mortar was good, but the bricks were the most inferior he had ever seen. The walls were not bonded, in the true sense of the word, except by the tenacity of the mortar.—By the Bench: Having regard to the safety of persons who might occupy the houses when finished, he should pronounce the walls insecure.—Defendant said he had expressed his willingness to do anything the surveyor to the Board might suggest to remedy existing defects.

Mr. Abbiss inquired if anything could be done, short of pulling down the walls, to secure the safety of occupiers.

A discussion arose, in the course of which a suggestion was made that the necessary strength to the walls could be given by having them coated with cement; and eventually an adjournment for three weeks was ordered to see if any scheme could be devised and carried out to the satisfaction of the Board's surveyor, the Bench intimating that, as the offences charged had really been committed, it must not be understood that a fine would not be imposed.

In Mr. Gimson's case it was shown that the spot where the buildings were being erected was not very solid ground, and that the plans sent in for the approval of the Board provided that 12 in. of concrete were to be laid to form the foundations of the houses, whereas the amount put in was only from 1½ in. to 4 in. in depth. The substance itself, too, was of a very inferior quality. The mortar, also, was exceedingly bad, consisting of very small portions of sand and lime, the rest being vegetable mould. Samples of mortar were produced, and the Bench said they could scarcely detect the presence of sand or lime.

Defendant said every ingredient for making good mortar was upon the ground, and if the material was bad, it was owing to the negligence of persons in his employ.

The Bench said had materials were used by many builders to save a little money, even at the cost of loss of character. The magistrates would assist Local Authorities as far as possible to ensure the erection of proper buildings; and in the hope that others would take warning by the result of the present case, defendant would be ordered to pay 2*l.* 10*s.* in respect of each of the eight summonses,—20*l.* in all,—with costs, the amount, if not paid, to be recovered by distress.

PARLIAMENTARY JOTTINGS.

Indian Railway Bridges.— In the House of Commons, on Monday last, Mr. Anderson asked the Secretary of State for India whether the Report on Indian Railways for 1877 correctly stated the name of the firm who contracted for the railway bridge across the Nerbudda river; whether that firm were not also contractors for the principal ironwork of the Tay Bridge; and whether, under these circumstances, he had considered the desirability of providing that the Indian Government should institute an investigation as to the quality and kind of iron used for the Nerbudda Bridge, and also extend their inquiry to the Indus Bridge and other bridges built or being built on the guaranteed and State railways of India. The Marquis of Hartington: In the Report on Indian Railways for 1877 the name of the firm who contracted for the railway bridge across the Nerbudda river is correctly given, and the firm mentioned is the same as that which is stated to have been connected with the supply of the principal ironwork of the Tay Bridge. The contract for the bridge was made by the Bombay, Baroda, and Central India Railway Company, in April, 1877. The Tay Bridge disaster occurred towards the close of last year. The plans and specifications of the Nerbudda Bridge were prepared by Sir John Hawkshaw, and the whole process of supplying the ironwork has been carefully watched and inspected under his direction. Upon the occurrence of the breakdown of the Tay Bridge, the directors of the company gave special directions to Sir John Hawkshaw to be most particular in carrying out the duty of inspection. No complaints have been received from India of the quality of the iron, but a second examination is made there, and severe tests are applied to the piers and the girders when placed in position. There can be no doubt that the engineers employed in designing and constructing bridges in India since the Tay Bridge disaster have been fully alive to the necessity of the most careful specifications being prepared, and of the most conclusive tests being applied to materials before they are accepted. I will take steps for obtaining a special report on the Nerbudda Bridge before it is opened for traffic.

The Electric Light.—Mr. Daniel Grant has given notice that he will ask the First Commissioner of Works whether he will take into his consideration the advisability of substituting the electric light for the purpose of illuminating the House in place of the gas now used in the roof.

Mr. George Jennings.—A correspondent, writing from the Sydney Exhibition, April 24th, says:—"I have much pleasure in informing you that Mr. G. Jennings has won the highest awards, viz., first for stoneware drain-pipes, &c.; first for hydrants and water-fittings; first for pumps; and first and special for sanitary wares: thus beating all those who copy his inventions in the old country. Here he has nothing to fear, for they prefer men who originate to those who copy."

ARCHÆOLOGICAL NOTES.

Cup-marked Stones.—Mr. Jolly, H.M. Inspector of Schools, Inverness, seeks to throw some light on the origin of the cup-like depressions in stones, several of which have of late been discovered by Mr. Linn, of the Geological Survey, in the rocks *in situ* on the hill of Roseisle, near Burghead, on the Calder hill at Forres, and in other localities. Mr. Jolly says that one of these depressions resembles in general appearance what would be produced by inserting an egg a third of its length into soft dough, only they have been formed in hard rock, and vary in size from half an inch in diameter to four inches and above it. In 1864 a detailed dissertation on these curious remains of prehistoric art or worship was read by Sir James Simpson before the Edinburgh Antiquarian Society, and was subsequently published in 1867. The neighbourhood of Inverness has numerous examples of these cup-stones. Within a radius of twenty miles in Inverness Mr. Jolly has obtained sketches of forty-five cup-marked stones hitherto unfigured, and these will be described, with illustrative drawings, at the first meeting of the next session of the Edinburgh Antiquarian Society.

Earthworks in Worcestershire.—The Worcestershire Naturalists' Field Club recently visited Thornbury, near which place, on hilly ground, is a castrametation called Wall-hill. The vallum is very lofty and steep. Mr. E. Lees read a short paper on the subject by Mr. H. H. Lines. Mr. Lines described the camp as presenting a combination of Roman and later British work, having an area large enough to hold 4,000 men easily. It is 1,220 ft. long, by 650 ft. in breadth within the ramparts. There are two original gates of remarkable width, one on the south-east corner, 60 ft. wide between its two crests, the other gate on the north-west end of the camp 50 ft. between the crests, and these gates possess neither Roman nor early British character, and their extraordinary width is remarkable. In addition, there are four openings, which appear to be of subsequent formation. On the western side are two yew trees growing on the line of the rampart, which has been diverted from its proper line in order to leave them outside the camp area, as though they grew where they stand before the camp was made. On the eastern side is a breach in the rampart of 90 ft. in length, where the earth has entirely disappeared, probably carted away, as Ducomb has stated has occurred with regard to several other lines of entrenchment. Mr. Lees said this castrametation was called the Wall-hill, from *waal*, a Saxon word signifying a stranger, and the Saxons gave this name to all those fortified posts that were occupied by the Romano-Britons, whose place of retreat they called *Wealas* or *Wales*, and no doubt this ground had been occupied and defended by the Welsh. Mr. J. Tom Burgess, who said that he was familiar with ancient earthworks, was of opinion that this was an original British work, showing no sign of Roman occupation, and Wall Hills he considered a term generally applied to ancient fortifications all over England.

SOCIETY FOR THE PROTECTION OF ANCIENT BUILDINGS.

THE third annual meeting of this society was held in the Hall of the Society of Arts, John-street, Adelphi, on Monday last.

The annual report stated the Society's work during the past year had differed little from that of the previous one, except in two notable instances, viz.,—St. Alban's Cathedral and St. Mark's, Venice. The committee had, as before, received information, written letters of inquiry, protest, and advice, "sometimes with obvious and encouraging results, sometimes with nothing apparent to show for the trouble." The committee believe the Society's principles are taking root, and especially, they think, are influencing the great body of our architects; "a course of events which is both very encouraging, and what might have been expected." A Society having a similar aim to this has been set on foot in France, under the auspices of M. Guillon, an honorary member of the Society. Among the cases in which the Society has taken action during the past year the report mentions Chesterton Church, near Cambridge; St. Germain's Cathedral, Isle of Man; Aldborough Church, Suffolk; Prestbury Church; Studland Church, Dorsetshire; five pre-Reformation churches in Exeter; Malmesbury Market Cross; and the Old Town-hall, Leicester. At Chesterton, St. Germain's, and Studland, proposed schemes of restoration have, it is stated, been abandoned; whilst those of Aldborough and Prestbury have been greatly modified. The proposal to pull down the Exeter churches has fallen through; Malmesbury Market Cross has, it is claimed, been protected from "restoration"; and the old Town-hall at Leicester has been saved, for the present at least, from demolition. Sir Edmund Beckett having offered to re-build the whole west front of St. Alban's Cathedral, the report states that the committee saw no other course open to them but to make one last protest to save what was still left unrestored of the Abbey,—

"They co-operated with Earl Cowper and Mr. John Evans in opposing the faculty which Sir Edmund Beckett was applying for in the Bishop's Court. The committee regret to state that their opposition was unsuccessful, and that Sir Edmund Beckett has obtained his faculty; and though the committee have been informed that an appeal lies to a higher Court, they do not think it advisable under the circumstances to carry the matter further. The committee cannot refrain here from drawing the attention of the Society to the fact that no tribunal exists in this country before which any proposal for the alteration of a public and national monument can be dealt with from the point of view of the effect such alteration may have upon it as a work of art or an historical monument."

With regard to ancient buildings abroad, the report detailed the steps taken by the committee to protest, on account of the danger to the mosaics, against the project of the Italian Government to bodily lift the Baptistery at Ravenna some 3 ft.; and also referred to the controversy *in re* St. Mark's, Venice.

CHURCH RESTORATION.

THE Church of Bronghton Sulney, in Nottinghamshire, has been opened by the Bishop of Nottingham, after undergoing extensive restoration. The external works comprise a new and enlarged north aisle. The walling is built of Bulwell stone. The roof is of red deal, stained and varnished, and covered with lead. Internally, a gallery at the west end has been removed, and the tower arch opened out. A new window has been put in the west end of the tower. The chancel arch, which had been built up, has been cleared out and restored. The chancel was restored some thirty years ago, but was quite hidden from the church. The pulpit is of oak, with stone base; the prayer-desk is of oak; and the benches throughout are of pitch deal, varnished. The aisles are paved with tiles, and the font occupies a prominent position at the west end. The walls throughout have been denuded of plaster, restored and painted, and in carrying out this portion of the work an interesting discovery was made in the south wall, where one of the old arches of a Norman arcade, with pillars and capitals, was found in a fairly good state of preservation, and it has been judiciously treated so as to form a leading feature in the chancel. The only entrance-door in the south side was of a nondescript character, and it has been replaced by a Norman doorway and door in character with the arch under which it stands. Two new windows in the south wall have completed that side, and the whole harmonises well together. The church is heated by Porritt's hot-air system. The works have been carried out from the designs and under the superintendence of Mr. R. W. Johnson, architect, of Melton Mowbray and Kettering, by Mr. Brickmore, of Bingham, who has carried out the works very creditably.

State of the Underground Railways.—The walls of the stations of the underground railways require thorough cleansing and re-whitewashing, or painting, not simply to make them decently respectable, but to place them in the sanitary condition in which such places should be carefully maintained. The tunnels also are in need of measures to purify their foul interiors. It would be a most regrettable circumstance if these important lines should fall into a neglected state, and again awaken anxiety in the public mind. It is impossible, in the nature of things, that they can ever be as bad as they were before the tunnels were ventilated by openings at suitable intervals, and houses were demolished to give them air space, both which reforms were effected by the intervention of the press years ago; but there is still room for improvement, and of late the condition of the stations, and the general state of uncleanliness which prevails, do not satisfy the most modest demands.—*Lancet.*

CHURCH DECORATION.

Norton Lees, near Sheffield.—The church of St. Paul has just been simply decorated, the chief artistic work having been expended on the chancel wall, roof, and roof-panels. The wall over the altar-table has been divided into three panels, the central one of which is occupied by a figure of the Saviour, with uplifted hand, in the act of blessing. St. Peter and St. Paul respectively occupy the side panels, with auxiliary embellishments. The paintings and decorations are by the firm of Powell, Bros., Park-square, Leeds.

Margaretting, Essex.—Mr. Thomson, of St. George's-road, Southwark, has just completed the decoration of the east end of Margaretting Church, Essex, under the superintendence of Mr. F. Chancellor. In the two sides are emblems of the Lamb and Flag, on the other side that of the pelican feeding her young. They are surrounded by a rich border. On the top part is the dove, and sacred monograms on coloured grounds. The whole of the decoration is on a rich vellum ground.

Scarborough.—The Westborough Unitarian Church in this town, Rev. D. Agate, minister, has been re-opened, after renovation and partial decoration, its walls having been previously white and bare. The chief artistic work is at the east end, in the part corresponding with the ordinary chancel. Here, instead of a window, is a large recessed panel, now divided into three compartments, in each of which is a figure of one of the three Christian graces, "Faith, Hope, and Charity," painted in strong outline, with the addition of but little colour, and relieved by a dull gold screen. Within a pointed arch above the figures the sun is rising above the dusk shadow of night, the brighter stars yet shining in the heavens. On the arch itself, in letters of gold, is the legend from 1 John 1-5, "God is light, and in Him is no darkness at all." The reredos of the altar beneath bears the legend, "God is love." The wall-spaces on either side of the figures, and above the arch, are suitably ornamented with strong bands of coloured scroll-work, dividing a more delicate diaper. A rich dossal hanging, an ornamented surbase, a dado round the whole church, and a slight band of ornament emphasising all the windows, complete the design. The work has been carried out by Messrs. Powell, Bros., under the superintendence of Messrs. Holtom & Connon, architects, Leeds.

LEWANICK CHURCH.

THE parish church of the little Cornish village of Lewanick, situated some five miles from Launceston, has just had its chancel restored. Lewaniok Church is, in the main, of the Perpendicular type of Gothic architecture; but the Decorated doorway at its western end, and some other remains, are indicative of an older church, built probably upon the same lines at some earlier period. On plan the building consists of the western tower, a chancel, north and south porches, and a spacious nave and two aisles, joined the one to the other by arcades. The building is principally of granite, of a rough moorstone, very like granite, and of the well-known Cornish Polyfant stone, which is procured from a quarry scarcely a mile away. The arcades dividing the nave and aisles are highly-wrought and fine examples of Polyfant masonry, and the roofs, which are of the wagon type, exhibit effective wood-carving. One of the chief glories of the edifice consists in the fine old benches, with which the main portion of the structure is filled. The seats in question are of the local type, made of English oaken planks fully 4 in. thick; their ends are carved, and, by a legend upon one of them, we learn that it was in 1516 they were erected. The angle seats at the head and foot of each aisle are surmounted by carved angels, cut out of the same oak. The font stands at the western end, and dates from the thirteenth century. The avenues between the seating are wide, and are laid with old Delahole slates.

The most remarkable thing about the church is the miniature font-like stone that stands near the inner door of the north-west porch, and immediately against the adjacent seating. It is a cresset-stone, a very rare piece of ecclesiastical furniture, so exceedingly rare, indeed, that it is very questionable whether another example exists in any parish church in England. Some 20 in. high, by 18 in. in diameter, its shape resembles that of a font, save that, instead of one basin, the bowl contains seven holes, each some 3 in. wide and as many deep. These cup-like cavities, in ancient days, were filled with oil or tallow, and were provided with wicks, so that at early morning service or after dark at night, the seven lamps were lighted for the convenience of worshippers. This curious cresset is made of Hicks Mill Greystone, of precisely the same character as the Norman font, and is probably as old.

The chancel has just been put into a seemly state by the present vicar. The chancel-walls have been denuded of their many coats of white-wash, and the stones beneath have been carefully pointed. The old plastered and stuccoed inner roof has been removed, and the wagon-typed shape of the original nave-roof has been carried on right through to the east wall. The roof springs from newly-carved and embattled wall-plates in oak; the moulded ribs and purlins are of the same material, and their intersections are stopped with carved bosses. The panels are lined with oak boarding. The fine four-light east window has been faithfully restored; new moulded mullions have been put in, in the same material as the original window—grey granite,—and, wherever it was necessary, the rest of the window has been repaired. The old altar-rails, which were of a Jacobean type, have been modified and refixed.

The altar-table is new, and of massive English oak. A reredos has been erected. It is of Bath stone, a parallelogram in form, and surmounted by a richly-carved and pierced cresting. Immediately over the altar-table are sculptured representations of the four Evangelists, and at each side are panels, in which are carved lilies in pots. Upon the reredos is incorporated a brass, upon which is inscribed the legend, "To the glory of God, and in loving memory of Edward Archer, of Trelaske, Esquire, and Charlotte Catherine, his wife, parents of the Rev. Charles Harward Archer, vicar of this parish, 1880."

The various works have been carried out by Mr. Harry Hems, of Exeter, under the personal superintendence of the Rev. Charles H. Archer, the vicar. Mr. Archer, it is interesting to add, is a great-grandson of the celebrated architect of the last century, Sir William Chambers.

LORD MOUNT TEMPLE AND COMMONS RIGHTS.

SIR,—At the public meeting held yesterday at Willis's Rooms by the Commons Preservation Society, the noble chairman, Lord Mount Temple, with characteristic modesty, refrained from referring by one word to the very prominent part he had himself taken in the preservation of commons, parks, and other open spaces. A similar reticence, I regret to say, was observed by all the other speakers. Suffer me now to be the mouthpiece of thousands,—should I not rather say of millions?—and remark that Mr. Cowper-Temple's eloquent advocacy of these unmistakable reservoirs of health dates as far back as March, 1844, when, in company with our now illustrious Premier, he supported Lord Worsley's Enclosure of Commons Bill, in which the rights of the people to commons land were emphatically recognised. During the thirty-six years which have elapsed since then, Mr. Cowper-Temple has done wonders as the valorous champion of open spaces, of commons, parks, and village-greens, which, as he truly contended, have done more to promote the happiness of the English people than any other institution handed down by their Saxon forefathers. When Epping Forest was in danger from attempted enclosure, this real statesman persistently and eloquently defended year after year the rights of the people against the encroachments of the Lords of the Manor. Again and again did he remind the House of the rare value of the forest to the teeming population of the East End of London; and on one remarkable occasion he saved this magnificent piece of public property in spite of the opposition of the Liberal Government, actually defeating them by a majority of 100. He succeeded in getting incorporated in the General Enclosures Act a clause providing that in all future enclosures of waste land certain portions should be set apart for labourers. He struggled gallantly, but, alas! in vain, to get introduced into Mr. Cross's Commons Bill a clause which would prevent enclosures within six miles of London, and within certain fixed distances of other towns, according to their population. Lastly, Mr. Cowper-Temple's Thames Embankment Bill has produced for Londoners and provincial visitors to London what Lord Harrowby truly designated "the noblest Boulevard in the world." In advocating this important matter of open spaces Lord Mount Temple was far ahead of his contemporaries, just as he was in advocating the repeal of the Corn Laws, the abolition of University tests, church-rates, and Jewish disabilities. S. L.

ON THE FALLACY OF ADJUSTING PROPORTION TO SIZE.

SIR,—A few years since a fallacy of a similar order to that upheld by "Toreuticos" possessed the *dilettanti*. Peculiar defects in pictures were then attributed to the astigmatism of the painter's eye, and differences in the rendering of the same originals to artists seeing differently. But the shortsighted theorists forgot that the pictorial representations, not being like the originals copied, could never have re-impressed the retina of the artist as correct copies. So this long-existing fallacy was at last, by rational acumen, finally disposed of.

There is a very simple and natural method of disposing of the more recent fallacy. Remove any of the famous works from the proper or best point of view to different distances, and determine whether any disproportion is apparent as the image on the retina is reduced by the removal of the statue to a distance. There is no collective opinion, that I am aware of, in support of "Toreuticos's" motion. The fallacy originates, I am inclined to think, in the utterly unwarrantable assumption that everything the Greeks did in art was right. They did a great deal that was disproportionate and wrong in the commencement of their art career, and only less than other nations when they were at their best.

METER.

PARTY-WALLS.

SIR,—I notice a letter under the above heading in your number of June 26th, which seems to be of interest to builders, in which an explanation of certain facts is asked for. But as regards the first instance, in which "E. G." has paid 100*l.* to be clear of the claim against him, one must presume that he would not quietly pay the sum unless he had received legal advice upon the question he puts to your readers, so he can hardly expect them to give amateur opinion, and possibly make themselves look foolish. But it strikes me that "E. G.'s" difficulty in both cases falls under the head of the right of buildings to support rather than under that of party-walls, as no question apparently of what one may term a "party-wall" character arose, but rather a question as to proper working and the right to support. As to Sir W. Tite's plan, these stories often lose some of their original features by telling, but I fancy a lawyer would say that if a neighbouring building had a right to support, no notice that building operations likely to endanger it were about to take place would do away with the right. But, then, was there such a right? I fear we have not been told the cardinal facts of the case.

A CONSTANT READER.

THE LAW OF DISTRESS AND THE LAND QUESTION.

SIR,—In a letter on "The Land Question," which you did me the favour to publish on April 3rd, I mentioned incidentally, as one of the farmers' grievances, the operation of the law of distress, as making the landlord a preferential creditor over others, to their and the farmers' detriment. Exception was taken to my statement in a letter you published on April 17th, in which the writer says my view of the question "shows want of knowledge," and goes on to state that many landlords have made use of this law to shield their tenants from creditors during the recent bad times,—which latter may be true, although, from a creditor's point of view, undesirable and unjust.

That my statement, thus called in question, was not inaccurate, we have proof in a report of a deputation to the Premier from the "Farmers' Alliance," on the 16th inst., a body having, according to Mr. James Howard, M.P., the chairman, no less than fifty members in the present Parliament. One of the spokesmen on this occasion, Mr. Edward England, called the

attention of the Premier to the existing law of distress, which he said "he regarded as the hinge and pivot of all the disadvantages that regarded the tenant. That law of distress was largely taken advantage of by landlords, because under it they were perfectly safe in accepting the most reckless bid that could be offered to them. It was an unfair advantage, which in the long run did not secure them any benefit. He spoke the feeling of that deputation, and he believed that of the large majority of the farmers of Norfolk, when he said that nothing short of the total abolition of that law would be satisfactory to them."

To this the Premier replied,—"I quite agree that the law of distress is a law of severity which cannot be justified, and the course which has been taken in Scotland may lead the English farmer to say that he has not been treated on the same principle."

As this is a purely social question, and one of great interest to all of us, it cannot be desirable that this relic of a fendal system, no longer suited to our civilisation, as many of us think, should remain at least misunderstood, and the *Builder* may, therefore, be doing us a great service in permitting such a question to be veutilated in its pages. E. GRIMES.

THE PROPOSED NEW MUNICIPAL BUILDINGS FOR GLASGOW.

THE Glasgow Town Council have resolved to ask Mr. Charles Barry, late President of the Institute of British Architects, to adjudicate on the plans which have been sent in by architects from various parts of the country for the municipal buildings for Glasgow. It is stated that no fewer than ninety-eight boxes and parcels have been sent in to the Glasgow town-clerk in connexion with the competitive designs for the buildings. The designs have been numbered consecutively from 1 to 98, and insured by a floating policy to the extent of 5,000*l*. A number of architects sent in copies of reports on their plans for distribution among members of the Town Council, but the committee have declined to distribute them, leaving the matter entirely in the hands of the adjudicator.

BLUNDELL'S SCHOOL, TIVERTON

THE memorial-stone of the new buildings was laid on the 26th ult. by the Earl of Devon. The site consists of about 20 acres, and the new buildings will accommodate 250 boys. The cost of the whole is estimated at abont 15,000*l*. The buildings have been designed by Messrs. Hayward, of Exeter, and the contractors for the work are Messrs. Langdon & Poole, Minehead. In style the new school will correspond with the old one, but the interior will be considerably different. The buildings will be arranged so as to carry ont the present system of teaching by the use of class-rooms in combination with a large school, or assembly-hall, and the whole of these rooms, with the exception of the laboratory and adjacent lecture-room, will be on the upper floor. The large room will be 66 ft. by 30 ft., and have an open-timbered roof; and the class-rooms, six in number, will vary from 31 ft. to 24 ft. in length, and he generally 20 ft. wide and 14 ft. in height. The entrance will be through the tower, which is at the north-west angle of the building, and over the doorway will be a niche for a statue of the founder. A second external doorway in the tower is intended to form an approach to a chapel, which, it is hoped, will be soon erected. Beyond the tower the principal staircase will lead up to the rooms above, and the remainder of the north front will contain the laboratory, a room for apparatas, and a lecture-room underneath the great school-room. Uader the class-rooms will be a cloak-room, a room for the day boys, one for the assistant-masters, a school lihrary, and a large dining-hall intended for hoarders in the head-master's house, as well as for snch day boys as, living a distance from the school, may he glad to avail themselves of the master's table. The accommodation for the head-master will he convenient, and have kitchen offices sufficiently large for taking boarders, hnt no further provision is made for them in the present contract. The north front of the building will be 108 ft. in length, and the extreme length from north to south, including the head-master's honse, will be about 224 ft. The whole of the building will be erected with Halherton stone, with dressings of Doulting stone.

ARCHITECTURE, UNIVERSITY COLLEGE, LONDON.

THE following are the prize-gainers in the department:—

ARCHITECTURE, Mr. T. Roger Smith, F.R.I.B.A.—*Construction, second series*, Donaldson Silver Medal, A. S. Vowell, of Loudon; Certificate, 2, C. H. Bedells,* of Cronch End; Third Class, F. W. St. Aubyn, of London. *First series*, Prize, C. J. Tait, of London; Certificate, 2, F. S. Ogilvie,* of North Shields. Third class, S. J. Bury, of Whetstone. *Fine Art, second series*, Donaldson Silver Medal, A. B. Pite, of Loudon. Second Class, Wm. A. Pite, of Loudon; Third Class, F. A. Gerrish, of London. First Series, Prize, W. J. Lander, of London; Third Class, B. V. Westbrook, of London, C. Turner, of London. *Modern Practice*, Prize. Fr. E. Eales, of Loudon. Certificates, 2, R. E. Smith,* of Forest Hill. 3. A. G. Morten, of Loudon. 4. (equal) S. J. Bury, of London, F. G. F. Hooper, of Loudon. *Ladies' Class, Prize*, Laura E. Jones, of London. Certificate, 2, Edith M. Smith, of Forest Hill; Second Class, Elizabeth Beck, of London; Third Class, Hannah Oliver, of Kew.

The Council of the Collego have again appointed Mr. Roger Smith to conduct these classes for the session 1880-81, in the absence of Professor Hayter Lewis.

"THE SITE OF THE '51 EXHIBITION."

SIR,—In last week's number of the *Builder* you remark, in reply to the letter from Mr. Worssam, "The site of the '51 Exhibition should certainly be marked." Permit me to state that when talking over business matters with the late Sir Joseph Paxton in 1852, while making the plans for the present Crystal Palace at Sydenham, I distinctly remember his telling me, "I have planted the site of the old Exhibition with *a special kind of grass*, so as to indicate the spot in years to come."

That was his idea of a memorial. Why cannot this simple plan still be carried out?

PHILIP B. LEE, Architect.

"SMALL POWER ENGINES."

SIR,—May I be permitted to answer the very suggestive inquiry, under the above heading, contained in your issue of the 19th ult.?

Mr. Sewell wishes to know of a firm that will supply small power engines to do the following work in a country house, viz.:—

1. Pump water.
2. Do minor farm work.
3. Warm the building.
4. When not engaged on Nos. 1 and 2 to produce power for two electric lights.

The first three conditions are not by any means new to my firm, as several of the hot-air engines we manufacture, and which have been described in your pages, are doing this class of work. The stove of the hot-air engine warms a room; and, if need be, the waste heat of the furnace can he utilised for warming hy the hot-air system, or it may he used to supply heat to the hot-water boiler of an ordinary greenhouse.

From ¾-h.p. to 5-h.p. the hot-air engine will do this class of work with very little consumption of fuel, and with much less attention and skill than is required to drive a steam engine.

No. 4 is the only condition requiring more than ordinary consideration, not because of the mechanical difficulties so much as the extraordinary perverseness of electric engineers when describing a fact.

The Transatlantic fabrications about electric light have made ordinary engineers and mechanical men in this country despair of ever receiving the truth. Gravitation having placed these audacities in the gutter, it is refreshing to know that Dr. Siemens, Dr. Hopkinson, and other authorities, have been able to tell us what power is required to produce the electric light.

According to Dr. Siemens, an electric light of 6,000 candles requires an engine of 4-horse power, and to illuminate three quarters of an acre, nine of such lights would he required, absorbing the energy of a 36-horse power engine.

I have watched the progress of the electric light with some interest, and although I shall he glad to see a demand for hot-air engines for driving the magneto-electric machines, I think that, until further improvements are made in the production of the light, small motors will he of little use.

Where water is abundant our water-motors will produce power for the electric light. One we have just delivered to Mr. Hussey-Vivian, M.P., for his silver-mines in Norway, will he driven hy a head of water 400 ft. high, producing 25-horse power. When this is not winding it might produce the electric light with ease.

If your correspondent wishes us to test any electric-light apparatus, in order to see what power is required to produce one or two lights in order to obtain information on which to base an estimate for hot-air engines, I will, with pleasure, conduct such an experiment free of charge. W. H. BAILEY.

*** Among various manufacturers who write, Mr. F. W. Jackson, Kingsbury Iron-works, Ballspond, says, "I make a speciality similar to what is required by your correspondent."

* Obtained number of marks qualifying for a prize.

CHURCH-BUILDING NEWS.

Soham.—Soham parish church has lately been re-opened by the Bishop of Ely, after restoration nnder the direction of Mr. J. P. St. Aubyn, architect, according to whom the church was originally a "cross church," with a central tower, built ahont the end of the twelfth century. The nave is 52 ft. by 22 ft., with side aisles of the same length and 9 ft. wide, divided from the nave by arcades of four arches, springing alternately from octagonal and circular shafts, with moulded caps and bases, and plain pointed arches of two orders. The central tower, 22 ft. square, springs from four pointed and enriched arches of three orders, rising from semicircular responds with enriched capitals and plain hases. The works now completed compriso the complete repair of all the windows, doors, and other stonework, both external and internal. New roofs have been put to the north and south transepts, as well as to the two chapels, and a new floor to the tower. The work has also included the re-plastering of the walls, the removal of the galleries which surrounded and encumbered the church on all sides, the re-arrangement of the seating, the opening of the tower to the church, the removal of the font, the repairing and re-tiling of the floor, the re-glazing of all the windows, and the warming of the church. Some portions of the work have been carried out by Mr. Tooley, of Bury St. Edmund's, and they were completed by Messrs. Tebbitt, of Soham, at a total cost of ahout 3,000*l*. Mr. Tebhitt, sen., died during the progress of the work, which was then taken up by his son. The accommodation is for 562 persons.

Wilden.—A new church at Wilden has lately been consecrated by the Bishop of Worcester. The church bas been erected at the sole cost of Mr. Alfred Baldwin, J.P., on ground the gift of the Ecclesiastical Commissioners. It consists of a nave, chancel, vestry, organ-chamber, and bell-cote, and will accommodate 150 adults. Tbe style is Early Decorated. The materials used are the best facing hricks, with stone dressings, and tiles for the roof. The roof, internally, is open-timbered. The architect is Mr. W. J. Hopkins, diocesan architect, Worcester; and the contractor was Mr. J. Cook, of Hartlehury. The original contract for the church was 1,400*l*., exclusive of honndary-walls, heating-apparatus, lighting, the Communion service, and the church furniture, which, with the cost of the organ, must make the total expenditure amonnt to between 2,000*l*. and 3,000*l*.

Oldham.—The new church of St. Paul's, Ashton-road, Oldham, has heen consecrated by the Bishop of Manchester. Messrs. Wild & Collins, of Oldham, are the architects. The church is in the thirteenth-century style of Englisb architecture, and on plan consists of nave, aisles, chancel, organ-chamber, clergy and choir vestries, with a contemplated tower and spire at the west end of the south aisle, for which the fonndations have been put in. The walls are built of Yorkshire parpoints, with Warwick stone dressings, hacked up with Highmoor ruhble. The roofs throughout are open timbered, and varnished. The benches are of pitch-pine, varnished, and provide accommodatioa for 550 worshippers, exclusive of twenty-four seats in the chancel for the choir. Tne floors of the aisles are flagged with Rochdale flags, and the chancel floor is laid with ornamental tiles. The reredos, which has been presented by Mr. John Taylor, of Fernholm, is of Caen stone, with carvings emhlematic of the four Evangelists in the head of the side panels, the centre panel having the head of Christ, with a crown of thorns. The pulpit is also of Caen stone. The church is warmed on the low-pressure hot-water system, with Wagstaff's saddle boiler. The contractors have been:—For foundations, Mr. Joseph Stevens; for masons' work, Messrs. J. & J. Whitehead, of Marsden; joiners' work, Messrs. Cbas. Schofield & Co.; plumbing and glazing, Mr. John Bardsley; slating, Mr. Daniel Lees; plastering, Mr. James Hall; heating apparatus, Mr. Giles Shaw; gasfittings and commnnion-rail, Messrs. Gentle & Falconer; reredos, Messrs. Joseph Bonehill & Co., of Manchester; pulpit and font, Mr. James Hilton, of Manchester; chancel tiling, the Campbell Brick and Tile Company, Stoke-on-Trent. The Communion-table has been made and presented by Mr. Samuel Mellor.

Llanbadern.—Llanbadern Church, Aberystwith, was reopened on tbo 1st of July by the Bishop of St. David's, after restoration and refur-

nishing of the tower and transepts, at a cost of about 2,500*l.*, under the direction of Mr. John P. Seddon, architect. The transepts have been re-roofed, and the crux groined in wood under the belfry-stage. The freestone pulpit, which has two figures in bas-relief, of St. John and St. Paul, by Mr. Stannus, is a memorial-gift of the Bishop's. Messrs. Roderick Williams & Son have executed the work of the restoration. The nave was restored some years since by the same architect, and the chancel will shortly be taken in hand.

DISSENTING CHURCH BUILDING NEWS.

Somercotes.—Four memorial stones of a new Wesleyan School-chapel have been laid at Somercotes, Derbyshire. The building will cost 720*l.*, including the cost of the land. The chapel will accommodate 200 persons. The contractor is Mr. Page, of South Normanton, and the architect, Mr. Eyre, of Codnor.

London.—The City-road Wesleyan Chapel, which was partially destroyed by fire in December last, has been reopened, after restoration, in which all the old and familiar features have been reproduced. The fine plaster-enriched ceiling, which was 100 years old, has been reproduced from castings of the fragments of the ornament not quite burnt, and decorated and gilded. The lighting is by two sun-burners, replacing the former plan of a ring of burners round the gallery. The ventilation is on the tube-system, Weaver's extractors being used in the roof. All the monuments have been restored precisely as before, including one of the granite monoliths supporting the apse-arch which was erected as a monument to the memory of the late Dr. Waddy. The morning or small side-chapel has a new roof of panelled pitch-pine, with ceiling-light, with an outer one glazed with Rendle's glazing. The warming is to be effected by Grundy's system. The architect is Mr. Charles Bell, and the builder is Mr. J. D. Hobson, of the Adelphi, who has carried out the work in the short space of eighteen weeks, the amount of the contract being about 5,000*l.* The gas-lighting is by Messrs. Strode & Co.; the ventilating by the Sanitary Engineering Co.; and the ornamental work by Mr. Mullen.

Pendleton.—A new Welsh Presbyterian chapel, with schools and house adjoining, have lately been completed. They were designed and carried out under the superintendence of Mr. Wm. Dawes, architect, Manchester. They are situated in Broad-street, Pendleton, and in style they are based on the Romanesque. The walls throughout are of red brick, relieved with stone dressings, and on the principal front some good carving and ornamental stonework add to the effective appearance of the buildings. The chapel, which accommodates 305 persons on the ground-floor and 258 in the galleries, is 57 ft. long, 30 ft. 7 in. wide, and 32 ft. high. The floor rises as it recedes from the pulpit, so that all those who have sittings at the back have an unobstructed view of the minister. The inner and outer porches or lobbies are arranged to prevent draughts interfering with the comfort of the congregation sitting near the inner entrance. The air of the lobby will be warmed by hot-water piping, the same as that in the chapel itself, so that any rush of cold air from the outer porch would be intercepted and warmed before it passes into the interior of the building. The staircases to the galleries flank the principal front, and are entered from the outer porch. They are designed externally to break up the otherwise broad and flat gable end of the chapel, and they give, in connexion with the turret that surmounts the gable and the recessed portion over the front entrance, a varied outline. The whole of the windows in the principal front of the chapel are filled with stained glass. The ventilation has been carefully considered, and alternative systems of natural and artificial extraction have been provided for by ornamental outlets in the ceiling underneath the galleries, and by piercings in the ornamental string of the ceiling of the chapel, connected in each case with the foul-air trunks that convey the vitiated air to the extraction-shaft; the impure air will be drawn upwards and will thence escape. Whenever found necessary, to meet the varying conditions of certain seasons of the year, extraction-boilers will be used to rarefy the air in the extraction-shafts and accelerate the upward current; but for the present it has not been considered necessary to make this extra provision. The escape-outlets in the ceiling of the chapel are confined to three bays farthest from the pulpit, with the view of making the current of air passing from that part help to convey the voice of the minister to the most distant parts of the building. In connexion with the chapel there is a minister's vestry and conveniences for the use of the congregation, and between the chapel and the schools there are three rooms that may be alternately used as vestries or class-rooms. Over these rooms are arranged the organ-chamber and two additional class-rooms. The school-room is 48 ft. long, 36 ft. wide, and 22 ft. high. In the basement there are store-rooms, tea-room, heating-chamber, &c. A lift is carried from the tea-room to the school-room for the convenient supply of the various articles required at large tea-meetings. The chapel-keeper's house is at the back of the main buildings, and is quite detached. The contractors for the work were Messrs. Enley, Jones, & Robertson. Mr. Joseph Roberts was the clerk of the works. The cost of the buildings was about 5,500*l.*

Bude.—A new Wesleyan Chapel has been opened at Bude, Cornwall. It has been built by Mr. Beckley, of Holsworthy, from designs of Mr. J. Hine, architect, Plymouth, at an estimated cost of about 1,800*l.* It is Byzantine in character, and Plymouth limestone and Bath freestone are used externally. The chapel consists of a nave with a transeptal end, divided from the main building by an arcade of three segmental arches extending across the building. The object of this is to allow of the lower end, with the transepts, being shut off from the nave during service in winter, and also to facilitate its use as a school. The larger congregations of the summer months will thus be provided for, and the chapel will not be inconveniently roomy in winter. The interior is highly finished, and has a pitch-pine dado carried to the height of the pews, which also are of varnished pitched pine. The windows, of which there are fifteen, are round-headed, and have been glazed with cathedral glass, in two tints, by Fouracre & Son, of Stonehouse. The ceiling, which is flat, is divided into square panels by moulded beams, sustaining the pendants of coloured metal which uphold the coronas for the lighting of the chapel. The exterior of the chapel is relieved by bold entrance-porches, and the frontage by the window columns and mouldings, and a little carving, done by Mr. Harry Hems, of Exeter.

Books.

The Industrial Arts of India. By GEORGE C. M. BIRDWOOD, C.S.I., M.D. Edin. With Map and Woodcuts. Chapman & Hall.

THIS, which is one of the series of Art Handbooks issued under the authority of the Committee of Council on Education, has been prepared to form a guide to the public in visiting the India Museum, now transferred to the authorities of the South Kensington Museum. The second part of the book is, in great measure, a reprint of the author's Handbook to the Indian Court at the Paris Exhibition of 1878. This was so well received that Dr. Birdwood had resolved to re-publish it, with additions, when he was asked to write a popular handbook in connexion with the re-opening of the India Museum under its new administration. The material already collected formed part of this,—not, as the author explains, that the book thus formed is directly an analysis of the contents of the India Museum: it must rather be regarded as an index of its deficiencies; the treatise giving a general outline of Indian art manufactures which are partially, but only partially, illustrated by the contents of the Museum. To this is prefixed a sketch of the Hindu Pantheon, the enormous ramifications of which cannot be even briefly set down under a considerable number of pages, and some knowledge of which is necessary to understanding half the interest of the manual arts of India. So Dr. Birdwood affirms, and it is not for us to contradict him; though we may be allowed to say that the great interest of Indian art lies really in that portion of it which is purely decorative, and into which no story and no representation of their multifarious deities enters, the interest in regard to the latter being, after all, rather archæological than artistic. Nevertheless, the information given upon this subject is no doubt of much interest in itself, and the small drawings which accompany it will enable those who are desirous of following up the Hindu mythology in its artistic illustration to identify the various deities. But the sketches given of them, many of which represent figures we are all more or less familiar with, recal Ruskin's effective comparison between the *morale* of the Highlander and the Hindu, as connected with the love of nature in the one, and the worship of monstrous, cruel, and mis-shapen deities in the other. And, in fact, Dr. Birdwood, by implication, confirms Ruskin's view, when he remarks on the bad effect which much of this grotesque mythology has had upon Hindu art, in leading the artists of the Peninsula to the constant representation of monstrous and mis-shapen forms. He points out, and one or two of his illustrations, show that the Hindu has not been without the faculty of carving graceful human figures when his mythology presented them now and then with a god who was in the image of man; but people who are continually led to produce figures which are essentially symbolic rather than human in character, and in which the symbolism is carried out by the production of figures with a plurality of heads, arms, or legs, and in other ways entirely and purposely departing from the human type while just recalling it sufficiently to give point to the grotesque character of its treatment, are almost inevitably bound to lose the power of excellence in the representation of human expression; and the natural result is that Indian art, with all the truly exquisite elaboration and fancy which it displays in dealing with purely ornamental work, has produced an enormous number of the most hideous figures that ever were invented by man.

The Hindu artist is not much better at animals, though he does not intentionally caricature them. But perhaps the influences which led him away from the realistic study of the human figure have also operated to make him blind to the anatomical points of animal framework. In this respect the Hindu artists stand in curious contrast to the Japanese, who are also a people incapable of correctly representing the human figure and at the same time are beautiful artists in decorative work; but with this the Japanese combine a rare power of representing animal life with spirit and fidelity, which the Hindus seem entirely to want. Their animals are grotesque in proportion and action, for the most part, and are often almost boneless in appearance and destitute of proper articulation of the joints; and perspective, when it comes to drawing on the flat, is quite a mystery to them.

It is needless to say that when we come from figure-subjects, human or animal, to pure ornament, Indian art is for the most part superb, not only in design, but in the beautifully fit way of treating the material, and in the manner in which floral types are made use of as the basis of artificial ornament. Among the instances of the true taste in regard to material shown in Indian work, Dr. Birdwood especially mentions their treatment of the precious metals, the manner in which the least possible bulk of a costly material is turned to the greatest possible account in artistic value, and the contrast presented by such work to so much of English gold and silver work, where weight and mass of material seem to be regarded as an object in itself for which the purchaser is willing to pay even more highly than design. We have before commented on this vulgarity of taste in English work of this kind, and are glad to find Dr. Birdwood speaking so strongly on the point. He adds that English dealers in *bijouterie* will weigh such specimens of Indian gold and silver work in their hands, and look on them with contempt for their lightness, which, when combined with such beautifully artistic use of the material, is, of course, one of their excellencies, and renders them a far better investment of money, even, than "the unseemly dead-weight gold and silver manufactures of London and Birmingham, for which customers have to pay four times more than the value of their weight," and in which, as the author truly observes, the object seems to be to "bestow the least amount of work on the greatest amount of metal."

The book is adorned with a sufficient number of excellent illustrations of Indian decorative art, to render it in itself a considerable help to appreciating the beauty of Indian art, even apart from the Museum, and a good account is given of each branch of work. It is noticed that there is one form of art, lace, that has only recently been introduced into India, but for which (as one would have expected) the native artists show great aptitude, and in which they have already produced beautiful work. At present India is still a country where all orna-

mental work is hand-made, and therefore has almost inevitably an artistic style and feeling; though it is to be feared that machinery will set its hoof there before long. The art is, however, more traditional than people are aware of who do not see much of it; the same forms are continually repeated, but they are all beautiful forms, so far as the purely decorative work is concerned; but the author remarks that the influence of European education and "the irresistible energy of the mechanical productiveness of Birmingham and Manchester" are already going far to vitiate the beauty of the traditional art of India, and to confuse its forms. Another remark of Dr. Birdwood's we may quote *verbatim*:—"The worst mischief is perhaps done by the architecture foisted on the country by the Government of India, which, being the architecture of the State, is naturally thought to be worthy of all imitation. The Nawab of Bahawalpur was the other day installed on the throne of his ancestors, and in anticipation of the auspicious event, the Indian Government built him a palace, which is the ghastliest piece of bare Classicism it is possible to imagine, even with so many examples before us in this country of the Dissenting-chapels and vestry-halls of the last century. And now Holkar, in obvious emulation of this preposterous production, is building for himself a vast Italian palace at Indore, which is to cost many lakhs of rupees, and will be like Trentham, or Buckingham Palace, or anything else in the world but a habitation meant for kings. This sort of thing has been going on all over India ever since the establishment of the British peace in 1803-6, and 1818-19, and is the fountain-head of all the evil we deplore." We fear there is no hope of any remedy for this, unless we could educate the British Government in architecture, which seems out of the question.

VARIORUM.

A NEW edition of "Dickens's Dictionary of London" has been published. As some little omissions that we pointed out in the first issue have been supplied in this, we can conscientiously say that it is an improved edition. The Dictionary has been received with great favour by the public.——Mr. Elliot Stock is about to issue "Our Ancient Monuments and the Land Around Them," an antiquarian and historical account of the antiquities which are proposed to be preserved by the Ancient Monuments Bill now before the Houses of Parliament. The work will be illustrated, and will have an Introduction by Sir John Lubbock, Bart.——"Ancient Wood and Iron Work in Cambridge" is the title of a work about to be published in parts by Spalding, of Cambridge, containing a series of elevations and sections drawn from examples of carved wood and wrought-iron work dating from the sixteenth century, by W. B. Redfarn, with descriptive letterpress.——With reference to the numerous new synagogues to which we have lately referred, the following account of the ancient synagogue, from Canon Farrar's "Life of Christ," will not be out of place:—"It was simply a rectangular hall, with a pillared portico of Grecian architecture, of which the further extremity (where the 'sanctuary' was placed) usually pointed towards Jerusalem, which, since the time of Solomon, had always been the *kibleh*,—*i.e.*, the consecrated *direction*,—of a Jew's worship, as Mecca is of a Mohammedan's. In wealthier places it was built of white marble, and sculptured on the outside in alto-relievo, with rude ornaments of vine-leaves and grapes, or the budding rod and the pot of manna. On entering there were seats on one side for the men; on the other, behind a lattice, were seated the women, shrouded in their long veils. At one end was the *tebhah*, or ark of painted wood, which contained the sacred Scriptures, and at one side was the *bima*, or elevated seat for the reader or preacher. Clergy, properly speaking, there were none, but in the chief seats were the ten or more *battanim*, "men of leisure," or leading elders; and pre-eminent among these the chief of the synagogue, *rôsh hak-kenéseth*. Inferior in rank to these were the *chazzan*, or clerk, whose duty it was to keep the sacred books; the *sheltach*, corresponding to our sacristan or verger, and the *parnasim*, or shepherds, who in some respects acted as deacons."——From the July number of "Picturesque Europe,"—an excellent one,—we take a paragraph as to the fountains of Constantinople:—"At every corner fountains of pure running water supply the element which plays so prominent a part in the religion of Islam, and which is in constant demand for purification after prayer. These fountains vary in size and magnificence; some are mere openings in a wall, others are square-built temples of marble, with dome-like roofs and projecting eaves, richly decorated and inscribed with suitable texts. The words, 'By water everything lives,' may be deciphered on almost all,—here cut into the stone, there written in golden letters upon an azure ground. Some of these fountains enjoy especial prestige, as that of the Sweet Waters of Asia, which stands upon a wide terrace on the Asiatic side above the Bosphorus, shaded by plane-trees, and in full view of the glittering white houses, castles, and towers of Europe, the prison formerly of the Janissaries, who once made and unmade sultans, and governed the capital with despotic, irresponsible rule. To this come not only humble neighbours to fill their water-vessels, but great ladies are ferried across in their private *caïques*—the gondolas of Constantinople—from the harems of Stamboul, and wait, lying enveloped in their *yash-maks*, or veils, while their attendants bring them goblets of water from the fountain which is so much esteemed."

Miscellanea.

Royal Albert Hall.—On Sunday afternoon last there were, at the lowest computation, 5,000 attendants at the organ recital. It was the last of the series which has been given during the months of May and June by Mr. H. H. Statham, as a labour of love. The programme was laid down and printed at the commencement of the series, and consisted entirely of organ music, pure and simple, of high character, and with very little reference to what is called the popular taste. The public have reason to be thankful to the Council of the Albert Hall for this provision, gratuitously, of a high and fitting form of enjoyment. The fine-art exhibition at the hall has been considerably increased and strengthened since its opening, and the collection of ancient and modern wood-carving should be seen by all who are interested in the arts of the country.——On this, Saturday, afternoon, a great opera concert is to be given by Mr. Gye, with the *artistes* of the Royal Italian Opera, including Madame Patti and Madame Albani. The interior of the hall, on the last occasion when Mr. Gye gave a concert here, was a sight not soon to be forgotten. When filled, as it was then, the Albert Hall presents a scene scarcely to be paralleled.

New Board Schools.—Some picturesque schools, built on rising ground, and affording accommodation for 521 scholars, were opened at Killamarsh, near Chesterfield, on the 16th ult. Of an English Domestic type of Gothic, they have been erected at an expense of 4,437*l.* from the designs of Messrs. Innocent & Brown, of Sheffield, architects, whose experience in school-board schools is considerable. The buildings are of Dunford Bridge stone, with dressings from the Ancaster quarries. The roofs are covered with Welsh slates, and there are Berkshire ridge creases. A master's house is attached to the school-buildings. The dwarf boundary wall is surmounted by wrought-iron railings. The rooms have all a pitch-pine dado, up to the level of the window-cills. The floors of the principal compartments are laid with wood cubes. The warming is by hot water. The following tradesmen carried out the works. Mr. J. Lister, of Aston, near Rotherham, general contractor; Mr. Holden, Sheffield, heating apparatus; Mr. Harry Hems, Exeter, carving; and Messrs. Redmayne, May, & Co., Sheffield, desks and fittings. The clerk of works was Mr. W. W. Mabson.

Value of Ground-rents.—On the 24th ult. Messrs. Chesterton & Sons offered for sale, at the Auction Mart, freehold ground-rents, secured upon houses in Beaufort-gardens, Brompton-road, amounting to 231*l.* per annum. They were sold in one lot for 6,600*l.* The house will come to the freeholder in about eighty years from this time.——The same auctioneers, on the same occasion, offered for sale leasehold ground-rents, secured on dwelling-houses in the St. John's-wood neighbourhood. They were sold in two lots. The first lot, giving a net profit rent of 115*l.* 10*s.* per annum for sixty-one years unexpired, was sold for 1,925*l.* The second, a net rent of 61*l.* per annum, also for sixty-one years unexpired, sold for 1,130*l.*

Industrial Exhibition at the East End.—On Wednesday afternoon the Lord Mayor (Sir F. Wyatt Truscott) proceeded in civic state to the east end of London, for the purpose of opening an industrial and fine-art exhibition at the Bow and Bromley Institute. The Institute, which has been established for ten years, is situated over the North London Railway station in the Bow-road. The exhibition was promoted with a view to encourage inventive skill, excellence of workmanship, and the wise employment of workmen's spare hours, and all the exhibitors belong to the working classes. The articles exhibited are arranged under five heads,—namely, mechanical articles, artistic, general, fabrics and fancy work, and work done by young persons under eighteen. Fifty guineas in prizes are offered, of which the Clothworkers' Company give 21*l.* The Coopers' Company provide a special prize for the best specimens of cooperage or articles connected with that trade. Various firms lend interesting specimens of their particular trades; thus, Messrs. Doulton and Messrs. Wedgwood send articles of pottery; Messrs. Powell, of Whitefriars, some ornamental glass; and Mr. Wilherforce Bryant, of the firm of Messrs. Bryant & May, sends a valuable collection of Japanese brouzes, carvings, and armour. The exhibition will remain open for some time to come from two o'clock until ten at night, Sundays excepted.

Who is to Blame?—At the meeting of the Hackney Guardians on Wednesday, says the *Metropolitan*, the clerk laid before the Board a report from the building committee, stating that they had considered the question referred to them as to the position in which the new infirmary buildings were placed, and they found that the foundations were laid 25 ft. nearer to the existing infirmary than was directed by the Local Government Board, and they recommended that the matter be laid before the Central Board, and to ask their advice on the matter. "The report having been received, the question of responsibility for the error was raised. Some of the members were of opinion that it rested with the architects; others considered the builder culpable, and all agreed that the mistake was a most unfortunate one.—In reply to a question, Mr. Higgins said a reason had been assigned by the architects, but he (the speaker) could not give it in public. On this, Mr. Kemp and Mr. Hart declared their inability to vote unless they were put in possession of those facts. Eventually they were given, and then followed a discussion as to the propriety of the work being allowed to progress until the will of the Local Government Board was known. In the end, it was decided to forward a statement of the affair to the Upper Board, and also to let the architects and the builders know the position of affairs."

Fires.—What proved to be a very extensive fire broke out on Saturday night, soon after nine o'clock, at the saw-mills of Messrs. Roberts, Bartram, & Prout, Belvedere-road, Lambeth. The official report of the damage states that a brick building of two floors, about 120 ft. by 60 ft., the property of Messrs. Roberts & Co., was completely burnt out; a brick building of one floor, about 35 ft. by 20 ft., used as a boiler and engine house, was, with the contents, very seriously damaged by fire, heat, and water; and several surrounding stacks of timber were also greatly damaged by fire, water, and removal. The stacks in an adjoining open yard, belonging to Messrs. Lucas Bros., builders, also suffered damage. The cause of the fire is unknown.——At half-past four o'clock on Sunday morning a serious fire occurred at 17, Duke-street, Bloomsbury, on premises occupied by Messrs. Holland & Hannen, builders. The fire originated in the saw-mills on the ground floor, from an unknown cause, and was not extinguished until the mills and the contents had been seriously damaged by fire and heat, and an adjoining building of three floors, about 50 ft. by 20 ft., used as a store, completely burnt out.

The Late Mr. W. Hepworth Dixon.—The interesting and valuable library of this lamented writer will be sold by auction, by Messrs. Sotheby, Wilkinson, & Hodge, on Tuesday and Wednesday next. Some of our readers may be glad of the information.

Window Gardens.—I see window-gardening is a subject with you. I have had some iron window-gardens,—all in one piece with the sill,—holding two narrow rule of earth each, perfectly drained and safe, for years. They are fully successful, and their contents are in luxuriance now.—B.

The Destruction of a Railway Bridge.—An inquiry into the causes of the recent accident on the Hereford and Brecon Mid-Railway, by washing away of the buttresses of a bridge over a trihntary of the river Wye, was resumed at Brecon, before Mr. D. W. J. Thomas, county coroner. Colonel Rich, inspector to the Board of Trade, was present. The accident happened on the 18th ult. A heavily-laden goods train was to pass over a bridge across a stream known as the Llaingan Brook, but the ahutments of the bridge had, owing to exceptionally heavy storms, been washed away, and when the train reached the spot it went over the chasm, and was utterly smashed, and a driver named Parker was killed. The evidence taken now tended to show that the bridge was fairly well and substantially built, and that the exceptional character of the storm fully accounted for the accident. The testimony of Colonel Rich, C.E., inspector of railways for the Board of Trade, who had examined the scene of the catastrophe, was directly to this effect. The jury were unanimously of opinion that the death of George Parker was purely accidental, and that no hlame was attributable to the railway officials.

Schools for Girls.—On the 29th ult. the North London Collegiate Schools for Girls were formally opened by his Grace the Archbishop of York, Mrs. Thomson presenting the prizes to the girls in the Great Hall. The Bishop of Rochester, late chairman of the Board, was also present. His Grace was taken by the architect (Mr. E. C. Robins) over the building, which is now entirely in the occupation of the girls. The opening of the Great Hall and new building associated with it, by the Prince and Princess of Wales, took place in July last year. About 500 girls are now accommodated, and ahout 150 more are awaiting vacancies. A tablet recording the munificence of the Brewers' Company has been placed in the entrance-hall. Thus the largest and one of the most successful day-schools in the metropolis for the higher education of girls is started on its way, with every modern appliance to ensure continued usefulness.

A Merry Old Parson.—One of the oldest clergymen living is the Rev. John Russell, or "Passon Jack," as he is oftener called amongst his North Devon parishioners. The reverend gentleman is fast approaching five score years, and still continues to be as "lively as a cricket." In another column of this paper may be read an account of the new Blundell School, at Tiverton, of which the foundation-stone was laid upon the 26th ult. A couple of days before, the annual celebration, known as the "Old Boys' Day," was observed at Blundell School, when, after service at St. Peter's Church, those present were photographed, and then lunched together with other friends in the Lower School. The health of the "Old Boys" having been proposed, the toast was coupled with the name of the Rev. John Russell, who replied in a long and humorous speech.

Cleopatra's Needle.—A plaster cast of a sphinx, coloured to look like bronze, has been fixed by the Metropolitan Board of Works on the Victoria Embankment, in order to judge of the effect prior to the casting in hronze of the two sphinxes which the Board have decided to place on the pedestals on either side of Cleopatra's Needle. The model now exhibited is an enlarged copy of a small sphinx in stone in the collection of the Duke of Northumberland at Alnwick Castle, which is supposed to be of the same period as the obelisk itself, as it bears on its breast the cartouche of Thothmes III. Certain additions have also been made in the manner above described to the base and pedestal of the obelisk in order to hide the broken angles, and, if approved, these will eventually be executed in bronze. The works have been carried out from the design of Mr. Vulliamy, the Board's architect. The general effect is very good.

The Royal Academy.—The President and Council of the Royal Academy held a reception on Wednesday night at Burlington House. Sir Frederick Leighton received his guests at the entrance to the central hall. All the rooms of the Academy were thrown open to the guests, and the general effect was, as usual, very brilliant.

Roselands, Upper Walmer.—A convent church and choir, for the Sisters of the Visitation, are now heing built at Roselands, Upper Walmer. Messrs. Pugin, of Westminster, are the architects. The cost will be about 1,900*l*. The contractors are Messrs. W. & T. Denne, of Upper Walmer, Kent.

Removing the Gravel.—This objectionable practice continues to be pursued at the Royal Hospital, Chelsea, and bas been again brought under the notice of that parish. It was stated that the holes thus made were filled up with objectionable ruhbish. The parish surveyor, however, denied this, and the vestry resolved therefore, by a small minority, to take no action. Mr. Ash said the nuisance was not so great as it was formerly, but still it was bad enough. Some thousands of loads of gravel had been taken out of the place and sold to builders or anyhody else who liked to pay for it; a man in Symons-street had the contract to cart the gravel away, and to fill up with any rubbish he could get. Although, perhaps, it was not strictly the husiness of the Vestry, it would he interesting to know who had the money for it. We think so, too.

Caterham, Surrey.—The foundation-stone of the new Roman Catholic Church at Caterham, Surrey, was laid on the 24th ult. by Dr. Danell, the Roman Catholic Bishop of the diocese, in presence of a large gathering of his clergy and of the guests of the priest in charge of the mission, the Rev. Francis J. Roe. The buildings comprise a church, schools, and presbytery, and are in active progress, the contractor heing Mr. Wm. Carruthers, of Reigate, and the architect Mr. E. Ingress Bell.

Church of the Oratory, Brompton.—The first stone was laid a day or so ago. Some correspondents, who were present, complain of great mismanagement on the occasion, and one writes, "It was a perfect muddle."

TENDERS

For the erection of a block of private offices, at the corner of St. Peter-street, Maidstone. Mr. Edward W. Stephens, architect:—

Callund & Son, Rochester	£3,493 0 0
Reeves, Staplehurst	3,407 0 0
Simmonds, Maidstone	3,397 0 0
Clements & Wallis, Maidstone	3,396 0 0
Vaughan Bros., Maidstone	3,388 0 0
Cox Bros., Maidstone	3,313 0 0
Avard, Maidstone	3,237 0 0
Naylar, Rochester	3,147 0 0

For the erection of six cottages at Silvertown, for Messrs. John Knight & Sons. Messrs. Tunley & Boyle, architects:—

Cowland Bros.	£3,291 0 0
Outhwaite & Son	3,196 0 0
Morter	3,195 0 0
Perry & Co.	3,083 0 0
Sheffield & Prebble	2,973 0 0
Cullum	2,896 0 0
Sabey & Son (accepted)	2,888 0 0

For paving at Knightsbridge, for the Metropolitan Board of Works:—

Neal	£1,975 0 0
Cooper & Co.	1,890 0 0
Turner	1,850 0 0
Nowell & Robson	1,589 0 0
Beevors	1,549 0 0
Mowlem & Co. (accepted)	1,487 0 0
Rutty	1,399 0 0

For re-seating St. Paul's Church, Winchmore-hill, Mr. Alfred R. Pite, architect:—

Webber	£520 0 0
Smith	497 0 0
Evans	490 0 0
Staines & Son	478 0 0
Wheeler	455 0 0
Jacklin	440 0 0

For alterations, &c., at Ratland Lodge, Brixton. Messrs. Davis & Emanuel, architects:—

Maxwell, Bros., Brixton-road	£1,027 11 9
Crabb & Son, Upper Tulse-hill	997 0 0
Pack Bros., Brixton-road (accepted)	966 0 0
For Sanitary Works.	
C. & F. Mansfield, Gray's-inn-road (accepted)	£210 0 0

For rebuilding Camberwell Provident Dispensary, and works to residence belonging, Camberwell-green, for the committee of the Dispensary. Mr. William Dunk, architect. Quantities supplied:—

Hall, Beddall, & Co.	£2,312 0 0
Higgs & Hill	2,206 0 0
Downs	2,062 0 0
Ashby Bros.	1,848 0 0
King & Son	1,844 0 0
Rider & Son (accepted)	1,788 0 0

For Wesleyan Methodist Chapel and School, East Grinstead, Sussex. Mr. S. W. Haughton, architect:—

	Chapel.	School, &c.	Saving by use of Red Brick.
Beale, Battersea	£2,095 0	£540	£17 1
Morris, Ashurst Wood	1,609 0	352	60
Godley, East Grinstead	1,409 0	390	30
Etheridge, Horsham	1,695 0	combined	—
Steer, East Grinstead	1,285 0	345	30
Brown, Southborough	1,617 10	combined	20
Goad, Tonbridge	1,400 0	combined	add 30
Charlwood,* E. Grinstead	1,047 0	230	20
Watera, Forest Row	972 0	175	60

* Accepted.

For extension of premises, Goswell-road, for Messrs. Carter, Paterson, & Co. Mr. Wm. Eve, architect:—

Hubble & Trott	£1,529 0 0
Abraham	1,467 0 0
Wilson & Exton	1,356 0 0
Harris & Wardrop	1,287 0 0
Sheffield & Prebble, Rifle-street (accepted)	1,287 0 0
For Fireproof Floor.	
Homan & Rodgers (accepted)	£178 0 0

For repairs to houses, Royal Crescent and Darnley-road, Notting-hill. Mr. Wm. Eve, architect:—

Eary	£988 0 0
Heiser	924 0 0
Wilson & Exton	910 0 0
Alldred	600 0 0
Larter (accepted)	573 0 0

For erection of a house on the Hog's Back, Guildford, for Mr. George Drewitt. Mr. Chas. H. Sparkes, architect. Quantities by Mr. H. Moon:—

Stephenson	£3,423 0 0
Horn	3,388 0 0
Marten	3,294 0 0
Mitchell Bros.	3,090 0 0
Harris	2,902 0 0
Pink	2,900 0 0
Beale	2,832 0 0
Crooke	2,479 0 0

For alterations and additions to No. 10, Upper Charlton-street, Fitzroy-square, for Mr. James Houghton. Messrs. New & Son, architects. Quantities by the architects:—

Berridge & Traise	£1,899 0 0
Hook & Oldrey	1,654 0 0
Grimwood & Son	1,630 0 0
Gritten	1,620 0 0
Mark	1,590 0 0
Harris & Son	1,469 0 0
Ashford & Stevenson	1,397 0 0

For alterations to bar and fittings of the "Rock of Gibraltar," Evelyn-street, Deptford, for Mr. H. Burney. Mr. Henry Roberts, architect:—

McPherson	£785 0 0
Lewis	515 0 0
Banks, Deptford (accepted)	495 0 0

For residence on the Start's-hill Estate, Orpington, for Mr. J. L. Lovibond. Mr. G. St. Pierre Harris, architect:—

Grover	£1,285 0 0
Haisman	1,268 0 0
Taylor & Son (accepted)	1,250 0 0

For re-building the "Wheatsheaf," Kemsing, for Messrs. Fox & Sons. Mr. G. St. Pierre Harris, architect:—

Warren	£882 0 0
King	852 0 0
Wood	847 0 0
Wiltshire (withdrawn)	525 0 0

For erecting three houses and shops, in Rochester-row, Westminster. Mr. Henry Brace, architect:—

King & Son	£2,825 0 0
Keen	2,459 0 0
Hosar & Son	2,195 0 0
Watson & Dennett, Dulwich (accepted)	1,985 0 0

For the erection of Board Schools in three departments, for 637 children, at Etruria, for the Hanley School Board, Staffordshire. Mr. W. A. Keates, architect:—

Gallimore, Newcastle (accepted)	£3,945 0 0

For the erection of two semi-detached residences, in Jasper-street, Hanley, for Messrs. Malkin & Stokes. Mr. W. A. Keates, architect:—

Lawton & Macham, Silverdale (accepted)	£830 0 0

For Congregational Church, New Maldon, Surrey. Mr. W. D. Church, architect:—

Dove Bros. (accepted)	£2,400 0 0

For altering out-building into coach-house, and building new stable, at Ashstead, for Capt. W. Fitz-Henry. Mr. T. A. Smith, architect:—

Gummow (accepted)	£230 0 0

For engineers' work for new wing, Royal Hospital for Incurables, West-hill, Putney. Messrs. Searle, Son, & Hayes, architects:—

Steam Boilers and Hot-Water Supply.	
Waller & Co.	£742 0 0
Eastons & Anderson	696 0 0
May	670 0 0
Fraser (accepted)	540 0 0
Cooking Apparatus.	
Waller	£610 0 0
Fraser	545 0 0
May (accepted)	418 0 0
Electric Bells.	
Markham	£105 19 0
Sax	56 7 0
Lewis & Sons	37 15 0
Koerber (accepted)	37 10 0

For additions to Belfort House, Upper Norwood, for Mr. S. Symons. Mr. Edward Maynard, architect:—

Hockaday	£1,150 0 0
Bowyer & Sons	798 0 0
Jenkin	674 10 0

For club-room and bar, Epsom-common. Mr. J. Hatchard Smith, architect:—

Pyke (accepted)	£690 0 0

For pair of cottages, Epsom. Mr. J. Hatchard Smith, architect:—

Pyke (accepted)	£500 0 0

For training stables and residence, Epsom. Mr. J. Hatchard Smith, architect:—

Pyke	£1,800 0 0
Jeal (accepted)	1,600 0 0

For house and offices, Epsom. Mr. J. Hatchard Smith, architect:—

Pyke	£1,125 0 0
Jeal (accepted)	1,100 0 0

For repairing and painting the Clerkenwell Parochial Schools. Mr. W. P. Griffith, architect. Quantities not supplied:—

Thompson	£350	0	0!
Stone	339	0	0
Brown	295	0	0
Haines	215	10	0
Groome	209	0	0
Minton	204	10	0
Cornwell	185	0	0
Barton (accepted)	180	0	0
Bishop & Hooper	175	0	0
Thomas	165	0	0
Parrish	150	0	0
Smythe	117	0	0!

For the erection of a farm-house at Pwllglas, in the parish of Trefeglwys, Montgomeryshire, for the trustees of the late General J. B. Woosnam. Quantities supplied. Mr. Evan Powell, architect:—

		Extra for 14-in. walls to the first floor.
George, Abbey Foregate, Shrewsbury	£899 11 0	£41 10 0
Hughes & Son, Marton Chirbury	792 14 1	44 0 0
Breeze, Llanidloes	767 0 3	29 12 0
Farmer, Wyle Cop, Shrewsbury	749 0 0	46 0 0
Edwd. Williams, Newtown	745 17 11	55 0 0
E. H. Williams, Llanbrynmair	730 0 0	20 0 0
Jarman, Llanidloes	728 10 0	—
Price & Sons, Leigh Minsterly, Salop	700 0 0	—
Evans, Caersws	673 3 9	30 0 0
Woolley, Llandinam*	630 13 8	45 0 0

* Accepted.

For additions to farm buildings, Pant Farm, in the parish of Trefeglwys, Montgomeryshire, for the trustees of the late General J. B. Woosnam. Quantities supplied. Mr. Evan Fowell, architect:—

Jarman, Llanidloes	£605 5 0
George, Abbey Foregate, Shrewsbury	507 7 0
E. Williams, Newtown	481 15 5
Hughes & Son, Marton Chirbury	451 16 6
Farmer, Wyle Cop, Shrewsbury	429 9 4
Evans, Caersws, Montgomeryshire	417 3 0
Breeze, Llanidloes	392 1 10
Price & Son, Leigh Minsterley, Salop.	374 15 0
Woolley, Llandinam	372 16 0
E. H. Williams, Llanbrynmair*	345 0 0

* Accepted.

For tanks, &c., Lincoln Main Sewerage Works. Contract No. 6. Mr. James Mansergh, engineer of the works. Mr. John James Henderson, city surveyor:—

Binns Bros., Lincoln	£5,380 11 10
Bell, London	5,218 16 0
Hill Bros., Britton Ferry	4,920 16 6
Small & Sons, Gloucester	4,787 1 1
Hunter, Nottingham	4,719 17 0
Dawson, Bury	4,695 2 6
Kellett & Sent'ey, Lincoln	4,556 19 9
S. & W. Pattinson, Ruskington	4,523 4 10
Bell & Sons, Nottingham	4,262 13 9

For repairing, painting, &c., at the Lion Brewery, Belvedere-road, Lambeth. Mr. Francis Edwards, architect. Quantities not supplied:—

Sharpe & Mills	£3,330 0 0!
Drew & Co.	1,660 0 0
Arres	1,650 0 0
Dilloway	1,579 0 0
Perry & Co.	1,400 0 0
Sykes	1,350 0 0
Ford & Sons	994 0 0
Van Camp	992 0 0
Sawyer	989 0 0
Langmead & Way	980 0 0
Ansell (accepted)	947 0 0
Cawthorn	875 15 9
Crutchfield & McCarthy	800 0 0
Knight & Tillotson	788 0 0
Allen	604 0 0!

For restoration of Langford Church, Essex. Mr. Edwd. Browning, architect. Quantities supplied:—

Longmire & Burge, London	£2,580 0 0
Hobson, London	2,539 0 0
Halliday, Oakham	2,500 0 0
Thodsy & Son, Cambridge	2,490 0 0
Thompson, Peterborough	2,430 0 0

For alterations, repairs, and decorations, to St. Bartholomew's Church, Gray's-inn-road:—

Dixon	£547 0 0
Ansell	532 0 0
Kilby	498 0 0
Axford	495 0 0
Southcott & Co.	467 0 0
Patten	460 0 0
Langmead & Co.	441 0 0
Jeffreys	420 0 0
Harris & Co., Old-street, E.C	345 0 0

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The Builder.

VOL. XXXIX. No. 1963. SATURDAY, JULY 10, 1880.

ILLUSTRATIONS.

CONTENTS.

The Progress of Invention.

IF it were possible to take an airy flight, such as that described by the imaginative author of the "Diable Boiteux," and to peep unseen at the silent occupations of our neighbours, we should probably be surprised at one feature of the time. We should discover, unless we are much mistaken, that a bent has been given to the energy of thought which is already producing marvellous results, — results, however, which can as yet only be compared to the upspringing of the first green blades which promise an abundant harvest hereafter. We refer to the great stimulus which has been given of late to the creative power of the inventor.

We doubt how far public opinion has yet recognised the character of the revolution in the midst of which we live. We are not speaking of political, or even of social, change. But we refer to that which is more potent in its effect than anything that legislation can produce,—the application of the forces of Nature to the service of man. The commencement of this revolution was made, as we all know, by the genius of Watt, in the invention of the steam-engine. The next powerful impulse was given by the genius of Stephenson, when he employed the steam-engine as a locomotive agent. And there are signs abroad that a third wave is on the flow, and that we are about to reap more fruit from the progress of invention than could have entered into the wildest dreams of the fathers of mechanical science. Not a month passes without some great indication of the activity of the inventive power. Not a step is made in chemical, mechanical, or physical discovery which does not open a wider vista, and a more commanding range of prospect, than could be attained at a lower elevation.

Two main obstacles tend to arrest the progress of useful discovery. One is the ignorance of the inventor of what has been done before his time. The other is the unwillingness of those who use inventions to admit that any improvement is necessary or useful, as compared with their own mode of conducting affairs. Of these the first, which has hitherto probably been the most serious, is also that which it is most easy to remove. It may be removed, to some extent, by journals such as our own. It is, at least, made to a great extent removable, by the admirable organisation of the Patent Office. As matter of economy in time, which is also economy in money, there can be no excuse for any inventor to whom London is accessible if he wastes his valuable time in the rediscovery of expedients already tried, owing to the fact that he has not paid a visit to the Patent Office, where, free of charge, he can consult the indices, and peruse the specifications, of all patented inventions bearing on his subject. And yet even at the moment at which we write we are told of a large expense to which a man of long and well-known mechanical experience is putting the War Department of a neighbouring nation, by making, on a large scale, experiments on the explosion of ordnance under water,—a point on which experiments already made on a small scale are, if correctly reported, entirely conclusive, in a negative sense.

Impatience, characteristic as it is of the peculiar idiosyncracy of the inventor, leads only to loss of time. True, this is loss of productive power; but nature is full of cases of the loss of productive power. It is a law of organic life that production is enormously in excess of what might be thought necessary to maintain a given level of numbers. The impatience of the inventor is a shadow cast by his genius, and we must be content to take him as he is, and to be thankful. But it is quite another thing when the impatience is displayed, not by the inventor, but by the opponent of invention. No great invention, as far as we are aware, has ever been brought before the world without awaking a very strong resistance. And this resistance, it often proves, is made by the very men who would be, when the account was finally balanced, the most benefited by the change. A case in point is that of the opposition made by divers to the introduction of a closed and safe diving-dress, in place of the loose diving-helmet which would fill with water if the diver happened to fall. Such, again, is the opposition which has maintained the prescriptive badness and ugliness of the ordinary brick, by the violent opposition made by the brick-moulder to brick-making machinery.

The most remarkable instance of a successful opposition to a great improvement which has hitherto been stated to us is that of an eminently respectable body of men to a simple invention that would enable them to work with far more ease, and probably to obtain far more work, than at present. We refer to the method of casting types, which was perfected, we believe, by a Pole, now many years since, and which, being connected with the further introduction of what were called logotypes, or compound letters to be used in printing, has been known by the name of the logotype system. Of that system, as a whole, we have nothing to say. No doubt it is extremely ingenious; but how far that ingenuity has a commercial value nothing but actual experience can determine. It is otherwise with the plan of casting each type with a letter at each end; reversed, as at present, below, but upright at top. In fact, it is as if each type were a solid letter, passing through a rectangle of metal. The effect of this is, that when the types are set up they can at once be read, the back of the form representing exactly the impression of the face. The objection to that method is, that any one can use it. That the trained compositor could use it better than any one else, and thus could always command his proper remuneration, cannot be denied. But the possibility that women, children, or even authors themselves, should be enabled to compose type, is said so to have alarmed a body of men who may be said to guard the very springs of printed literature, that the greatest improvement in printing made since the invention of movable types has not hitherto been carried out. It is, however, only fair to add that the compositors demur to the charge that they have opposed the introduction of this great improvement. Bearing in mind that utter impracticability in matters of business which is so frequent a characteristic of the inventor, it is quite possible that the blame of failure has been unjustly thrown on them.

It is well known to many of our readers that it is to the industrial application of electricity that science is now looking for the greatest and most surprising advance. Such advance is rendered possible by the fact that we now look to electricity not as a prime motor, but as a means of communicating power. For more than a quarter of a century inventors attempted to supersede steam by electricity. It was when, accepting the steam-engine as the cheapest mode yet known for converting heat into motion, they used the motion so obtained for the production of electricity, that a new chapter in physical science was opened. Light, sound, power, are all to be produced or transmitted, with wonderful economy, by the agency of electricity. Coal is, at present, the cheapest source for the heat thus to be converted and transmitted. But if the transmitting agency be developed, as the best authorities fully anticipate will be the case, to its full extent, man will be able to make use of the wasted mechanical force of nature, the action of the tides and the rivers, as a cheaper source of heat and of motion than coal, which he has to extract from the bowels of the earth.

As a sign of that inventive activity of which we speak, it happened that a few days ago the same morning paper contained notices of two novel inventions, quite independent of one another, the practical success of either of which would open a new chapter in the mechanics of daily life. One of these was the application of electricity to agriculture; the other was the application of compressed air to locomotion. In both cases the account was wrongly headed We were told of electricity as a motive power, and of compressed air as a motive power. The term is inexact. It is a survival from the time when the labours of engineers were turned in a wrong direction. It is as convenient, and probably hereafter fully successful, means of the transmission of power, that each of these inventions has its value. The air has first to be compressed before it can yield power from its elastic recoil. The Gramme machine has to be

set in revolution by a portable steam-engine before it speeds the plough or drives the thrashing machine.

Beginning with the invention which, if fully successful, will most directly affect the comfort of the inhabitants of cities and towns, we have to refer to some experiments lately made at the Royal Arsenal, Woolwich. Colonel Beanmont, R. E., has been for four years experimenting on the use of compressed air for driving locomotives. To avoid the necessity of carrying a furnace on an engine, to obviate heat, smoke, smell, in tunnels or city streets, while at the same time exerting a power as manageable as that of the ordinary locomotive, would be, there can be no doubt, an immense gain. Not a gain, we repeat, in cost or in production of power; but a gain of extraordinary utility in its application. For the passage of a train through a tunnel to be made a means of ventilation, instead of a means of poisoning the air, is an advantage that speaks for itself. We do not ask for that transmission to be made a source of direct saving. If the additional cost incurred be not more than will counterbalance the advantage gained, we shall be more than content; we shall have made in that case a very important step in the right direction.

The mother idea of Col. Beanmont is one that commends itself to the engineer. It is an application and a considerable development of that principle which, as carried out in the compound engine, has effected so much economy in ocean steam-transport. The object of the plan is to utilise during expansion the whole force that has been stored up by the compression of a given volume of air. This is effected by allowing the compressed air to pass successively through a series of cylinders, each of a larger diameter than its predecessor. Thus, admitted under a pressure of 1,000 lb. per square inch into the first and smallest cylinder, the air, having expanded and thus done its work, passes into a second cylinder of larger volume, where it repeats the process; thence, again, it passes into a third and yet larger cylinder, from a port at the side of which, having done its last period of work, it escapes noiselessly into the atmosphere. There can be no doubt of the elegance of the scheme.

The machine resembles a large tank upon wheels, which is distinguished from the ordinary locomotive in its appearance by the absence of a funnel. The present form of the engine, however, is not that which will be adopted in future. The air is compressed by a stationary engine and machinery into the reservoir of the locomotive air-engine. In the experimental trials reported, a distance of about 700 yards was traversed, to and fro, by the engine. The work done in hauling an aggregate weight of 12 tons for a distance of three miles is said to have reduced the pressure in the air-reservoir from 1,000 lb. to 820 lb. per square inch. As neither the dimensions of the cylinders, the volume of the receiver, or the incline of the road, are mentioned in the report, we are unable to make any calculation as to the economy of the process. The engine, we are told, is arranged so as to make a run of twenty miles with a single charge of air. It ought to be said, in explanation, what is the volume of the air used, and what the weight hauled, and the gradients of the line. We are informed that a gross load of 22 tons has been hauled for eleven miles, and a gross load of 12 tons for over twenty miles, under the inspection of the Arsenal authorities. If the mileage, with a single charge of air in each case, is measured, as we conclude must be the case, to and fro on the 700 yards of rail, the rise and fall of gradient, if any, may be taken practically to balance one another. But points of this kind ought to be distinctly stated, and not left to be inferred by men competent to form a scientific opinion on the work done. We shall be glad to receive exact particulars. The deduction is stated that the engine will take 3 tons one mile with the expenditure of one cubic foot of compressed air.

To compare this with the efficiency of a steam-engine we have to remember the serious loss of power that occurs in the case of compressed air as a transmitter of energy, due to the free action of heat. When air is compressed, the temperature rises, and calorie escapes by conduction and radiation, with a speed proportioned to the difference of temperature within and without the receiver. It was this incontrollable movement of heat that formed the insuperable stumbling-block in the progress of the atmospheric railway. At the pumping-stations on the South Devon line the air-pumps became nearly red hot, and much inconvenience ensued. On the other hand, the rarefied, and consequently cooled, air within the tubes had a great capacity for heat, which accordingly rushed in through the conducting surface of the atmospheric main, and raised the tension of the air within it. Thus the engines were doing more work in squeezing out of the air heat which rushed in almost as fast as it was extracted than they did in moving the trains.

In the present case, Colonel Beaumont has been aware of the extreme cold produced by the expansion of highly-compressed air, which is so great as to condense and freeze the moisture of the atmosphere on the working parts of the engine. To counterbalance this, a small steam-generator is used, which is carried on the framing of the engine. It may, no doubt, be possible not only to counteract the mechanical ill effects of the formation of ice, but also to supply heat to the expanded air in the second and third cylinders, by the agency of steam. But this agency requires the consumption of an equivalent quantity of coal. Here is another source of expense. With a fixed condensing apparatus, and a locomotive expansive apparatus, it must prove difficult, if not impossible, to prevent a serious loss of heat; that is to say, a serious excess of cost, as compared with the duty to be obtained from a steam-engine.

We do not make these remarks with the object of throwing cold water on a very elegant invention. To work a machine by compressed air (unless the prime motor be water-power), must necessarily be more costly than to work it by steam. But the convenience attained may be well worth the cost. In the case of city tramways, and of long railway tunnels, it would be well worth the while of the engineer to double the actual expenditure of fuel, if by so doing he could do away with all the annoyance of a locomotive furnace. We see no reason whatever to doubt that this may be effected, or that Colonel Beaumont's air-engine is a step in the right direction,—a step, moreover, which we hope to see carried to full and perfect completion by the gallant inventor himself. If those persons who take an interest in the matter will bear in mind that compressed air is not a source of power, but a mode of using power produced by the steam-engine, they will avoid undue expectations, and thus avoid unnecessary disappointment.

Remarks of exactly the same nature apply to the experiments recently made at Bar-le-Duc in the application of the Gramme dynamo-electric machine to agricultural purposes. Here, again, the reporters of the experiment head their account with the words "Electricity as a motive power." Here again it is the steam-engine which does the work, although the transformation and application of the energy liberated is effected, and possibly very admirably effected, by the intervention of the ingenious Gramme machine. Looking at what can now be effected by a pair of movable steam-engines, in ploughing, thrashing, and other agricultural operations, our own expectation is that it will be found to be chiefly, if not exclusively, in those cases where water is available as a cheap motor power that such an application of the Gramme machine as that made by M. Felix at Sermaize (in the department of the Marne), will be most useful. That opinion, however, does not detract from the interest with which these and all such actual experiments should be regarded. Two Gramme machines are employed; one is driven by a steam-engine, of which it is significant to remark that the power is not mentioned in the report. The other is fixed in a very solid framework of wrought iron, in the field which has to be ploughed. The transmission of the power from one Gramme engine to the other is effected immediately by a coil of wire on wooden reels. In this case it will be seen that, economically speaking, we have to compare the cost of the removal of the steam-engine to convenient spots for agricultural work, from time to time, with that of the providing of the electric apparatus, and of the removal of the second Gramme engine from spot to spot. There will also be the loss of power due to the friction of the Gramme machines, and the loss of electricity during conduction from one to the other. These elements of cost must, we apprehend, show a sensible balance in favour of the direct application of the steam-engine.

At the same time, the elegance and convenience of the transmission of power by copper wires is so great that we look with much interest to every practical experience on the subject. What M. Felix does, at Sermaize, by a steam engine, another cultivator may do, in another district, by economising the power of a waterfall. It is to the economising of the wasted force of nature that we must look,—first, for doing the work now done by the consumption of coal at a cheaper rate,—and secondly, for producing mechanical power, light, and heat, when our present coal-mines are exhausted. This is the ultimate point which the mechanic has to bear in mind. It is towards this that our most eminent electricians tell us that we are making steady progress. Our chief hesitation as to taking them at their word arises thus. If those laws of the conduction of electricity, to which we have before now referred, as enunciated by Sir W. Thomson and Dr. Siemens, are properly stated,—how is it that some practical demonstration has not already been given to the world? The saving to be effected is so great, that, in a country like our own, capital counted in millions would be forthcoming under far less promise of profit than that offered by this utilisation of electric force. How this may be, we do not at present understand. In the meantime, we look at such experiments as those of M. Felix with even more interest than at those of Colonel Beaumont. Only let experimenters and reporters keep it quite clear in their minds that compressed air, or dynamo-electricity, are not, properly speaking, motive powers, but transmitters, and transmitters at a certain loss, of motive power produced by the action of the expansive power of heat, or the constant activity of gravitation, and they will be saved from the danger of rash expectations, and more likely to take advantage of the facilities afforded by science.

STAINED GLASS FROM A MODERN POINT OF VIEW.

IN no respect does there seem to have been more difficulty in evolving a modern art out of revived Mediævalism than in the matter of stained glass, considered in reference to the style of design and the class of subject to be illustrated in it. A great many points in Gothic architecture, in regard to details especially, but in some respects also in regard to planning and arrangement of churches, have been so much modified under the influence of modern taste as to represent more or less of a real modern development from a Mediæval point of departure. The church which, as a whole, is a mere reproduction of Mediæval architecture, is becoming less and less common, and is only rigidly adhered to by a few very conservative church-building architects. But stained-glass design, though it has advanced very considerably in regard to the feeling for harmonious colour, still retains for the most part the characteristics of a modern Mediævalism. The same kinds of ornament, the same expressionless figures, still constantly meet our view, and seem to have become the stock-in-trade of at least a majority of designers, and to be regarded as an entirely satisfactory application of the resources of the art.

What makes this conservatism in stained-glass work the more remarkable is that at a comparatively early period of the Gothic revival it was recognised by some of those who took most interest in the subject that the archaic forms of Mediæval glass were not desirable models for mere imitation, more especially in regard to the figure. This is expressed strongly and plainly in Winston's admirable book, now a classic of long standing on the subject. He not only deprecated the mere imitation of archaic figures, but he pointed out reasons for thinking that the makers of the Mediæval windows had hardly even any deliberate intention of conventionalising their figures; that they, in fact, wished to make them as naturalistic as their skill and the material allowed, and only failed in naturalism through inability to compass it. They endeavoured, also, to represent the perspective of their imitative architectural details, instead of keeping them absolutely in one plane and in geometrical elevation. It by no means follows that they were right in their theory, or rather (to put it more truly) their want of theory; their imperfect power of drawing and execution perhaps kept them in a path better suited for the conditions of the art than that which they would have followed had their hands been more free to carry out their intentions. But it is, at any rate, significant that there is no reason to

think that the special character which belongs to Mediæval glass-painting was imposed upon it by deliberate choice, or, in fact, by anything else than the limitations set by a want of skill to attain greater freedom of treatment.

But it is still more important to bear in mind that neither was stained glass in that day regarded as essentially and by preference a religious form of art, as it still for the most part is in the eyes of its modern patrons, if not of its modern practitioners. It was only a religious or ecclesiastical art in so far as the whole higher life of the day was connected with ecclesiasticism, and therefore all the arts were brought to the service of the church, as the one great outlet for anything like artistic and poetic creation. It represented the current feeling and sympathies of the day truly and without affectation. But this same form of art in our own day, in spite of efforts which have been made to throw off mere Mediæval defects of drawing, and to improve modern stained-glass design in that respect at least, is nevertheless an affectation as regards the present day, and in this respect has nothing in common with the Mediæval work upon which it professes to be based. The latter was in its day a living art representing the tastes and the artistic powers of the men of the day, just as truly as the Academy and Grosvenor exhibitions represent the taste and artistic power of to-day.

Even when Mediævalism in the strictest sense has been entirely thrown aside in modern stained glass, it has mostly been only in favour of the imitation of another bygone style,—the Cinque-cento. We have had, from the neighbourhood of South Kensington especially, specimens of glass design in which the features of Cinque-cento stained glass have been reproduced; its rawness in regard to colour, its clumsy reproduction of bad architectural detail, its rococo ornamental details. This is, in reality, a more undesirable form of imitative art than the quasi-Mediæval, as, with no more claim to originality, it has not even the merit of fine colour or of a treatment which brings out the characteristic qualities and effects of the material. Some of the work of this kind which has proceeded from quarters whence we have a kind of official right to look for artistic work, has been positively ugly as well as unsuitable, both in colour and design, and has presented no merit but that of falling in with the current taste for rather debased Classic detail, and providing windows to match.

There is one other class of stained-glass design which has considerable merit, that which may be called the modern Domestic style: a style in which simple motives in foliage design are introduced, consisting generally of sprigs of conventionalised flowers, treated often, both in design and colour, in a manner entirely suited to the material. The deficiency in most of this glass is, however, that it commonly wants distinct meaning and significance; that subjects that would be very appropriate and good as borders to some central design, become the centre and only object in the window; and, moreover, that there is a great want of variety and individuality in it; wherever we turn we see the same forms and the same colours; that it is, in fact, a recent mannerism, correct and tasteful in itself as far as it goes, but a mere mannerism, which any draughtsman can produce with little of pains or thought when once he has got the trick of it.

Now, we cannot but suggest that if stained glass be to be used at all in important situations, much more may and should be made out of it than this. We have much talk about the great importance of high-class mural painting at present, and the great work which such painting is calculated to effect in educating and improving public taste; and painters of the first rank among us have given some of their best efforts to it in a few instances, sometimes with signal success. But there seems to be no suggestion that translucent mural painting (which is what stained glass is) may be worth as much attention and as much application of the best artistic genius, as opaque mural painting. Stained glass is at present, in fact, even in its most satisfactory forms, rather an art-manufacture than an art.

Does stained glass, then, admit of the treatment of all the subjects which could be treated in mural painting, and under the same conditions? Certainly not. It is useful, perhaps, to look back at what has been done during the real lifetime of the art in the past, and see if we can gather from that any decided conclusions as to what can and what cannot be effectively attempted in the future. In regard to what cannot be done with effect, the point most plain to every one of critical perception is that landscapes and perspective grouping are entirely out of place. The former no one in his senses attempts now; but in regard to the latter it is necessary to reiterate the caution, for in many quarters there is a persistence in the adoption of perspective treatment, interiors with "vanishing points" and many figures on different planes of distance are still frequently to be met with, and all alike tend to prove that such a treatment is an utter mistake. A mural painting, though not admitting, in its most satisfactory modes of execution, of the illusory perspective and gradations of tone of a cabinet painting, nevertheless admits pictorial illusion to a certain extent, both in perspective and in gradation of distance, especially if its architectural framework be so designed as to give sufficient solidity to the architecture enclosing the space painted on, without absolutely demanding that the appearance of a flat wall should be retained in the painting. But a design which is lighted by transmitted light is (to repeat a commonplace for the hundredth time) essentially deharred from perspective or pictorial treatment by this one fact, even apart from other difficulties which are involved in the mechanism of the process, such as the impossibility of real gradation of tone, and in the necessity (in the only good and durable method) of strong lines of construction showing all over the picture.

Shutting out this kind of treatment, then, from among the possibilities of stained glass, we find in the art of the past in this material several different elements of design. We have figure-subjects in flat treatment, either in single figures or in groups, most often the former, as single figures are always more easily and suitably treated under such circumstances. We have ornamental diaper design founded either on geometrical or on floral types, and we have mimic architectural design serving usually as a framework to figures, and seldom used without them. This latter form of decorative adjunct has been a great favourite with modern stained-glass designers, as it was with Mediæval designers, during the latter period especially of Mediæval art. Perhaps it is not too uncharitable to suggest that in both cases the motive for favouring this style of treatment was the same,—in part, at any rate: it saves a great deal of trouble in design. The architectural features are, so far as the glass-designer is concerned, ready made to his hand, and their reproduction in the glass is a mere matter of drawing and arrangement, involving little or no thought. In addition to this, there may seem to be a suitability in repeating in the window design, in little, some of the architectural details of the building, so as to produce a consistent whole, the smaller decorative details repeating some of the character and design of the larger ones and of the whole building. And it is unnecessary to remark that this kind of repetition in little has been the basis of a great deal of architectural ornamentation in many styles and in many periods, and there is a good deal to be said in favour of it. But we do not think that the realistic imitation of architectural details in the window design is to be approved. If the influence of architectural detail shows itself in the window, it should not be in this way, but in a highly-conventionalised design which might appear as obviously suggested by, and in turn suggesting, architectural detail, but as completely modified to suit the conditions and requirements of glass. To do this well requires thought and consideration, and therefore it is not likely to be so popular a method; but it is the true one, and has the advantage, as it has not yet been much attempted, of affording a field for some novelty and invention in regard to detail.

In regard to diaper ornament, there is a wide field for invention. Hitherto our glass-designers have been just running in a groove, or, perhaps, in two grooves; but usually in one or the other, either that of conventional Mediæval foliage, or that of conventional modern foliage. Both employ very few types, and these are very artificially repeated. The Mediæval types may be summed up into the peculiar and admirable conventional scroll foliage which the earlier Mediæval designers invented (than which nothing, of course, could be better in its way), and the more naturalistic treatment of ivy, oak, or maple leaves. Modern conventional foliage has sought some new types, but they are still not very various, and the designs produced seem to us to have on the whole a remarkable degree of family likeness. Considering the endless variety of nature, it certainly cannot be said that we are quite at the end of our tether yet, and would seem that a study of floral designs from nature, appropriately conventionalised, ought to furnish work for new designs for a long time to come. We need, however, except in the case of a very small piece of work, something more as a central motive of interest than a mere diaper, however successful. To make the foliage grow out of a conventional vase, we may respectfully hint, is not quite sufficient. On the contrary, it is a piece of false artificialism, adverse to the true spirit of high-class ornament, which should be based either on abstract proportion or on forms of nature conventionalised according to natural principles; not upon any imitation of artificial objects, which is always a sign of weakness, and a source of vulgarity of effect. Heraldry is rather at a discount now, otherwise it affords a very good and legitimate means of giving some meaning and interest to a window, without which a mere diaper is no more than a successful wall-paper pattern shown in more brilliant colouring than is possible on an opaque wall. The introduction of scrolls with inscriptions is a means of imparting a meaning to a window which may be varied in relation to the various destinations of the window designed, and which, in combination with foliage diaper, may be elaborated into something very satisfactory to the eye and suggestive to the mind. But it may be suggested that one of the best ways of giving specialty of interest to a stained glass design is in the introduction of either ideal or portrait heads. This source of interest has not been enough drawn upon. Whatever difficulties stained glass imposes upon figure design, the portrayal of character in large-sized heads is possible in it with great effect, provided that the treatment is of that broad, decided style in which a few lines give the likeness and the expression, omitting details of modelling such as cannot be expressed on glass. Tennyson gives us a hint in the decorations of his "Palace of Art,"—

> "And from the topmost oriel's colour'd flame,
> Two god-like faces gazed below,—
> Plato the wise, and large-brow'd Verulam,
> The first of those who know."

But we opine that the treatment of portraiture of a less ideal kind may be successfully achieved in stained glass. And the introduction of even a single medallion of this kind in a large light is sufficient to give it an interest and a meaning; the spectator will be content with a large expanse of good diaper work, provided it lead up to something ("and so grow to a point"), but he will hardly be content for very long with diaper and nothing else,—*toujours perdrix*.

We passed over the question of merely formal diaper design, produced by the interlacing of various shapes with no assistance from floral types; but it may be observed that here, too, we are travelling round in a beaten track. The designs that are made for merely ornamental quarries and interlacing diapers are mostly only repetitions of Mediæval types. These types themselves might be varied and improved upon more than they are; and the rich and endlessly-varied combinations suggested by the Saracenic type of ornament alone have hardly been touched upon. Another suggestion that might have been made, when speaking of floral types of design, is that in designing windows for a Renaissance building there is scope for the treatment of some of the types of conventional foliage which are peculiar to Roman and Renaissance ornament, in such a manner as to convey the same general effect which belongs to such ornament, while employing in detail natural leaves and flowers—an experiment which has hardly ever, as far as we are aware, been made.

In regard to the highest class of art, figure design, what are we to say as to the capacities of stained glass? We are disposed to urge that the art is very well adapted for the display of figure design, single figures especially (better than groups), on a tolerably large scale and with a sufficiently severe and what may be called in a sense sculpturesque kind of treatment. Figures on a small scale are seldom successful in regard to the heads: the detail of the expressions is almost necessarily missed, on a small scale, in so inflexible a mode of execution, and even the limbs (if shown) are apt in such a case, with whatever care, to appear coarse in execution, and overweighted by

the heavy lines of the leading. These latter, on the contrary, have no ill effect on the figure when on a larger scale; and even subjects which include the whole figure may be represented, we believe, with good effect in stained glass, provided the design is treated with that degree of conventionalism which prevents the spectator from feeling the want of realistic tone and tinting, which would be hardly possible. It may be thought that to use the whole figure in stained glass would be to throw away too much what is one of the chief capabilities of the art,—that of brilliant colour effect; but we do not always require highly or richly-coloured windows; and if the plain surface occupied by the figure be sufficiently relieved by the juxtaposition of diaper and other decorative surfaces or adjuncts, not in so heavy a key as to contrast harshly with the figure, the requirement of colour and richness would be sufficiently fulfilled. The attempt would, at any rate, be an important step towards breaking through the merely ecclesiastical idea about stained-glass figure-subjects.

We do not, as we said, always want richly-coloured subjects, and, in fact, the effect of heavily-toned stained glass in lessening the scale of an interior is a point as often overlooked as it has been often referred to and commented on. The key of the interior in regard to tone (if decorated), the scale of it, and other conditions (as to access of light, for instance), should determine the key of the stained-glass design, which may sometimes necessarily have to be rich and heavy, in order to make itself properly felt, and to aid in producing the total effect required; but which very often operates injuriously by being over rich and strong in colour. Primary colours, it can hardly be too often urged, should seldom or never be used in large masses,—rather in brilliant points. But whatever reticence may be judicious in regard to colour in many instances, it may be said that in regard to ornamental and diaper design hardly any degree of elaboration, if carried out in good taste, can be too great for the situation. Whether high or low in scale of colour, a stained-glass window is essentially decorative art, and the more decorative, we might say, even (under certain restrictions as to colour and keeping), the more sumptuous it is, the better it fulfils its purpose as a part of the whole.

EXPLORATION IN ASIA MINOR.

MAGNESIA AND THE TEMPLE OF ATHENE-POLIAS AT PRIENE.

HALFWAY on the dusty, burning road that Cicero described 1,800 years ago, and which leads from the antique Tralles, the modern Aïdin, of which M. Rayet has told us so much,* and the squalid village of Aya-Sonlouk, which has replaced the once opulent city of Ephesus, lie, at the eastern foot of the Kemer-Dagh (the classic Mount Thorax), a heap of ruins marking the site of Magnesia of the Mæander. Surrounded though it is by the marshes of the river, the district is one of the most fertile and actively commercial of the vilayet of Aïdin, the neighbouring plantations of Deirmand-Jik producing the finest figs of the whole province. In antiquity this plain, even more productive, was the source of immense activity, all the busy commerce plied between Ephesus and Miletus on the coast and inland converging by the high road at a point where in the past existed a great city, now marked alone by a mass of scattered ruins which lie near the hamlet of Tekke. Various have been the theories as to the identity of these remains. Hamilton was the first, so M. Rayet tells us, to suggest that this was the site of the city of Magnesia, a view adopted also by Leak and Rennel in their works on Asia Minor.

The ruins of Tekke are not, however, those of the first city, which was built in the plain, and which bore the name of Magnesia. The older city was abandoned as incapable of being defended, in the middle of the fourth century before our era, and the inhabitants moved to the spot where now lie the chief mass of the ruins. Long used as a convenient quarry of ready-made building materials, centuries of pillage still leave these ruins of more than usual interest. Although in part described by most of the travellers to this portion of Asia Minor, the first trustworthy information is to be gathered from the drawings and notes of the French architect, Huyot, who visited Magnesia as far back as 1820, accompanied (a point of special interest to our readers) by two enthusiastic young students, M. Drenx and a veteran past-President of the Institute of British Architects, Professor (then Mr.) Donaldson.

The drawings and notes then made were purchased in 1841 by the French Government, and they now repose in the MS. department of the National Library. They comprise a plan of Magnesia, together with others of the stadium, the theatre, the gymnasium, the thermæ, and, finally, a panoramic view of the widely-scattered ruins,—an interesting drawing, which is reproduced in the atlas that accompanies the second part of the work of MM. Rayet & Thomas.

More important explorations were undertaken in 1842 by M. Texier, with the help of the French Government. Fever, however, was added to the many other difficulties, and little work was sent home; but M. Texier has described the expedition in his work on Asia Minor. It is only to be regretted that the plans and drawings of M. Clerget, an architect who accompanied the expedition (and who fell a victim to the fever), were not published. As a more recent authority, we have M. Tremaux's work on an archæological exploration in Asia Minor, published in 1874.

Scattered among the reeds that cover the site of Magnesia may be seen a number of dislocated blocks, which doubtless show the line of the city walls. The space which this line confines is considerable,—some 1,200 yards from east to west, some 900 yards from south to north,—a space which, even at the height of the prosperity of the town, it can scarcely be believed can have been entirely covered with houses and public buildings. On the heights few remains have been found; but on the slopes the relics unearthed point to the existence of a large population; the ruins of the principal monuments all lie in the lowest portion.

The most important and most imposing of these is a large rectangular enclosure, some 200 yards long and about 150 yards broad. The walls remain, and show several of the secrets of their construction; the whole interior can be seen. M. Clerget, it would appear, prepared a number of plans for their restoration, and among the illustrations of M. Rayet's work we are promised the reproduction of some of the more important of these. It would appear also that this enclosure is no less than the sanctuary consecrated to the great divinity of Magnesia,—to Artemis Leukophrunê, one of the variations of the lunary, and, at the same time, a prolific goddess, who occupies the most important place in the religion of Caria, and of which the Artemis of Thebes is the best known type. A number of coins are reproduced by M. Rayet in support of this theory.

Among the other remains of the town of Magnesia few have escaped the reckless hand of man. Huyot, in 1820, observed more than one ruin of which no trace now exists,—notably the conjectured *agora*, of which now not a vestige remains. Near the *odeon*, to the south of the *agora*, was the theatre, of which Huyot gives us an interesting view; other ruins that may be those of the thermæ, and, not far distant, probably those of the *stadium*, and near these the presumed gymnasium, are all that speak of the past magnificence of Magnesia. The texts of the ancient authors point to the existence of numerous other monuments in the past: the Temple of Athene, the important tomb of Dionysius, the Temple of Zeus Sosipolis, with many others.

As for the history of Magnesia, those who may be interested in learning the story of the rise, the development, the golden days, and the decadence of this once important city, will find it ably told at length by M. Rayet in the several chapters which close the second number of his work. Bulky notes refer the reader to the authorities quoted, while a number of interesting and beautiful coins figure as further original documents of reference and corroboration. In these chapters we can trace the whole history of Magnesia, from its Greek origin to its subjugation by the Persians (Themistocles governed Magnesia for many years under the Persian rule, and it is almost certain that the so sadly ill-treated general died in the city), through the period of its existence under the Macedonians. Already in the third century before Christ it would appear by Polybius that fige formed the staple of commerce, as Zeuxis, the general of Antiochus, we learn, was victualled by the Magnesiates with "dried figs"—down to the day when, in the second century (109 B.C.), Magnesia saw under its walls the oaques and bucklers of a Roman army under the command of Manlius Vulso. The last information to be gathered of Magnesia must be sought by the aid of the numismatist; and the documents which the coins of Magnesia supply are numerous. The activity of its mint shows, indeed, how long the town continued to be wealthy and prosperous. At the commencement of the Byzantine empire it still existed as the seat of a bishopric. The decadence began when the disastrous wars waged with the Greek empire, in the first place by the Persians, then by the Arabs, and finally by the Turks, obliged the inhabitants to withdraw to a stronger fortress. Magnesia, difficult of defence, was entirely abandoned, as in its ruins not a vestige has been found belonging to the Middle Ages.

The illustrations that accompany the second part of M. Rayet's work are no less interesting than those which show us the antique city of Tralles. To Magnesia is devoted a fac-simile of M. Huyot's sketch of the ruins, taken in 1820, together with a number of beautiful photo-gravures of the bas-reliefs from the Temple of Artemis, and a view of the existing state of the site.

The third part of the work of MM. Rayet and Thomas, and which has only very recently made its appearance, deals with the description of the explorations of Priene, being almost entirely devoted to the Temple of Athene Polias. Priene, which lies on the northern shore of the Gulf of Latmos, is now marked by a village situated far inland, the hamlet of Samsoun. Priene has been visited and explored more than once. In the last century Chandler and Revett, who had been sent to Asia Minor in 1765, by the Dilettanti Society, visited Priene, of which they have left an interesting account and a view, with details, in the first volume of the "Ionian Antiquities." As for the somewhat more recent explorations of Mr. Pullan (of Halicarnassus memory), they are familiar to the profession.

Almost in the centre of the site of the antique city rises, amidst the scattered ruins, an eminence of elliptical form. To the north and east the approach is gentle; to the west and south it is abrupt; at its feet lie the *agora* and the *stadium*. It was this eminence, visible from a great distance, that became the site of the sanctuary of the protecting goddess chosen by the Prienians, the blue-eyed Athene Polias. Chandler and Revett, who first explored the temple, have left us a view, and some important architectural details; but it was not until a century later (at the end of 1868) when the same Dilettanti Society sent out Mr. Pullan that the temple received the careful attention which its artistic beauty merited. It will be probably remembered by many of our readers how easy the first operations were; the earth covering the ruins being rapidly removed, before the end of the same winter the ruins were cleared. The bas-reliefs and architectural details discovered by Mr. Pullan having been presented by the Dilettanti Society to the British Museum, the indefatigable Mr. Newton visited Priene, in company with Mr. Murray, in order to make his choice of and attend to the transport of the precious relics. The specimens he sent home are familiar to us all.

Unfortunately, as M. Thomas points out, the explorations of Mr. Pullan only hastened, after his departure, the destruction of the interesting monument. Priene, like Magnesia, became an excellent quarry of ready-made material, and M. Thomas, in speaking of the ruin worked by the worthy natives of the neighbouring village of Kelehech, refers to an anecdote of Mr. Oakley Clarke finding in 1870, at the foot of the wilfully-broken pedestal of Minerva herself, a beautiful coin, a tetradrachm of Orophernes II., king of Cappadocia.* The news of this "find" spreading, unfortunately increased the destructive zeal of the inhabitants, though several other coins were brought to light.

In spite of these successive and destructive onsets, Priene still presented in 1873 remains of great interest. While the explorations at Miletus were being continued, M. Thomas paid a first visit to Priene, and in the following year our two

* See *Builder*, p. 3, *ante*. "Milet et le Golfe Latmique: Tralles, Magnesie, Priène, etc." Par Olivier Rayet et Albert Thomas. Parts II. and III. Paris: J. Baudry. 4to. 1880.

* To Mr. Clarke, mentioned at this point by Rayet, a heart-felt tribute of gratitude is expressed for his kindness in rendering him and his companions not alone his friendly assistance, but the deeper obligation of kind attendance during a severe fever.

anthors were able, in company with Mr. Newton, to study in detail at the Britisb Mneeum all the fragments carried to our ehoree. It is by this meane that have been gathered the documents and authorities by the aid of whicb have been executed ths rostorations of MM. Rayet and Thomas. In a series of sub-divisione the various portione of the temple are considered.

It is to about the year 312 or eo before our era that can be attributed the dedication of the temple. Long before 334 the plans of the edifice muet have heen eettled and the erection commenced. The Greeke, M. Rayet at this point remarke, never urged, as far ae have done the moderne, the eearch after originality. Art with them never strayed into bye-paths, but followed a perfectly regular marcb. This was especially the case with architecture, submitted by its very nature to positive neceeeitiee and to mathematical rules*. The architect of the temple was Pythios, mentioned by Vitruviue. Pythioe, we learn from varioue sources, gained from the erection of this temple a great celebrity. We know also that, ae ws find in the caee of many other Greek architects, be had ehown in his Commentaries the merits of his work. In thie work he euetained a singularly ambitious theory on the extent of the learning necessary to the architect; he further declared open war against the Doric order, the proportione of which were, he asserted, faulty and ungainly. Putting into practice his theoriee on the universality of the learning neceeeary in hie profession, Pythios was not alone an architect and a writer; if we are to believe Pliny, he wae also a eculptor, and it was he who executed the colossal chariot in marble placed at ths summit of the pyramid of the Mausoleum, and of which the statnes of Mausolue and Artemieia remain almost intact. Thie union of the talents of eculptor and arcbitect, remarke M. Rayet, was not rare in antiquity, for, at the eame epoch, Scopas offers no another example.

To attempt to summariee the description of the temple which M. Rayet'e colleague, M. Thomae, has so learnedly and technically entered into, ie beyond the limite of our epace. Those who may he interested in further research into the subject will find in thie third part of the work of MM. Rayet and Thomae a number of well-classified and illustrated details. Of the various parte of the temple of Athene Polias; the *temenos* paved with marble slahs, the rectangnlar flat form on which rises the edifice; the *secos* divided into its three portions, the *pronaos*, the *naos*, and the *opisthodomos*; of the many columne of which the hasee remain, only one capital exiete, and that is mutilated; another, it will be remembered, ie now in the British Museum. In describing the walls of the *secos*, M. Thomae speaks of the perfection of their workmanship, which is carried, he etates, as far as in any of the monuments of Athene. The stonee do not adhere to each other on their whole breadth; but only on a hed of ahont 4 in. all round the ontside, the central portion heing hollowed and ronghed. By this means joints which are almoet invisible were ohtained, at the eame time that the surface in contact was sufficient for solidity, this heing further menred hy a double eystem of metal fixinge hinding the blocks together, horizontally and vertically.

A ehort notice ie devoted to the fragments of eculpture discovered in the ruine; thoee helonging to the colosea etatne of Athene fonnd by Mr. Pullan were cent home to the British Mneenm, and other sculpturee were found, hnt it ie not certain from what part of the edifice they come.

To the polychromatic decoration of the temple M. Thomas devotes also aome attention, for, as he states, no one can now deny that colonr played a great part in the decoration of the Greek temples, though perhaps the general tendency hae heen to somewhat exaggerate thie part. The ruins of Priene offer to the student of classic polychomy several pointe of interest; on several architectural membere have heen found coats of perfectly preserved colonr, which appear in all their hrilliancy when ecraped. Three facte may he deduced from the researches, firstly, that thoee portions where no trace of colonr hae heen found were never painted; secondly, that the colour wae only applied on the gronnd and hollows of the monldinge, the eculptured portions, and the caissone; thirdly, that two coloure only were employed, a dark red (cinnahar) and a light hlne (silicate of copper), the eame colonr need in the decoration of the Propylæa at Athens.*

A eerice of carefnlly-drawn details, beantiful in their exactnee, together with several plates of learned restorations hy M. Thomas, illustrate the number of the work devoted to the Priene explorations. One plate gives coloured details of the capital and hase of the columns of the *pronaos*; the other platee, that form the "atlae" of the second and third numbere, illustrate the explorations at Miletne and Didymus, of which, however, the accompanying text hae not yet appeared.

In England, the portion that deals with the Priene ruine will he read, perhape, with the moet general interest, as we have in our British Mneeum eo many preciove remaine of thie intereeting Temple of Athene Polias, so beantiful a model of Ionio architecture fonnd in Ionia itself. The hook of MM. Thomse and Rayet will form an almoet complete guide to the possessions from thie country and this epoch contained in the European collections, a work only the more welcome and the more valuahle to archæologists and artists as the explorations of Mr. Pullan had remained so far nnpnblished.

* M. Rayet further classes the successive evolutions of Ionic architecture in Asia Minor from 360 B.C. to abont 200 in the following order:—First, the Temple of Priene, and the mausoleum of Halicarnassus; second, the Temple of Ephesus; third, the Temple of Didymes; and lastly the Temple of Magnesia.

* A cake of this colour was found in the necropolis of Camiros, and is now in the British Museum. Later on the colour was made in large quantities at Alexandria; and finally, in the first century B.C. at Pozzuoli, Vitruvius has described its preparation (vii. 11).

THE TAY BRIDGE REPORT.

A FULL, clear, and definite report has been presented to the President of the Board of Trade by Colonel Yolland, R.E., and Mr. W. H. Barlow, C.E., on ths canees of the destruction of the Tay Bridge. When we consider the numerous instanoee,—not to say of the miecarriage of justice,—but of tho mode in which legal technicalities have of late been fonnd to he so involved as to set in one place judge against judge, and in other cases judicial decieione against pnblic policy, or even against common eenee, it is with some satisfaction that we call attention to a case in which a definite ontcome has resulted from an inquiry into engineering facts. Nor is our eatisfaction any the less, hecanse the reporters have taken precisely the view that we indicated in tbeee colnmne on the first occurrence of the catastrophe. "With iron work and bracing of snfficient strength in all their parts, held down hy strong holte hedded deep in the eolid mass of the piere," eay the reporters, "there is no donht that the caieeons are wide enough to permit of piles heing constructed adequate to perform all the duty required." The evidence of a competent witness ie cited a little further on to the effect "that if the columne had heen etrongly hraced, etrongly fitted, and strongly held down hy holding-down bolte, tbe piere would have been standing now."

There ie one, and we think but one, feature in the report which we hold to he liahle to ohjection, or, at all evente, to question. That ie, that either of the engineers who were conenlted ae to the design of the hridge ehould have heen asked to act, and should have acted, ae reporter. Thie is against the general rule in snch cases, and might have jnstified a challenge of the arhitrator (for such he virtnally wae) on the part of the engineer of the Tay Bridge, aseuming that Mr. W. H. Barlow, F.R.S., ie tho Mr. Barlow epoken of in hoth cases. Bnt while we hold that there ie a certain weight in this objection, we do not see that any great practical difference can have reenlted from the nomination of a man of the deservedly high reputation of Mr. Barlow. At all events, there hae heen no hlinking of the fact. The report ie qnite candid on the enbject. But it puts the reporters on their own defence, which is, we think, eomewhat to he regretted.

Mr. Barlow and Dr. Pole, being asked to carry ont the investigation of the atmoepheric or etorm pressnre against which it was necessary to provide in the case of the Tay and Forth Bridges, consulted the Astronomer-Royal. Sir G. Airey replied that "We know that in very limited surfaces, and for very limited timee, the pressure of the wind doee amonnt sometimes to 40 lh. per square foot; or, in Scotland, prohahly to more." This ie the positive evidence, farnished hy an experienced physicist; and was the hasis on which calculation ehould have heen made. Sir G. Airey goee on to eay that positive knowledge, as far as he is aware, goee no further, hnt that these high pressures are momentary, and, he adde, "I think we may say that the greatest wind-pressure to which a plain surface like that of the bridge [the Forth Bridge] will he subjected in its whole extent ie 10 lh. per eqnare foot." Thie, it mnet he noted, ie given ae opinion only, while the pressure of 40 lh. or more ie given as matter of fact. In thie opinion, even after what has occnrred, we are not wholly dispoeed to disagree with Sir G. Airey. At the same time, the expression nsed ie one very liahle to mielead, and which, in point of fact, has, we think, misled thoee concerned. No engineering or architectural calculation depends on the estimate of what would he the greatest wind-pressnre, at one time, over tbe whole extent of the bridge. The information reqnired for structural purposes was,—what ie the greatest pressure which, at any moment, can come on a single bay? No matter how momentary the preeenre, that ie the maximum that we eeek to know. And, if there is no evidence ae to how limited the area of highest pressure for the moment is, no one would be eafe in taking any diminution of that pressure over the whole surface of one bay, in calculating that against which the engineer was honnd to provide. Thns, ae far as the weight of the advice of the Astronomer Royal goee, no engineer, we think, would have been justified in disregarding the probability that a eide pressnre of more than 40 lh per foot might come on any single bay of the bridge. But Messrs. Barlow and Pole reported upon tbis,—"We may, therefore, safely adopt 10 lh. per sqnare foot ae side pressnre." That ie qnite another matter. We think that on one side the Astronomer Royal, and on the other band Sir Thomas Bonch msy justly demur here. We do not understand the former to havs given an engineering opinion as to the proper atrength of the hridge, though he gave data hy which a cautious engineer would, we take it, have been induced to allow at least 50 lh. per foot of reeisting power. Had that been done, as far as the evidence on the trial goee, the bridge would have been now standing. Bnt the report of Messrs. Barlow & Pole converted tbis maximnm pressnre of more than 40 lh., and this general pressnre of 10 lh. over the whole extent of the hridge, into an allowance of 16 lh. per eqnare foot *over the bay*. Sir J. Hawkshaw, Mr. Bidder, Mr. T. Harrieon, and Mr. Barlow signed the report adopting these conclnsions. That the conclusions were wrong let the facte tell. That they were not the true ontcome of the facts stated by the Astronomer-Royal, we think is indieputable. It ie an instance of the disadvantage of forming an opinion ae to phyeical facta npon evidence collected for other purposes, and in other hranches of inquiry. If the eminent engineers whose names are attached to the report had collected their own facts, it cannot he for a moment supposed that they would have thonght 16 lh. per foot a proper allowance for storm-pressnre. If Sir G. Airey had had to build the hridge, it ie pretty certain that he would not have heen satisfied with snch a margin. But as far as Sir Thomas Bouch is concerned, he hae a very strong case for insisting that an allowance of 16 lb. per foot was that considered adequate hy four of the first engineers of the day. The partial embarrasement of the reporters ie to be read in the paragraph,—"It mnst not he understood, however, that we express an opinion aa to the sufficiency of a provision for only 10 lb. of wind-pressure in a large span of 1,600 ft. ... Two or more gnsts might act simnltaneonsly on eo large a span, or there might he a wind-gust of nnusual width." No doubt; and no doubt that not only this might have heen, hnt was, the case. The point which, in common justice to a gentleman who hae quite enough reeponeihility on his shoulders, as it ie, to demand the moet fair and liheral allowance on the part of his jndges, is this. Ieit fair or jnst to eay in one hreath,—"We may, therefore, eafely adopt 10 lb. per foot ae the eide pressure," and to add, "We think Sir T. Bonch mnet bave misunderstood the nature of that report, for, as it pointed ont that the pressure of gnste of wind amonnted to 40 lh. or more, it was ohviously necessary to provide for the pressure eo arising *in each of the spans of the Tay Bridge*"? That all along has been our contention. We hold that it is indieputable. It hae heen confirmed hy the terrible logic of facts. But it ie rather late in the day for a reporter who wrote, "allowing, therefore, 16 lh. per square foot," now to say that that allowance ought to have heen trehled,—that is, to say so after the fall of the bridge.

We, therefore, feel that Sir Thomas Bouch has a fair claim,—if it he the case that he provided for 10 lb. or for 16 lb. pressure on his girders,—to share that responsibility with Messrs. Hawkshaw, Bidder, Harrison, and Barlow; and we feel confident that most impartial persons will admit the force of this plea in mitigation.

Passing over this difficulty,—which ought to have been avoided,—we come to the conclusions of the reporters. These are,—(1) That there is no evidence of any movement of the foundations of the bridge; (2, 3) that the iron used was of fair, though not of the best, quality; (4) that the girders were of sufficient strength; (5) that the piers, though adequate to support the vertical weight, were not sufficiently substantial or sufficiently braced, their great height being borne in mind; and (6) that their workmanship and fittings were inferior; (7—11) that the inspection of the bridge was not what it should have been, and that the speed allowed over it was too great; (12) "that the fall of the bridge was occasioned by the insufficiency of the iron bracings and fastenings to sustain the force of the gale on the night of December 28, 1879, and that the bridge had been previously strained by other gales"; (13, 14, 15) that the first set of continuous girders, covering four spans, were the first that fell, after the engine and train had passed over the fourth pier.

The reporters agree with us in the view that the evidence does not support the hypothesis that the carriages left the rails, and struck the girders, thus causing the fracture. They conclude with a paragraph which is of great importance, both as illustrating what we have before urged as to the comparative ease with which an event can be predicted, —after it has happened,—and as embodying the one practical outcome of a very extended inquiry.

"In conclusion, we have to state that there is no requirement issued by the Board of Trade respecting wind-pressure, and there does not appear to be any understood rule in the engineering profession regarding wind-pressure in railway structures, and we therefore recommend that the Board of Trade should take such steps as may be necessary for the establishment of rules for that purpose."

Unfettered by any antecedent expression of opinion, Mr. Rothery has spoken more decidedly as to the defects in the design and construction of the bridge. We wish that we could find more room for modifying his conclusions than we have above indicated. His reference to the allowance of 55 lb. in France, and of 50 lb. in the United States, for wind-pressure is most striking. His remarks as to the *quasi* responsibility of the Board of Trade are very just, and we cannot but assent to his opinion that it is rather for the Royal and civil engineers of Great Britain to investigate the important question of the pressure of the wind, and to frame rules for providing to resist it, than it is for them to pray to Hercules in the sanctuary of the Board of Trade.

ETRUSCAN-GREEK VASES AND THEIR TEACHINGS.

IT would be very difficult to find a subject of more or higher art interest (educationally) than that of the rise and fall of so famous and individualised a country and race of men as ancient Greece and the Greeks, from their first beginnings to their ultimate decline and all but extinction as a separate nation. Looking at the Greek and his doings when in his prime, and when he filled so finely-marked and conspicuous a place in the history of the world, it would seem hardly to be within the bounds of possibility that he should ever disappear and cease to be, or that what he did in the world of fine art could come to an end, or in any way die out and be no longer produced. But so it has been. Much has been thought and written on this fine theme, but the subject will admit of much more, for there are aspects of it but hitherto little more than glanced at, and it is to one or two of these that we would now call a moment's attention, as there would seem to be a chance of our seeing in both our national museums—the British Museum and the South Kensington Museum—much larger spaces devoted to the exhibition of what remains to the world, after so many ages of neglect and forgetfulness, and the loss of so much of the past art of it—of its architecture, and sculpture, and drawings, and through them of its antique methods of work.

Pending these further opportunities of increased insight into a matter so far from the present of things, we may make a note or two on the singular fact in the days that are gone by always to be found in the old art of the world,—birth, growth, however gradual, and final extinction and death. In the Greek work of which we are now speaking there was no copying of previous forms. All would seem to have been a gradual, though slow growth from the archaic to the more perfect and advanced and matured art, and then a gradual,—however slow,—decline, quite as marked and singular as its rise. In a well-arranged and carefully-selected series of illustrative fragments of Greek architecture and sculpture, this would, we cannot but think, become sufficiently manifest, and we should see within moderate compass how this all but perfect art of the Greek began, grew up to maturity, and then died out. Indeed, as it is, we may see this, though imperfectly, in the fragments, as they now are, in the British Museum, but even, as we think, more perfectly and emphatically in the Vase-room, where can be seen a series of Greek art works from the earliest and most archaic, down to the decline, if not final extinction, of the handiwork and thought of the Greek artist and Greek workman. It would be difficult to find a better illustration of the art of the Greek, or of his mode of work in the realisation of his thoughts as an artist. It is, indeed, a magnificent collection, and its increase in the future is to be desired.

In this Greek or Etruscan room may be found an instructive series of art thoughts and works of the Grecian mind and hand,—of works thoroughly indicative of the tone and special character of the Greek as an artist and art-workman. And we would almost urge the study of them before that of the work in the more solid and enduring marble. The Greek fictile art, as it is termed, has been broadly divided into three distinct and broadly-marked "periods," quite distinct from each other, though, as we have said, no hard line can be traced between them, each distinct phase of the one running insensibly into the other. It is a progress from first to last, and a growth, and then a decline, as in the artistic powers of any single individual artist. In these Greek, or as they are more popularly termed, Etruscan vases and amphoræ, this will be seen at all but a glance, and, what is perhaps as instructive, we may see depicted on them the forms and faces, and all but "manner" of the race of men who produced them, and afterwards made use of them. They were, it is to be noted, not made for mere show, and as objects of ornament, and to be looked at merely, but as objects of practical utility and daily use. And thus it is that they are of so infinite a service, educationally, as showing that the mere utility and common daily use of an object did not blunt, in the Greek mind, the necessity and feeling for the impress of beauty on it, and at times even more than this. A Greek school of art is, indeed, here.

We forbear to catalogue the several names by which these so admirably-designed vases were known. Their general and leading outlines and forms can best be seen and appreciated by the sight and study of them in the Vase-room of the Museum itself, but we may well point to the fact of the several forms and outlines having some special relation to the special purpose for which each form or outline of vase, or calix, was intended, and for the way in which it was commonly intended to be held and carried. This is most instructive, and tends to show that nothing escaped the notice of the Greek artist-workmen. They looked not only to the form of the object designed, and to its special fitness for its purpose and wear, but to the way in which it must needs be seen, and to the impression made by it on the eye of those who must needs see it in daily use. Indeed, it may fairly be said that not only the forms of many of these vases, but their very method of ornamentation, could only have occurred to those who designed and ornamented them with all this in constant view. And thus we cannot but think this is well worth noting, and might lead, if carefully thought out, to much that would be novel and suggestive in our art-schools and schools of design, and especially in any, if there be such, where the work done, as educational work and training, has this element of beauty inculcated, by the side of the first and prime one of utility.

There are so many items to be noted in this all-but complete illustration of Greek art and art-workmanship, and even ways of Greek life that we hardly know what to first urge on the attention of those who regard Greek art as the climax of art strength. In its first and instructive beginnings, in its archaic days, and when the Greek man first got to be an artist and an art-workman, it would seem,—as in these vases and amphoræ and other forms is seen so vividly,—he commenced with the very rudest and simplest of forms, in the most archaic way possible, with some "markings" on the moist clay, with lines, crosses, waves, chequers, and the rudest of line arrangements, much ruder, indeed, than much of that to be found in the work of the South Sea Islanders and other savage tribes of men, and, with what is most noteworthy, and not so much taken into account as it might be, with what are evidently rude imitations of wicker work, the art-mind of the rude artist-workman being evidently struck, all the wide world over, with the regularity and beauty of common basket and wicker work. Here we see it in all its phases, and with,—what is so instructive to note,—that peculiar feeling and *modus operandi*,—feeling peculiar to the Greek mind and method of hand work, to his "style" of workmanship, so evident in all he has, from first to last, attempted. It is not the wicker pattern of the South Sea Islander, but of the Greek, though copied, or the idea taken, from the very same object.

But he has done here as all the rest of the world have done in their earliest beginnings. He could not but attempt the copying and the effort to represent the living forms of the animal and vegetable life about him. These animal forms are but now and then introduced, and the forms are rude and grotesque. But there they are. And it will be found that at times a really great artist, though so rude and untutored, has done the work; for the vigour and life and strong action of the animal represented might well put to shame not a little of the same kind of work we see round and about us. Some of these rude vases here are difficult to get good sight of; but the power displayed in their forms and in the drawings on them can hardly in any case be missed. The more closely and attentively they are studied, the more impressive they become, and the greater is the lesson to be learnt from them; for they show us what the special character of the Greek was, and how emphatically he, in this archaic work, prophesies of himself what he would in the future do. We see, too, here in this primitive and archaic work rude representations of the Greek himself and his costume, and much of his way of life and manners, and, more than all, perhaps, the form and contour of his features; and none can doubt that in the later work, and in the more advanced work of the first period, as it is termed, we see simply the successors of the rude men of the archaic age.

How much might be written of the great art of the period which followed this archaic work we need not say. It will best be studied together with the examples of the later work which follows it, and which, in its way, is fully as interesting and instructive; for the decline and final ending of a great style of art, as of a great people, is as impressive and as full of lessons as the early commencement of it and its perfect development. Quite sure dates would be not a little valuable here. The archaic work is believed to have commenced with the beginnings of Greek civilisation, as so-called, and the date of the final ending of Greek vase-painting is thought to be about the year 100 B.C., when probably some other and a foreign art took the place of it. We fear that this final phase of the Greek handiwork is not quite so much attended to, or represented, as it deserves to be; for, as we say, the decay and the ceasing to exist of a great style of art are as interesting and momentous as are the beginnings of it. All things, it is true, are born but to die, and to give place to what we are told is a something better, and better adapted to the wants and aspirations of a new age and new men. But the past is ever instructive, as here seen, and the passing away of a great style of art is certainly not the least instructive lesson to be learned from the study of it through all its phases. Through this fine collection of Greek art-work we may have yet a fair insight into old Grecian life and ways of work.

Mr. William Thomas Wiseman, of Cromwell House, Brixton, Surrey, agent for some of our large Kent brick manufacturers, has been elected a vestryman for Lambeth.

THE ACTUAL STATE OF THE INDUSTRIAL ARTS IN GERMANY.

An addition has recently been made to the number of French artistic publications by the appearance of a new monthly magazine, *The Review of the Decorative Arts* (*La Revue des Arts Décoratifs*). The new periodical sees the light under favourable circumstances. It is intended to serve as the monthly report of the "Society of the Central Union, applied to the Fine Arts," and the recently-founded Museum of Decorative Art. Judging by the first number which has made its appearance, the new publication will supply an evident need.

Unpleasant as the truth may be to the mass of the French people, thoroughly satisfied as they are with the reputation for artistic superiority which they have been accustomed to receive till now, to the more thoughtful the recent international exhibitions have shown the value of this superiority, which they find France is slowly losing. The Union Centrale was founded many years since to save France from continuing on the downward slope in her artistic products, and the aims of the more recently formed Museum of Decorative Art was a further step in the same direction. As a first move the managers of the two societies have felt that it was necessary in their magazine to have a series of good reports on the state of the artistic industries of foreign rivals, and in their first number has appeared an article of more than usual interest on the state of the industrial arts in Germany. The subject being one which interests no less warmly a large portion of the British public, and hence many of our readers, an epitome of the article may, we trust, be acceptable. The author, who is a German, Adolf Rosenberg, and who writes from Berlin, possesses, it will be seen, a more than ordinary knowledge of his subject.

It was at the Vienna Exhibition of 1873 that Germany first showed to the world the products of her industrial art, but the result was, as Herr Rosenberg has to admit, far from creditable. To explain the inferiority of his country, the author takes us back to the various political crises through which Prussia had to pass. The Thirty Years' War (of the seventeenth century) dealt perhaps the cruellest blow, not alone in severing all the bonds which connected the past with the present, but in checking all artistic, literary, and scientific effort throughout the country. The renown of the sixteenth-century masters of Nuremberg and Augsburg seemed forgotten, and the few works of art which escaped from the ravages of the war went to seek a refuge in the locked-up collections of princes, or in private houses, where they have remained till the present hour.

With the close of the Thirty Years' War Germany was powerfully influenced by France, and this influence can be traced down to the fall of Napoleon. From this moment may be dated a new revival of the arts, due to the renowned architect, Charles Frederick Schinkel, who composed a new system of architecture founded on Greek models. Berlin was metamorphosed under his influence. But it was not alone the architecture of his time that Schinkel's teachings affected; the industrial arts received from him a large share of attention. The numerous models that Schinkel designed have served for forty years and more to the manufacturers, while pupils of the master have further popularised his style.

At the time that Schinkel formed his grandest projects for the embellishment of Berlin the knowledge of Greek architecture was not so extended as it is in the present day; it was almost solely confined to the temples of Greece. "It was difficult to compose from such sources a domestic architecture which should satisfy the varied exigencies of modern existence and a climate so different from that of Attica; it was even more difficult and more dangerous to seek a fund of decorative elements for the industrial arts from the artistic treasure-house of a nation whose mode of life had scarcely a point in common with that of the present. With the exaggerated imitation of Greek forms, the façade of a temple was made to serve as the ornament of a stove, the system of metopes and triglyphs as the entablement of a chimney-piece. But what was more to be regretted was the aversion of the architects who designed the models for the manufacturers for positive colours. This aversion was only fostered by means of an error, the refutation of which we owe to very recent discoveries. The Greeks were no enemies to the use of colour, as Schinkel and his pupils believed, but, on the contrary, the partisans of a system of colouring which extended over a large portion of their edifices, and which the Italians of the fifteenth and sixteenth centuries revived." Herr Rosenberg concludes that Schinkel, in spite of his merit, cannot be said to have exercised a favourable influence on the industrial arts of his country. None of his successors inherited his prolific genius, and after his death commenced a period of stagnation which from day to day can be traced in its extension, till at length "the great industrial exhibitions revealed to the world the inferiority of Germany in the industrial arts."

Vienna Herr Rosenberg mentions as showing its superiority in the art of the goldsmith; but everywhere the classic traditions were being broken with, and a return made to the industrious period of the sixteenth century. Munich, Berlin, and Stuttgart became the centres of this new movement, the first results of which were shown in the Munich Exhibition of 1876. The *Kunstgewerbeverein* of Munich (Society for the Encouragement of the Decorative Arts), which celebrated during the exhibition its half-century jubilee, held in the front rank of its aims the revival of the style of the "German Renaissance." These efforts were continued by the treasures of the National Museum of Munich and that of Nuremberg, where in 1872 was founded another museum devoted to the industrial arts, the "Bayrische Gewerbemuseum," where are held exhibitions of modern work. Munich, as Herr Rosenberg truly remarks, remained after the triumph of her exhibition "the devoted champion of the style of our ancestors." The "*Kunstgewerbeverein*" has built an important edifice entirely in this sixteenth-century style. A permanent exhibition shows the most recent products of the industry of Bavaria and the other parts of the German empire.

The publishers aided in this movement towards the Renaissance. In 1877, Herr George Hirth, a scholar and publisher, produced under the title of "Der Formenschatz," a collection of drawings, sketches, and studies to serve as models to the trade and the designers. To attain this end the price of this collection is made very small. Another publication, by the same author, and no less instructive, "Das Deutsche Zimmer der Renaissance,"—the German room of the Renaissance,—endeavours to show the elegance and charm of a house embellished with art and furnished with taste. Herr Hirth has taken from Holbein, and the other masters of the sixteenth century, a large number of models, to which he has added reproductions of the furniture and stuffs of the period. German artists are not the sole authorities; the East, the looms of the Gobelins manufactory and Flanders; French pottery and Italian majolica, are all laid under requisition.

To the Munich Exhibition many excellent results may be traced. Its success led to the foundation of numerous schools and societies throughout Germany. In 1876 schools were opened at Breslau and at Dresden, to which has been added a museum, as also the school of Leipzig. The following year Münster and Pforzheim (in the Duchy of Baden) were supplied with excellent schools, the latter especially devoted to the goldsmith's art, which has left ancient traditions in the town. The most recent foundation is the industrial art-school of Frankfort-on-the-Main, opened in October of last year under the direction of the architect Luthmer, whose efforts in favour of the industrial arts have long made his name respected in Berlin. We owe to Luthmer a large number of compositions for the jeweller and the glass-worker, and in addition an invaluable publication on jewels, the elements of which are gathered from the pictures of the sixteenth century, or copied from the originals preserved in the German courts.

There are now sixteen industrial art-schools in Germany; in addition to those above mentioned there are schools at Berlin, Cassel, Dantzig, Erfurt, Hanau, Königsberg, Magdeburg, and Mulhouse. But further details will be found in a recently published manual, "Statistisches Handbuch für Kunst und Kunstgewerbe im Deutschen Reich. 1880. Weidmann. Berlin." (Statistical Manual for Art and the Industrial Arts in the German Empire.)

Herr Rosenberg is warm in his commendation of a further innovation which marked the Munich Exhibition, that of having apartments closed in on three sides, and provided with a ceiling intended to show completely the effect of the application to interior decoration of the Renaissance style. The success of these full-sized models was repeated at Leipzig and Berlin in 1879. Herr Rosenberg attributes to their introduction a complete revolution in the style of interior decoration.*

The architects of Berlin, in Herr Rosenberg's opinion, are much more cosmopolitan than their brethren of Munich. "They have studied the French and Italian Renaissance with the same zeal as the German Renaissance, and it is particularly the Italian forms that they have preferred. The painters, sculptors, and cabinet-makers work under the direction of the architects, who deserve credit for the impulse they have given to our industrial arts, and who furnish designs for the goldsmith, the glass-painter, the weaver,—in fact, for all the branches of industry directly dependent on art."

This almost exclusive predominance of architecture has, it cannot be denied, continues Herr Rosenberg, its inconveniences. As the greater number of the architects are often incapable of drawing the human figure,—an incapacity which arises from the insufficiency of the education they received,—they only too often entirely neglect the figural element in the conception of their sketches, confining themselves to arabesques and foliage. When it is recalled what an important part was played by figures in the industrial arts of the Renaissance, either as supports for the architectural portion, or as symbolising some profound idea, or representing some allegory, or to animate in a lively manner the architectonic lines, it is, indeed, to be regretted that they should disappear in the new system of ornamentation. But the efforts applied to the regeneration of the industrial arts are of too recent a date to produce as yet any definite result. We have, as it is, every reason to be pleased with the sufficiently high position which the German industrial arts have succeeded in attaining in so short a period as the last seven years, and much may be hoped for in the near future, as the impulse given in this direction is far from having ceased in its effect.

To show how universally the Renaissance has seized hold of the artistic world in Germany, Herr Rosenberg mentions how, in the Berlin Exhibition of last year, besides twenty exhibited examples of rooms furnished in the Renaissance style, there was only one in the Gothic style, a fact worthy of remark in a country where the art of the so-called Gothic masters produced such treasures of exquisite beauty. Herr Rosenberg strongly approves, nevertheless, the public taste in preferring the Gothic for the purpose of religious decoration. "For private life the Gothic style, venerable as it may be, has little charm. The stiff backs of the arm-chairs are energetically opposed to our modern sense of comfort, and foliage as an ornamentation scarcely flatters the eye by the variety of its forms." In Hanover and Cassel, Gothic is cultivated by several architects of taste and talent, who have tried with success to accommodate its forms and decorative elements to the needs of modern existence; but in general the Gothic, concludes Herr Rosenberg, is only adopted to the building and decoration of churches and town-halls.

Our author refers, in his review of the state of the industrial arts in Germany, to the influence exercised by France on several members of the German aristocracy, who have, in their visits to Paris, been affected by the "style Louis XIV.," but they have been obliged to employ French workmen to carry out their plans. The palaces of the Prince of Pless, at Berlin, and at Pless, in Silesia, may be mentioned as examples of this "hobby," the architect being M. Destaillenr.

In 1876 was formed at Berlin a Society for the Industrial Arts. This society, which numbers some four hundred members, patronises openly the Renaissance, a feature in part due to the fact that the greater number of the members, being manufacturers, naturally endeavour to suit the reigning taste of the public. The Museum of Industrial Art, which has been in existence at Berlin since 1867, has likewise succumbed to the popular current in favour of the Renaissance, and the new acquisitions belong chiefly to this period. Founded originally by

* Ernest Wasmuth, the Berlin publisher, has recently produced a folio work containing some twenty-four plates, photographed from the more important of these exhibited interiors,—*salons*, boudoirs, dining and sleeping rooms, &c.

private initiative, the museum and school are, however, submitted to the supervision of the State, which wisely and not too ostentatiously aids by an annual budget in the expenses of the Institution. A recent donation of the State consisted of a rich collection of objects of art from Japan and China. Japanism, remarks Herr Rosenberg, has not left the restrained circle of our art-lovers, and has not as yet, as in Paris, invaded our manufacturing world.

The Government has further wisely patronised the art movement by sending to Italy a painter, a professor at the School, Herr Maurice Meurer. Accompanied by a number of ardent companions, Herr Meurer has copied at Mantua, at Verona, Genoa, Bologna, Padua, and Rome, the ornamental frescos of the churches and palaces which belong to the *cinque-cento*. A large number of coloured studies, containing, as may be imagined, a mass of motives for mural decoration, has resulted from these expeditions, and Herr Meurer has several times had favourable opportunities, according to our author, of applying his studies to the decoration of vestibules, *salons*, boudoirs, &c. Herr Meurer further made, during his residence in Italy, a special study of the glazed terra-cotta tiles employed during the Renaissance to adorn the walls, archivolts, onpolas, &c., of the buildings of the epoch.*

Such, rapidly sketched, concludes Herr Rosenberg, is a statement of the present condition of the industrial arts in Germany, concerning which we are promised at a later date some supplementary information.

THE REFERENCE LIBRARY OF THE BRITISH MUSEUM.

THE readers of this journal have lately heard, in full, particulars of the progress that is being made at the British Museum, and the good work done there has been acknowledged warmly. We would now say a word or two, not of depreciation, but of advice as to changes and improvements that might usefully be made in the *Reference Library*. The ornamentation of the large circular hall in the centre of the Museum buildings is confined to the books and their bindings in it, and which, indeed, make up, to the eye, its very walls. It is literally built up of books, from the floor to the springing of its domical roof, — the very doors being utilised. It has been necessary to divide this wall of books into three stages: the floor of the room, and two galleries above it, thus bringing each volume within ready reach of the hand. The lower rows of books have always, most conveniently, been open to readers, so that any volume below the first and lower gallery can be readily got at and consulted, and we need hardly say how much use has been made of this plan of leaving the books open for the purposes of ready and easy reference. This has, indeed, been found so convenient that it is now the intention of the authorities to open to the public, so we understand, the gallery above, and thus give access to a further range of volumes. It is proposed, we believe, to devote this space, and long length of book-cases, to theological works, thus leaving the lower and ground-floor to more varied and general literature, and we presume to science, and, it is to be hoped, to art and fine art, and, perhaps, it may be, to architecture and building, or at least so much of them as to meet the wants of those who pursue such inquiries and researches. These are at least equal in importance and interest to not a few others here so amply provided for.

We say we hope this fair chance of granting some sufficient space to architecture and art, and fine art, may become a reality, for as things now are these are simply conspicuous by their all but total absence. We hardly dare to go into detail, but we cannot help asking how it has come to pass that so curious a selection of books has been made as that now to be found lining the wall of this great room as works of "Reference," and as handy and world-famous books? May we be pardoned the naming a detail or two? It may, at least, interest the curious in such matters. Ample enough is the store of dictionaries and encyclopædias, but are not many of these now all but, if not quite, obsolete, and without even an antiquarian interest? Of science there is ample show, but still with not a few startling omissions. Science in these latter days is making advances so portentous that no amount of space would seem to be enough for it, or ample enough to fully provide for its fair and due representation, and very many are the volumes here about it, and within handy reach, but there are not a few absent, and world-wide famous ones, too. Mr. Darwin has, if any have, influenced the world of science, but his all-famous book, the "Origin of Species," is not to be found on these shelves, though his book on "Coral Reefs" is, with some others. Surely the books first that have influenced the world of thought, and, through it, of action, should find place.

We hope to be understood. The books we speak of are, of course, in the Museum Library, and can always be had in the usual way, but they are not in the Reading-room as works of ready and constant reference, while there are so large a number of all-but-forgotten tomes; as of some of the "Reviews" from first number to last. Many others are here of but passing or bygone interest, and certainly not to be compared with the great books of original thinkers, or with those books without which the world might find itself somewhat at a loss. Here, again, we must carefully distinguish between the having too much and the having nothing. We cannot but think that the presence here of at least the last year's completed and bound volume of all art reviews and notices of matters appertaining to the art and fine art of the world as it now is, and goes on from year to year, would be a most useful and desirable addition to the shelves of this great Library of Reference. But there is, as things now are, no vestige of anything of the kind; so that what in the past year art has done, with its hints as to what is now at the moment doing, is altogether out of handy and helpful reach. In antique Greek or Roman days, to get sight or idea of a new building one must needs have travelled to the very spot on which it was built, but in these more advanced days we but need to ask for a book in a Library of Reference.

Our main object here, we may repeat, is to hint at some improvement while the alterations and re-arrangements are in progress, especially in the direction of art, and, as we say, of architecture more especially, for it needs some industrious looking for, as things are, to find the word "architecture" at all! A shelf or two certainly would hold all the Reference Library contains of it, useful and necessary as it is, for the world could hardly do without at least "Building." Mr. Fergusson's ever useful "History of Architecture in all Countries," is here, it is true, but Pugin's "Principles" is not, and this book certainly accomplished its work in its day, and called attention to much that was at the time all but forgotten. The "Modern Painters" are here, but the teachings of Venice are not. There need be but small difficulty here, for this very book of Fergusson's, with Gwilt's "Dictionary or Encyclopædia of Architecture" will furnish an ample list of "authorities" from which to make choice of representatives and always useful "reference" books. It may be curious, and it is suggestive to note that the great French work on "Egypt" is here, as it should be, with its careful engravings, but M. Leyuard's "Égypte et Nubié," with its admirable photographs of the same buildings, is absent, the one being all but a supplement to the other. We might go on. Should not Mr. Penrose's work on the Parthenon be here, as one of reference,—close as it would be, and not a little useful so near,—to the marble remains of the very structure treated of in it?

We thus, however incompletely, would call the attention of those who are rearranging the vast Library of Reference, holding no fewer than some 20,000 volumes, to its present imperfect and apparently accidental assortment of representative books and works of reference, and to the many authorities absent which ought certainly to be ever present. If there be those who think we lament without sufficient cause, let such take up any one world-wide art-subject, as architecture, and make note of what is, and what well might be, and, more than all, make thorough note of what now, as things are, fill these convenient shelves. We cannot fear the result of such examination; the more thorough and complete and exhaustive it is, the better, and the greater the good done, or, at least, hoped for. Of course, the very length of shelving, great as it is, is limited, and we cannot expect all and everything that is needed; but that a great improvement on what now is, and which simply comes from a past and a good-deal-forgotten state of things, should be made, there can be no doubt or question; and that, as we say, not by additions only. The whole subject is, of course, full of detail; each separate book must be looked at if not studied, thus to give it its due and appropriate place. We trust, therefore, that Painting, Sculpture, and Architecture may find a little more room in the future of this great Reading-room.

* Herr Meurer has recently published a portion of his interesting collection, under the title "Majolika-Fliesen der Renaissance" (Glazed Tiles of the Renaissance). Ernest Wasmuth, Berlin.

THE FOURTH SISTER.

WE do not assume that any one is in error; we only wish to keep right ourselves, and in respect to any idea which invites delineation, it is not a bad way to put pen or pencil to paper, and draw it out, to see whether it will bear inspection and examination.

"Decoration,"—what is its just significance? Let us go to its derivation. *Decor* is the original word, from which other Latin forms, as *decoramen*, &c., and our own term, "decoration," &c., are derived; and against *decor* in the dictionary we find the English terms "comeliness, gracefulness, beauty, seemliness, loveliness, a fine mien."

Decoramen is construed ornament. Assuredly we have seen buildings which were no ornament to the city or situation where they were placed, and paintings and pieces of sculpture also we have noticed, which were no ornament whatever, which arose from the fact that they were not good or apposite. Ornament and decoration are not perhaps words of which the significations are identical, but they have, at least, kindred meanings. *Orno* is to adorn, and a work of art, unless it be suitable to its place, as well as beautiful in itself, does not adorn, and is not decorative. A flower out of place is a weed; a weed, in its place, is a flower.

"Decorum" is another word from the same root as "decoration," and in it are implied the right manners, the right person, the right sentiments in the right place. Thus, in this view, it may appear that "decoration" is a term which has a claim to very high consideration, as involving a certain propriety, without which nothing can be really good. When the three sisters,—Architecture, Painting, and Sculpture,—meet together in one structure, it is so important that they should coalesce in harmonious propriety, which they cannot do without the production of decorative unity, that we would intercede for the emphatic preservation of the word "decorative," in its high sense, as we think that such a term is required for such an office, and we see none better than one which is so closely allied to "decorum."

We would submit a group of three sisters,—Grace, if you please,—Architecture, Painting, and Sculpture. They are noble damsels, stately, symmetrical, and sweet. Anon, a little sister, less in stature, lighter of limb, comes on the scene. Caressingly she dances round them, and festoons them with flowers: kneels at their feet, reaches to their shoulders, and stands on tiptoe beside them. Then she waves her wings, for she is a little Psyche, and rises into the air, and floats around them, and crowns them with buds and blooms, and sings to her ærial harp, which she touches daintily, a sweet refrain of harmony and love.

By this little idyll we would image the two-fold significance of this enchantress. In the one view she is the handmaid to her sisters; in the other she rises superior to them all, as the bond of union between them, crowning them with flowers, and weaving their souls together with a hymn of celestial concord.

Behold! she is only a little sister, but she can soar as well as serve, and her name is "Decoration."

THE PORTOBELLO SEWAGE CASE.

SOME time ago we drew attention to the unfortunate circumstances of Portobello, with regard to its being surrounded by the Edinburgh sewage. It appears that the local authority,—the provost and magistrates of Portobello,—have at length taken action in the matter; and last week Sheriff Campbell (reversing the judgment of his substitute) pronounced an interlocutor, finding that the pollution of the "Braid Burn," before its junction with the "Figgate Burn," which runs through Portobello, is a nuisance within the terms of the Act, and must be removed. The case we understand, from its great importance, is likely to lead to further litigation.

THE DONATELLO SOCIETY IN FLORENCE.

ON the 20th of June, M. Leon Gauchez held a conference in Florence for the purpose of setting forth the scope of the proposed Donatello Society. M. Leon Gauchez, a lover of art, and also of Florence, desires to aid the town in the revival of art there, aiming at bringing it to the standard it once occupied. At the present time there exists, one might almost say, nought but imitative art in Florence; the system of the art-schools has not tended to create originality. Exertions are now being made to remedy this defect, obliging the pupils to copy from nature only. M. Gauchez was obliged to acknowledge that "*en fait d'art, l'abilité n'est pas la maîtresse en Florence.*" At this moment Turin has given a grand example in having her exhibition of art this year, and in spite of being deprived of the honour of being the capital of Italy, she has gathered together examples of art not seen in any former exhibition. With this example the society wishes to urge the Florentines to a Renaissance in art in their city on solid bases, that may prove of the greatest possible use to them. Three Exhibitions are to be formed (each having its separate committee): one, of ancient art, for which it is hoped the Government will lend its aid; the second, of modern art; the third, of art applied to industry. The two latter, it is suggested, may be utilised, by lotteries for the sale of the artistic objects exposed, the French Government offering, through M. Leon Gauchez, any aid by the loan of objects acquired in the last Exhibition of Paris. The society intends forming a museum, open to the public, of models and works of art that shall tend to the improvement of the professional art-schools, in imitation of that of South Kensington. For this subscriptions are opened, and an appeal is made to the people for a guarantee of three years' subscription or donation,—a sum of 50,000 francs (2,000*l.*) being required before the society can begin its operations. The idea is one which, if realised, may be of immense advantage to the city,—now left so isolated, with so much native talent lying dormant from want of being utilised, and the spirit of making only what will most easily sell pervading every branch of art. The promised Exhibition of Ancient Art of Tuscany, again postponed, may be hoped for if the society take root, and hidden treasures will be unearthed that are comparatively unknown, and which are unequalled; for instance, the inconceivable amount of ancient tapestry in the different palaces, of such beauty and excellence of design and execution as cannot be surpassed elsewhere.

Let us augur good things from the operations of the Donatello Society, and from the fact of the ready and spirited aid offered by their French friends and neighbours.

SIR CHARLES DILKE'S RETURN.

THE return to the address moved for by Sir Charles Dilke, on the 10th of March last, for certain details of information intended to throw light on the true policy of the proposed Metropolitan Water Works Purchase Bill, was ordered by the House of Commons to be printed on May 31st, and appears in Messrs. Hansard's list of Parliamentary publications for June. The frequent reference to this return by the chairman of the special committee has directed public attention to it, and a brief account may therefore be welcome.

The order for the return, which is printed on the title-page, is so minute and comprehensive that it might have been expected that a full *aperçu*, such as has been given in our own columns (see pp. 181, 301 of our last volume), would have been stamped by official authority, and put into the hands of the public. But long experience on the part of those charged with the elaboration of Parliamentary returns has given them a power of obscuring the facts sought, which no care would seem to be able to anticipate and to prevent. The second part of the return does, indeed, present in parallel columns the details which were already in the hands of those who had procured the Board of Trade returns of the accounts of the water companies from 1871 to 1879. So far as presenting them in one blue (or rather white) book, instead of in nine, and as some working-out of details as to cost, goes, the return will be found a convenience to those who have to discuss the matter. But for the gist and outcome of the whole, that is to say, the sum of the returns, every one will, as heretofore, have the pleasure of calculating it for himself. Only the separate accounts, company by company, are given in the return. The great point of presenting the general result in a form that can be grasped without the constant addition of eight columns of figures is omitted from the return.

The importance of such a summary will be clear from the following considerations. The first thing required in the return was the financial statement on which the calculations for the payments contemplated by the Bill were to be made. In reply to this demand, Mr. E. J. Smith writes to the Home Secretary to say that "no official statement was deposited with the agreements, but its contents should in every way transpire before the confirmation by the water companies." Four schedules are then given: of which A sets out the prices agreed to be paid to the several companies (being, in fact, printed in the Bill); B sets out the interest to be paid in the year 1880-81, the revenue in that year, and the "allowance made to the several companies"; C is an estimate of the increment of income from 1881 to 1900; and D gives "certain statistics."

Of these statistics the first item is the gross incomes of the companies in 1879. The column which contains them is added up, and gives the gross total of 1,449,446*l.* It is by the absence of any corresponding column in the second part of the return that the immediate detection of a very serious discrepancy in Mr. Smith's figures has been avoided. In every instance the sum returned by Mr. Smith as the gross income for the companies for 1879 is considerably larger than the sum returned by the companies themselves! To show that we have not miscalculated, we add the items, placing side by side the two returns:—

Company.	Gross Income, 1879.	Total Income, March, 1880.
Chelsea	£93,780	£95,173
Grand Junction	137,290	134,511
Lambeth	150,074	145,325
Southwark	183,977	171,304
West Middlesex	164,746	159,570
New River	416,000	396,829
East London	208,741	203,942
Kent	92,928	86,286
	£1,449,446	

The items in the second column are not added up in the return, but come to 1,393,030*l.*

The gross return of the several companies is a matter as to which there is no room for dispute. If anything is said about it, it ought to be the simple arithmetical truth. The sum given by Mr. Smith, as we have said, for 1879, is 1,449,446*l.* The sum of the returns of the eight companies, given on pages 7 to 21 of the return, is 1,393,030*l.* There is therefore taken, as the basis of the financial arrangement, an over-credit of 56,401*l.* per annum, above the receipts of the companies, according to their own returns!

If each item in Schedule D be compared with the sum of the figures presented by the companies, a similar misfit turns up. Thus the East London Waterworks Company, which Mr. Smith makes out to have received 208,741*l.* in 1879, while they say they received 203,942*l.*, spent as follows, according to the two contradictory accounts. By their own return they spent 73,619*l.* on maintenance, 16,191*l.* on management, 17,216*l.* on interest paid, and 107,741*l.* in dividends. Mr. Smith states that they expended 86,621*l.* on "expenses and interest" (instead of 89,810*l.*), and 122,120*l.* in dividends. Thus this company is credited with 6,642*l.*,—too high a receipt—and 3,199*l.*—too low an expenditure—making a difference to the good of 9,841*l.*, and is said to have divided some 14,000*l.* more in dividends than its own accounts show! It may be fairly questioned whether so utterly unreliable a financial statement was ever brought before Parliament or the public as the basis of an important measure of legislation. The case of the companies is overstated by the negotiator for the Government. One feature of interest is to be found in the returns, in the statement of average cost per million gallons of water in respect of working expenses. The outcome of the paper is to show a variation in cost from the minimum of 7·71*l.* per million gallons, in the case of the Southwark and Vauxhall Company, to the maximum of 14·67*l.* in the case of the New River Company. The unit of the million of gallons is not, however, as convenient as that of the ton or the hundred tons of water, as its relation to the population is complicated. A million gallons is equal to 4,545 metric tons, or to the annual supply of about 90 individuals; the cost apiece thus ranging from 1·71 shillings to 3·26 shillings for working expenditure alone.

CHESTERFIELD AND ITS TRADE.

IN pleasant Derbyshire, one of the largest and most important of the ancient towns is Chesterfield, which has historic greatness, and which has had by its position greatness thrust upon it. It could be said of it once upon a time that Wordsworth's words were almost literally correct,—that "not a house but" seemed to give "assurance of content within," and though there has been great change in the pleasant county of Derby, there is not a total change in this respect. The large and irregularly-built town of Chesterfield is supposed to date back to Roman days. The great charter-granter, King John, gave it one, with the privilege of two markets and a fair; and by good Queen Bess this charter was confirmed, and later it was ratified by Charles II. It confided the town government to the hands of a mayor, "six aldermen, six brethren, and twelve capital burgesses," with their attendant chamberlain, clerk, and other officers. But even in pleasant Derbyshire the last two score years have introduced a great change, and we may, in glancing at the picture of Chesterfield and its trade two score years ago, and at the present time, notice evidences of that change almost everywhere. In the earlier period, Chesterfield had a court-leet under the lord of the manor, at which a constable was chosen. It had a varied trade,—hosiery, lace, and flax being amongst the manufactures; whilst there were large iron-foundries, tanneries, and potteries, and near it lead, coal, and iron mines were wrought. Its church was then an object of interest, much more the famous "twisted" spire thereof. In addition it had seven places of worship for persons of other denominations than Episcopalians. The Free Grammar School dated back to the days of Elizabeth, and there were other schools, almshouses, and abundance of literary and benevolent associations, whilst "an elegant assembly-room" had been a few years before built. The population of the parish, which in 1821 had been 9,190, had risen to about 10,000, one-half being that of the town. A canal passed near, but railways were projected only. There were three well-established banks, two of which at least survive, with little change in the title. Five coal-masters were in or around the town. There were seven earthenware manufacturers, but not on a very extensive scale; two ironfoundere, and five lace-manufacturers. The one newspaper of those days was the *Derbyshire Courier*, and the rest of the trades had nothing calling for special note. The Waterworks and Gaslight Company had its dwelling-place in Westbars. From the Angel in New-square seven coaches departed, mostly daily, and the Pickfords, the Wheatcrofts, and the Hibbersons were the chief of the many carriers. There was the one conveyance by water "to all parts of the kingdom" from the Canal Warehouse, and, under "John Bower, governor," there was the House of Correction in Bowling-green-side. The names of the streets, the trades carried on, and the nature of the inhabitants of those days had a pleasant old-world look, and in the county of Derby there were not many more pleasant spots than was Chesterfield two score years ago.

There has been a growth in the town of Chesterfield these two score years. It has forsaken the arts of war that distinguished it in the Civil War. It retains its curious old church, and has added thereto the Trinity Church, and the yet more handsome structure which commemorates the connexion of George Stephenson with the town. There has been a connexion with the great railway system, and there is around the town the upgrowth of a great coal-trade. The Tapton Coal Company records one of the adventures of Stephenson, long successful, and which may, when the coal-trade feels the improvement, again contribute to the wealth of the district; and though around the town there are places of historic note,—places such as Wingfield Manor House,—it is doubtful whether the old colliery is not as interesting. When it is stated that 41 out of the 240 collieries of Derbyshire are classed in the sub-district of Chesterfield, it will be evident that its contribution to the county output of coal of 7,190,000 tons cannot be very small. Out of the fifty-five

blast-furnaces of Derbyshire, eighteen are classed as in the Chesterfield district, and the eighteen include the important works of Sheepbridge and Staveley, whilst other sets of smelting-plant are near; and there are other minerals or their products, produced in the neighbourhood which have tended to the development of the trade of the district and of the town which has retained its central advantages. The older trades of Chesterfield have been materially developed by the growth of the great mineral industries in and around the town, and as these industries were either the growth or were stimulated by the railway system, or by those whom it brought into the district, it is not to be wondered at that Chesterfield was desirous to commemorate the residence of George Stephenson in its midst. Five years ago it projected the memorial hall which was last year opened, and which may fairly claim to be the most graceful specimen of architecture Chesterfield possesses. In 1877 the Marquis of Hartington laid the foundation-stone, and in 1879 the Duke of Devonshire formally opened it. The Gothic style has allowed of a picturesque aspect being given to the stately building, which was erected at a cost of over 13,000*l*. It has a spacious public hall, a free library and reading-room, museum, lecture-hall, and other rooms, and already it has found use as a meeting-place for the Chesterfield and Derbyshire Mining and Mechanical Engineers and allied bodies.*

As to the figures that show the growth of Chesterfield, it may be said that its population had more than doubled at the time of the last census, and was then over 11,000; whilst the rate of increase has in the present decade been as large as in any previous. It has retained and extended its banking facilities; has added to the number of its newspapers; and though its coaches and most of its carriers are gone, they are replaced by the carrying connexion which its position on the great Midland Railway gives it. The ancient town and its trade are both revolutionised by the advent of the railway system, and it is tolerably certain that its prospects for the future seem to brighten. It is in the midst of the great Midland coalfield; in the midst of the great ironfield of that district; and surrounded by collieries and ironworks of repute, such as those of the Butterley Company and of the Clay Cross Company, to mention no others. Near it are famous lead-mines, and though for years there has been deep depression felt in that industry, yet there are indications that with the advance in the price of lead there will be an increased activity known in the mining districts. It is on these three great industries that the future of Chesterfield largely depends, for lace and cotton cannot alone support a great town such as it has become and is becoming. So far as can be foreseen, the two chief of these three industries must advance, for there is a continuous growth in the demand for coal, which benefits all the coal-yielding districts of the kingdom, and especially those which are, like that of Derbyshire, relatively very near to the metropolis, and which are well served by railway companies. There is a change taking place in the iron trade, as is well known, but that change is one in favour of the districts producing high classes of iron, such as Derbyshire yields; and with a probable prosperity for these two important branches of the trade of the county, there should be in Chesterfield a continuance of that steady progress it has known for centuries, and experienced in peace and by a comparatively contented people.

NEW PAROCHIAL OFFICES, WESTMINSTER.

A CERTAIN number of architects having been invited to submit designs for the erection of new parochial offices for St. Margaret's and St. John's, Westminster, ten sets of drawings have been sent in, and are now under the consideration of the vestry committee, at the United Westminster Schools, Alexandra-street, Victoria-street. We have been requested to give no notice of the plans at present, and of course willingly comply.

The Index Society.—The second annual meeting will be held in the rooms of the Society of Arts, John-street, Adelphi, on this Friday, July 9th, the American Minister in the chair.

* View, plan, and description of this building will be found in our volume for last year, pp. 772, 774.

CENTRAL SCHOOLS AND OFFICES, SCHOOL-BOARD, SHEFFIELD.

A VERY important block of buildings, comprising the Firth College, Central Schools, and the School Board Offices, has been erected in Sheffield, to the great satisfaction of the townspeople. The style adopted may be called English Renaissance; the principal material employed is Huddersfield stone. There are two chief entrances, both handsome,—that in Bow-street, giving access to Firth College, and one leading to the new offices of the School Board, which form the central portion of the block fronting the new street.

The buildings form three sides of a quadrangle, the fourth side of which will be walled, so that the open space in the centre of the square may be used as a playground by the children. The Firth College occupies the Bow-street side, and fronts to a portion of the new street.

We give illustrations, view, section, and plans of the schools and Board offices.

The offices of the School Board, which are set a little back, form the centre of the group of buildings. They adjoin the College on the Bow-street side, and are connected with the Central Schools at the other end by a colonnade, which will be zinc-roofed, and utilised as a playground. A broad flight of steps from the main entrance gives access, along a corridor with a groined roof, to the offices of the Board, beneath which, in the basement-story, are store, strong, and sample rooms for slates, school-books, and other materials. The Board-room is on the ground-floor to the right of the entrance, and is 35 ft. by 25 ft., and will be panelled with carved oak, and have a ceiling decoration chiefly consisting of plaster figures representing learning. The committee-room is next to the board-room, and on the same floor is a members' room, and an ante-room. The first-floor is set apart for the office of Mr. Moss, the clerk to the Board, his private office adjacent, and the general offices, which include rooms for the corresponding clerk, minute clerk, visitors' book-keeper, accountant, and inspectors, as well as a large office for the general clerks. At the rear of the offices, facing the interior of the quadrangle, is a covered playground, supported by stone columns, to which the scholars will be able to resort when the weather is too unfavourable for their recreation in the quadrangle itself.

At the further end of the line of buildings are the Central Schools, which have a fine frontage to the new street, and extend some distance along Orchard-lane. The entrances to the schools are placed in Orchard-lane, and consist of a main entrance and two minor doorways, one for boys and the other for girls. The basement contains the school of chemistry, a room 20 ft. by 22 ft., and a larger room, 39 ft. by 20 ft., at present unappropriated for any special purpose. On this floor is a joiner's shop and a chamber set apart for the heating-apparatus. The ground-floor comprises the school of cookery, exactly the same size as the school of chemistry, and in connexion with it is a commodious scullery. In this story there is also a babies' room, a junior mixed school, accommodating 233 scholars; an infants' school, accommodating 193; a deaf and dumb school, accommodating 48; a fine gymnasium, and several class-rooms. The various schools are approached from the basement by two flights of stone steps. The mezzanine floor is fitted with rooms for the teachers, a lavatory, and apartments for the caretaker. On the first floor there are eight class-rooms, almost uniform in size, and rooms for the head master and mistress. Each class-room accommodates 48 scholars, and all are for the use of the senior boys and senior girls, of whom 480 will be able to receive education in the building. There is also a library on this floor, and it will be available to all the senior scholars. The next story is devoted exclusively to a large hall, constructed in the roof. It runs along nearly the whole length of the central school, and is 86 ft. long by 34 ft. wide. The hall will be used for lectures and similar purposes, and will accommodate about 1,500 persons.

The Central Schools are intended to solve the problem of connecting the very earliest education with higher knowledge, in such a manner as to open the whole field, even up to the university itself, to the poorest child in the town. The schools, as previously stated, comprise an infants' school, a general mixed school for boys and girls, to be taught together, and an upper school of boys and girls taught separately. The upper school, which is really the most novel portion of the undertaking, is intended by the School Board to be chiefly for the reception of clever boys and girls drafted from any of the elementary schools of the borough, on the recommendation of managers and teachers after due examination. These may be admitted to receive here a higher training than is ordinarily open to those of a similar position in life, as it would be impossible without great increase of teaching power to adopt such a system throughout the elementary schools of Sheffield. The senior departments are the principal feature of the schools. They are arranged on the class-system, but in the planning, improvements are introduced beyond what is generally adopted. Each class-room is really a little school in itself with cloak-room opening out into the general corridor, and there is in addition a small private room for the teacher.

The cost of the entire range of buildings, including furniture, architect's commission, &c., but exclusive of land, amounts to about 70,000*l*. Of this amount, 20,000*l*. is for the erection of the college, the cost of which is borne by Mr. Mark Firth. The heating apparatus, supplied by Mr. D. O. Boyd, of London, is effective. It is fixed in a large chamber, 84 ft. long, 5 ft. wide, and 5 ft. high, in the basement of the central schools. It heats the whole building by twenty tiers of pipes, and not only warms but purifies the atmosphere. The air is brought into the building through an iron grating, but before it passes into the pipe chamber it is conveyed through a canvas, upon which a spray of water plays, the effect being that the atmosphere is cleansed from all impurities, such as dust and smoke, after which the clarified air passes through a series of cavities into the various rooms, the supply being regulated by easily-worked valves.

The architects are Mr. T. J. Flockton (Sheffield) and Mr. E. R. Robson, F.S.A. (London). The builder is Mr. Bisset (Sheffield), and Mr. J. Laidler (London) is clerk of the works. The carver is Mr. J. M'Cullock, of London.

DENZELL HOUSE, BOWDON, NEAR MANCHESTER.

THE house here illustrated has been erected at Bowdon, for Mr. Robert Scott, Messrs. Clegg & Knowles, of Manchester, being the architects. It is externally constructed of Yorkshire stone, with dressings of Manley stone, and Messrs. Neill & Sons were the contractors. The cost was about 18,000*l*. The brickwork was by Mr. James Hamilton; the masons' work by Mr. Mills.

A view of the lodge was given in our last.

BLACKFRIARS BRIDGE.

AT a meeting of the Court of Common Council on the 1st inst., Mr. Hart moved,—

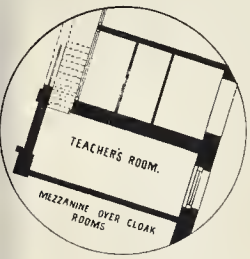
"That it is desirable that Blackfriars Bridge be completed in accordance with the designs and provisions of the engineer, by the addition of appropriate groups of statuary, to be placed upon pedestals provided for that purpose at the extremities of the bridge, and that it be referred to the Bridge House Estates Committee to obtain (by public competition) designs, which shall be the absolute property of the Corporation, at an expense by way of premiums of a sum not exceeding 1,000*l*., reporting thereon, with the cost of executing the work, to this Court."

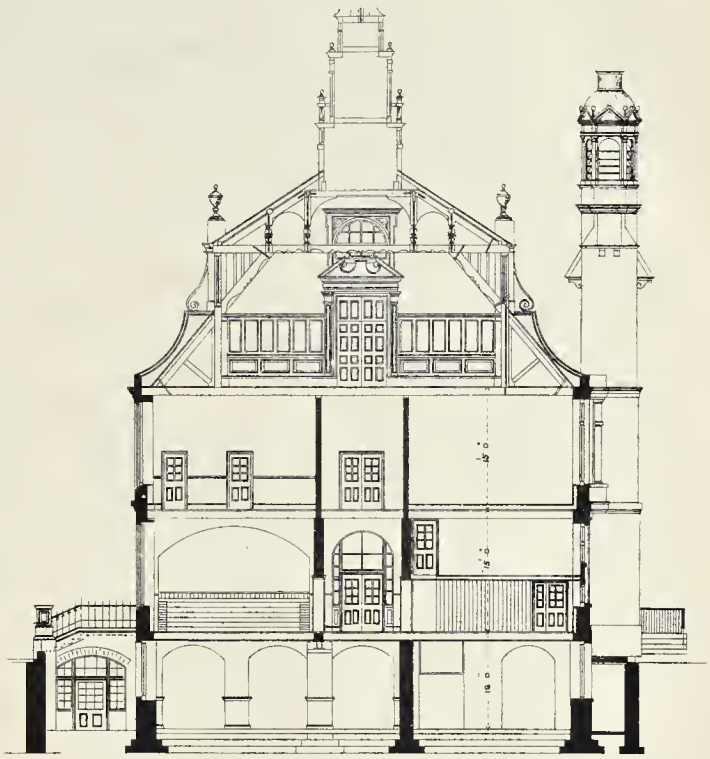
He reminded the Court that the engineer of the bridge, Mr. Cubitt, in the report which accompanied his design, said, "The abutments are well adapted for the erection of equestrian statues or groups of statuary." Sir F. Leighton, the president of the Royal Academy, had addressed a letter to the Lord Mayor on the subject, in which he alluded to the "strange and unparalleled indifference of the wealthiest city in the world" in leaving Blackfriars Bridge uncompleted; and if the members of the Corporation went to Edinburgh, Glasgow, Paris, or any large city on the Continent, they would find that art had been cultivated there for years past in a way which London might well imitate. There was no doubt that in 1861 it was contemplated that the abutments of the bridge should be graced with statuary, and he (Mr. Hart) trusted that the matter would not be delayed any longer.

Mr. Edmeston seconded the motion, remarking at the same time that he thought the strictures of Sir F. Leighton were scarcely deserved.

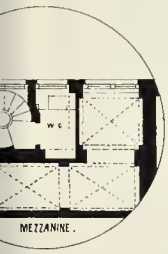
The motion was agreed to.

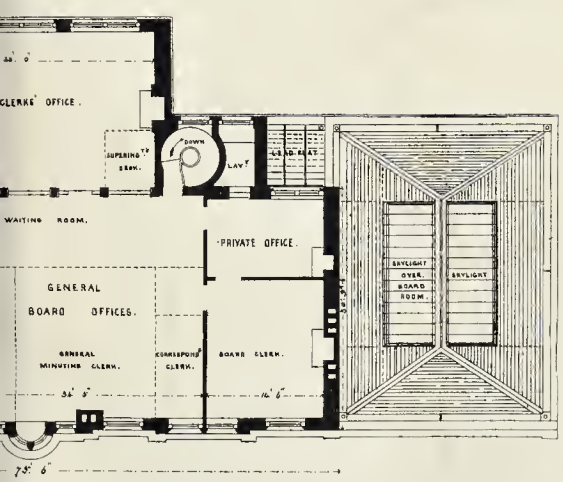
FIRST FLOOR PLAN.

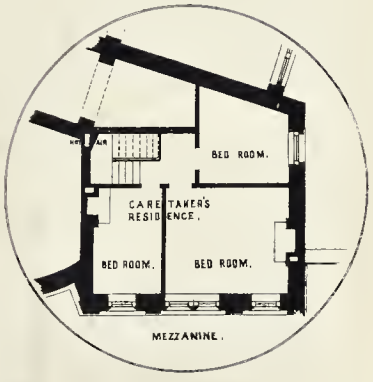




TRANSVERSE SECTION.







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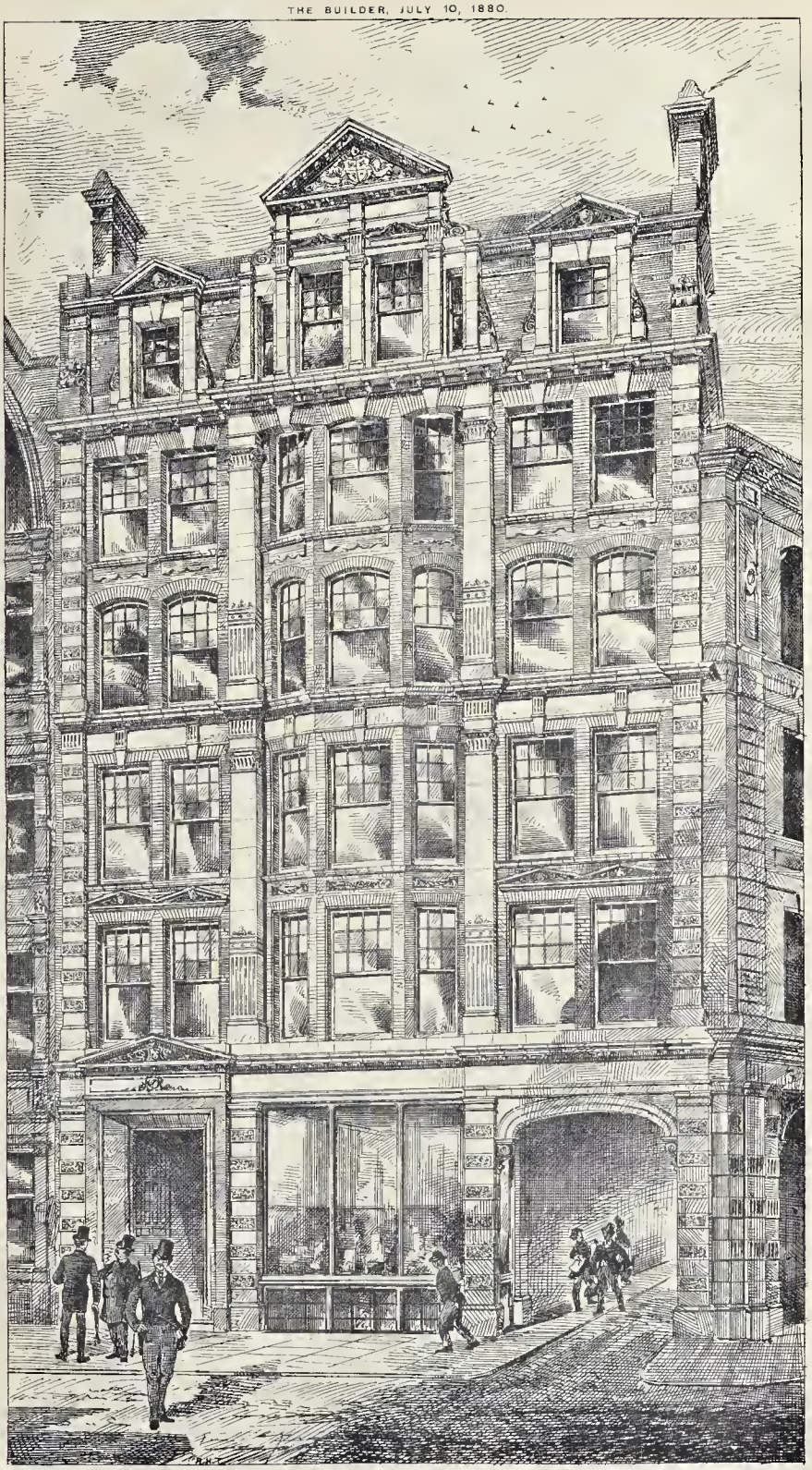
HOOL BOARD, SHEFFIELD.

Whiteman & Bass *Photo-litho* 236 High Holborn

DENZELL HOUSE, BOWDON, NEAR MANCHESTER.—Messrs. Clegg & Knowles, Architects.



LONDON STREET ARCHITECTURE: HOUSE IN BUCKLERSBURY.—Mr. Whichcord, F.S.A., Architect.

CENTRAL SCHOOLS AND OFFICES, SCHOOL BOARD, SHEFFIELD.—MR. T. J. FLOCKTON AND MR. E. R. ROBSON, F.S.A., ARCHITECTS.

LONDON STREET ARCHITECTURE: 20, BUCKLERSBURY.

IN a former number we published some particulars of an extensive block of new buildings, intended for banking, insurance, or other commercial purposes, in course of completion at the corner of Queen Victoria-street and Bucklersbury, immediately opposite to the National Safe Deposit Company's premises, from the designs of Mr. John Whichcord, F.S.A.* We now give a view of the building, and for convenience sake repeat a part of the account. As with the Safe Deposit Company's premises adjacent, the unseen basement portion of the new buildings forms a considerable part of the whole, the foundations being carried to a depth of 40 ft. below the ground-floor, and admitting of the construction of a lower ground-floor, a basement, and a sub-basement, the floor of the sub-basement being 30 ft. below the street level, and the foundations beneath the sub-basement being filled in with concrete to a depth of 10 ft. The Bucklersbury frontage is 40 ft. in extent, and is carried to a height of 70 ft. The building contains a lofty ground-floor, and five stories above, in addition to three stone dormers which surmount the elevation. The ground-floor portion is in Portland stone, the principal entrance at the east side of the frontage being in polished Dalbeattie granite. At the west side of the elevation there is a carriage-entrance to Old Barge-yard. The main face of the elevation above the ground-floor is in red Suffolk brick, with Portland stone quoins at the angles, and fluted pilasters with capitals in the central portion, also in Portland stone, carried up to the main cornice below the dormers. The central windows of the several floors are bays, with windows in two divisions on each side, the first-floor windows being surmounted by ornamental mouldings and carving in red brick. The building is carried to a depth of 90 ft., the west frontage in Old Barge-yard being partly in white glazed bricks, and partly in white Suffolk bricks. Internally the several upper floors are so constructed as to provide upwards of seventy chambers and offices, which will be reached by, in addition to the staircase, a steam-lift fixed in the centre of the staircase, working up, continuously throughout the day, from the sub-basement to the top of the building. The engine-room, with motive-power for the steam-lift, will be erected at the upper part of the building, above the fifth floor, and will be formed of concrete and iron.

Mr. E. Lawrence, of City-road, is the contractor; Mr. Roberts is the clerk of the works. The cost of the structure will be between 14,000*l.* and 15,000*l.*

In the view now given, the entrance to the offices is shown as originally intended by the architect, but in carrying out the work it was found necessary to utilise more of the valuable frontage by limiting the space devoted to the doorway referred to; with this exception the view represents the building as executed.

THE PAVING OF "NEW STREETS."

THE Parliamentary Committee of the Hackney Vestry have prepared an exhaustive report on this subject, which is of great importance to builders, owners of house property, and others liable to apportionment-payments. The reference to the committee was upon a motion by Mr. Button, "That the paving by the authority of the District Board of Works, of certain 'new streets, or parts thereof,' out of the general rate, is contrary to the provisions of the Metropolis Local Management Act, 1855, sec. 105, and the Metropolis Local Management Amendment Act, 1862, sec. 77; and that the sums so expended should forthwith be charged 'to the owners of the houses forming such street,' and of the 'land bounding or abutting thereto'; that the general rate should be reconped the amount so expended; and that it be an instruction to the District Board of Works henceforth to carry out the provisions of the said Act in respect to paving." The committee report that having had the sections of the Acts under review and the decisions of the courts of law thereon, they "are clearly of opinion that the Legislature intended, by the passing of these Acts, that no first paving need be made at the cost of the ratepayers." At first there appeared to be some difficulty in carrying out the provisions of the Act of 1855, as to charging the cost of paving *new* streets on house-owners, which by sec. 250 defined the word "street" to include any "highway (excepting the carriageway of any turnpike road), road, bridge, lane, footway, square, court, alley, or passage, *whether thoroughfare or not*," and also as "part" of any such highway, &c.; and by sec. 112 of the Act of 1862, the word "street" was held to include "mews," and the words "new street" were declared to mean and include "all streets hereafter to be formed or laid out, and a part of any such street, and also all streets the maintenance of the paving and roadway whereof had not, previously to the passing of the Act, been taken into charge and assumed by the authorities having control of the paving and highways in the parish, and also a part of any such street, and also all streets partly formed or laid out." Since the passing of the Act of 1862, many cases have been submitted to the superior courts for decision, respecting the paving of streets, and the vexed questions, what is a new street, and who are liable to pay for the paving, have been fully settled by the decisions in the cases of Pound *v.* Plumstead District Board of Works, in 1871, and reported in 7 L.R., Q.B., 183; Dryden *v.* Putney Local Board of Health, in 1876, reported 1 L.R. 1, Ex. D., 223; Attorney General *v.* Wandsworth Board of Works, L.R. 6, Chancery D., 539; and other cases too numerous to mention. There are, of course, numerous other decisions on collateral questions, but the above cases fully settle the application of sec. 105 of the Act of 1855, and sec. 77 of the Act of 1862. The district over which the Hackney District Board of Works exercises authority was one which, at the time of the passing of the Act of 1855, contained twenty-eight miles of roadway and sixty-nine miles of footways, under the control of the Board, and twenty-three miles of roadway and twenty-one miles of footways not under its control, and was, in fact, a rural district, and "its footways stood alone in being unpaved amongst those of all the suburban parishes" (Report for 1856). It was considered best to preserve its urban character as long as possible, but the time came when it was necessary to pave the old footways which were laid out before the passing of the Act, and the Hackney District Board of Works took under their consideration the advisability of adopting sec. 78 of the Act of 1862, but came to the resolution that the old footways should be paved out of the general rate. There is, however, a resolution in the minute-books of the Board that where the owners of houses would agree to contribute a moiety of the expense of paving the old footways, the Board would at once lay down paving, with a view to the general benefit of the district. The committee then call attention to the Hackney paving loans, and to the fact that over 100,000*l.* has, from time to time, been collected from owners for paving new streets. Out of the last loan there was expended 3,606*l.* 2s. 11d. for paving Sidney, Grove, Cassland, Amhurst, Clarence, Downs Park, Downs, London, Eleanor, Loddiges, and Paragon roads, and Lamb-lane, which thus falls upon the general rate; and the question which occupied the earnest and careful attention of the committee was whether these roads were "new streets" within the meaning of the Act, and therefore ought to have been charged on the owners under sec. 105 of the Act of 1855, and sec. 77 of the Act of 1862. The list above given, it may be observed, does not represent the whole of the roads and streets in the district which have been paved at various times out of the general rate, as of course is apparent from the expenditure, but only such as were involved in the resolution of reference to the committee. There are at the present time streets in the district which have been paved out of the general rate on one side only, the other side being still unpaved. To ascertain whether the roads mentioned in the schedule are "new streets" within the meaning of the Act, the committee have directed special attention to the cases of Pound *v.* Plumstead District Board of Works, Dryden *v.* Putney Local Board of Health, and the Attorney-General *v.* Wandsworth District Board of Works. From the facts connected with the roads as regards the Putney case, the committee are of opinion that it may be fairly contended from the further light which the above cases have given upon the subject, that each and all of the streets and roads mentioned in the schedule are analogous with the cases above mentioned, and are "new streets" within the meaning of the Act.

Illustrative and confirmatory of the committee's opinion, they append to the report an appendix, giving the facts of "Dryden *v.* Putney Overseers," setting forth that the appellant had been for eight years the occupier of a house in High-street, Putney, at some distance, and quite separate from, Upper Richmond-road, hereinafter referred to; and the distress was made in respect of part of a rate to which he was assessed in respect of his house at High-street. Upper Richmond-road was an old highway, and had been kept in repair for forty years by rates raised from the ratepayers of Putney. At the time of the passing of the Metropolis Local Management Act, 1855, this road had on its south side an irregular line of houses, but 434 yards out of the entire length of 734 yards were bounded by market gardens, and on the north side there were gardens, except at two places where there were two cottages. Along the south side there was a good raised gravel footpath, and on the north a narrow ill-defined foot-track. Since 1855 the two cottages had been pulled down, and the whole of the frontage land on the north side covered with houses, and in the course of building, the old boundary hedge had been removed and a fence formed; at intervals from 1864 to 1870 the Wandsworth District Board of Works fixed a granite kerb and gravelled the path, which was paid for by the Board out of the general rates of the parish, since which the footpath had been repaired by the Board. In 1874 the Board asphalted the southern footpath, the cost being included in the general rate. Prior to this, the appellant had (in June, 1874) urged the District Board under the circumstances that the road had become a "new street" under the Metropolis Local Management Acts, and that the cost of paving the footpath ought to be borne, not by the ratepayers of Putney at large out of the general rate, but by the owners of the houses and land abutting on the footpath in question. The District Board, however, refused to accede, contending that the road was not a "new street" within the meaning of those Acts. Appellant refused to pay 1s. 6d., part of the amount at which he was assessed to the general rate, on the ground that that sum represented the proportion charged for the paving of the footway,—an expense improperly included in the general rate,—and in consequence of such refusal 10s. 4d. was levied on appellant's goods, by a magistrate's order. It was admitted that 1s. 6d. was the proper proportion of the rate of 1*l.* 11s. 6d. attributable to the cost of the paving in question, and that if the appellant was not liable, as the occupier of his house in High-street, to contribute to the cost of such paving, the rate of 1*l.* 11s. 6d. ought to be reduced by the sum of 1s. 6d. The question for the opinion of the Court was whether under the circumstances above set forth, and having regard to the provisions of the Metropolis Local Management and Amendment Acts, 1855 and 1862, respectively, the appellant, as occupying the premises in High-street, was liable to contribute to the expenses of the above-mentioned paving on the north side of Upper Richmond-road. The case was heard before Mr. Justice Grove and Mr. Justice Quain in 1876, and the decision of the Court was in favour of Mr. Dryden and against the District Board of Works." This important report is fixed for debate at the next meeting of the Hackney Vestry in August, and thence, if adopted, it will be sent to the District Board of Works, where it is sure to be stoutly opposed.

GREEK PAINTING.

MR. NEWTON'S eighth lecture* on Ancient Greek Art treated of Greek painting, for the history of which, the lecturer said, the evidence was of a very slender kind. If we passed over the few traditions about Greek painters in the archaic period of art, the first name of note was that of Polygnotus, who flourished between the end of the Persian war and the beginning of the Peloponnesian war. At Delphi he adorned the walls of the great hall called the Lesche with two great compositions, the Taking of Troy and the Descent of Ulysses into Hades. Pausanias had left us a very full description of these, giving the names of all the figures represented and the order in which they were arranged. We must suppose the more distant

* See vol. XXXVIII., p. 615.

* See p. 24, *ante*.

figures placed above the others, not exactly in parallel lines, but in groups disposed with a certain tendency to horizontal regularity. There was in such compositions no attempt to render aërial perspective. The sources which inspired Polygnotus in great compositions were the "Iliad" and "Odyssey," and the Cyclic poets. He painted also great historical pictures at Athens, in conjunction with Mycon and Panænos. Several attempts had been made to recompose the designs of Polygnotus at Delphi by the aid of the description in Pausaniae, but such attempts, however ingenious, could only be regarded as pure speculations. With regard to the merits of Polygnotus as a painter, our best guide was the authority of Aristotle, who, living in the full maturity of Greek painting as developed by a succession of great masters from Zeuxis to Apelles, emphatically held up Polygnotus for the study of youth as being beyond all others the ethographer or painter of noble character, *ethos*. In thus distinguishing Polygnotus, Aristotle contrasted him with Zeuxis, whose paintings he considered deficient in that quality of *ethos* which was so conspicuous in Polygnotus. In the period immediately following, painting was still further developed by Apollodorus, who made the first essays in chiaroscuro, which were followed up with more brilliant results by Zeuxis, who, to use Pliny's expression, entered the door which Apollodorus had opened. Zeuxis painted a celebrated picture of Helen for the city of Croton, in Lower Italy. Parrhasius, a contemporary of Zeuxis, carried the art still further. He appeared, from Pliny's statement, to have succeeded in bringing out his figures in strong relief by the skill with which the contours were rendered. Neither Zeuxis nor Parrhasius appeared to have painted great historical compositions like those of Polygnotus, but rather isolated groups or single figures. Among the most conspicuous names which are found in Pliny's list was that of Pamphilus, who established a school at Sicyon, where he taught drawing on scientific principles; his scholars, who paid very large fees, drew on boxwood. Pausias, a scholar of Pamphilus, invented encaustic painting, which enabled him to obtain finer and deeper gradations of colour as modified by chiaroscuro. He was thus enabled to accomplish very bold foreshortenings. In one of his pictures an ox was so presented in a front view that the whole length of the animal was suggested. The successive improvements in art developed by these masters led to a power of expression which showed itself in the choice of dramatic incidents, to portray which it was necessary to render transient emotions. Such subjects were the dying mother still suckling her child in the picture by Aristides of the taking of a city, and the sacrifice of Iphigenia, by Timanthes, in which the grief of Agamemnon was expressed by the expedient of veiling his face. Apelles, after having had the benefit of the teaching of Pamphilus, and of the study of the great masterpieces of his predecessors, attained an eminence which entitled him, in the judgment of antiquity, to the highest rank as a painter. He did not appear to have been distinguished for his skill in complicated compositions of many figures; but the grace and charm of his pictures, the harmony of his colouring, and his wonderful mastery over all technical difficulties, were qualities in which he had no rival. He was the Court-painter of Alexander the Great, as Lysippus was his sculptor, and they alone among contemporary artists had the privilege of taking his portrait. Among the most celebrated works of Apelles were his "Alexander wielding the Thunderbolt" and his "Aphrodite rising from the Sea." A contemporary of Apelles, who, through that great master's generous notice, rose suddenly from comparative obscurity into fame, was Protogenes of Rhodes, a painter who, like Leonardo da Vinci, finished painfully and elaborately, attaining thus a perfection which excited the admiration of Apelles, but led him to utter those warning words which had since become a proverb,—*manum de tabula*. Protogenes appeared to have painted very few pictures. His two most celebrated works were his "Ialysus" and his "Satyr in Repose." After the reign of Alexander, there were many Greek painters, but of these no name was very prominent, except that of Timomachus, who lived at some time in the Hellenistic period, and who painted a Medea and an Ajax. Painting in the Hellenistic period had an idyllic tendency, with more or less of landscape in combination with some mythic incident or a scene from real life; it had also a tendency towards *genre*. Examples of idyllic subjects and *genre* abounded in the paintings at Pompeii, where we might also see in the decoration of walls the very style which Vitruvius described and objected to. The lecturer then explained a number of diagrams illustrating the progress of painting from extant examples, among which may be mentioned a figure drawn in an archaic style on an Athenian sepulchral *stele*. This carious example of early drawing is probably of not later date than B.C. 500. A figure of an athlete jumping is engraved on a bronze disc in the British Museum,—date probably about the time of Polygnotus. A fragment drawn on boxwood formed part of a casket found in a tomb near Kertch. The composition engraved on the Ficoroni bronze cista represented Amycus, king of the Bebryces, slain by Pollux. The mosaic found at Pompeii depicted Alexander and Darius at the battle of Issos. There was also a scene representing Niobe, Latona, and their companions drawn on marble, found at Herculaneum. A Roman mosaic represented a battle between a Centaur and wild beasts. Lastly, there was a Pompeian painting of Venus fishing.

HOW GREAT ARTISTS ARE MADE.

WHAT nonsense men scribble on art!
We're sick of their rhodomontade;
Let them turn their eyes to the mart,
Or handle the pick-axe and spade.

Nought know they of sculpture and models,
Of how artists chisell'd or drew;
They've not enough sense in their noddles;
They haven't the least *aperçu*.

Fine skill with mallet and chisel,
Comes not in a swoop from above;
'Tis only those who write drivel
Make genius descend like a dove.

Those touches yclept so divine,
From study come surely but slow
From work till the day doth decline,
Till taper burns dimly and low,—

Come not of intuitive flash:
Man's neither magician nor elf;
Come not of o'er-confident dash,
An easy belief in one's self.

They come not of untutor'd hand,
Of hand without training and aid;
Great artists must first understand;
Each touch and each stroke must be weigh'd.

They come of the resolute will,
From conquest of meanness and sin;
They come of that resolute will,—
That will, which determines to win.

They come by the process of years,
By might of attention and time,
By trouble, by failure, by tears,
By dint of a patience sublime.

METER.

A NEW SISTERHOOD HOUSE AND CHAPEL IN CAMBERWELL.

A SPACIOUS new building, of imposing proportions, is at present in course of erection in Wyndham-road, Camberwell, for the sisterhood in connexion with the Church of St. John the Divine, Kennington. The building consists of two distinct blocks, connected with each other by a corridor. The main building forming the "house," when completed will have a frontage to Wyndham-road 60 ft. in length. The materials of the elevation are red Suffolk brick, with Bath-stone dressings, the building being carried up to a height of 61 ft. to the apex of a central gable, and 55 ft. to the tops of two smaller gables on the east and west sides of the elevation respectively. The structure contains five lofty stories, including the basement, the windows to each floor being mullioned. There is a central Gothic porch entrance, 7 ft. 6 in. in width, projecting 7 ft. beyond the general face of the frontage. The building is carried to a depth of 39 ft., having to the rear a second frontage of an ornamental character, which overlooks a courtyard between the building itself and the other block containing the chapel beyond. This last-named frontage has large bay-windows in the centre, 17 ft. in width, projecting to the extent of 4 ft. The basement portion of the house for the sisterhood contains a refectory, 22 ft. by 19 ft., also a large kitchen, scullery, larder, and other apartments connected with the culinary department of the establishment. The principal entrance leads into a spacious hall on the ground-floor, on one side of which is the superior's room, an apartment 13 ft. by 15 ft., and on the opposite side is the waiting-room. Beyond these, on the opposite side of a corridor, is the community-room, 15 ft. by 18 ft., with glass-rooms on each side. All the upper floors consist of bed-rooms, upwards of twenty in number, together with bath-rooms, lavatories, and every requisite convenience.

A corridor on the west side of the building, between 7 ft. and 8 ft. in width, and 25 ft. in length, leads from the house of the sisterhood to the chapel. On the east side of this corridor an ornamental bay-window, uniform with those at the rear of the house, overlooks the courtyard. The chapel is Gothic in character, and underneath is the parish room, attached to which is a kitchen and separate culinary appliances for furnishing teas and other refreshments to the necessitous in the district. There is likewise a separate entrance to the parish room on the north-east side of the building. The dimensions of the chapel for the private use of the sisterhood are 38 ft. in length by 18 ft. in width, in addition to an aisle 7 ft. wide. The interior of the chapel is intended to be elaborately fitted. All the woodwork throughout both the house and chapel will be stained and varnished.

The buildings together occupy a ground area of about 5,000 superficial feet. The architect is Mr. Frederick W. Hunt, and the contractor is Mr. Downe, of Union-street. Mr. W. Frankland is clerk of the works, and Mr. R. Handley the foreman. The building, which is now being covered in, is estimated to cost about 10,000*l.* when entirely finished.

EPPING FOREST AND THE RE-ERECTION OF TEMPLE BAR.

IT is tolerably well known that the re-erection of Temple Bar has, for some time past, been under consideration by the committees of the Corporation most concerned, and that Epping Forest, amongst other places, has been suggested as the site for again setting up the old City landmark. It is, however, now stated that two of the committees are at present at issue upon the subject, and that whilst the City Lands Committee are strongly in favour of its re-erection on a site in the Forest, and have unanimously passed a resolution to that effect, the Epping Forest Committee, on the other hand, are opposed to the proposal, and have passed an equally unanimous resolution that, in their opinion, Epping Forest is not an appropriate place for the re-erection of the Bar, and that the site to be selected should, as nearly as possible, be adjacent to the confines of the City. We understand that the matter will very shortly come under discussion at a meeting of the City Council, which will have to pronounce a final decision on the differences between the two committees. We fully agree with the Epping Forest Committee; the erection of Temple Bar in the forest would be simply ridiculous.

THE SKELDERGATE BRIDGE, YORK.

AMONGST the various public improvements which are being effected by the corporation of York, the erection of the bridge over the River Ouse at Skeldergate Ferry is one of the most important and costly. One of the principal items of expenditure has been the hydraulic machinery required to open the arch at the Castlegate side of the river, for the passage of boats trafficking on the Ouse. Had it not been for this, the river would have been crossed by one span, as is the case with the Lendal Bridge. The Skeldergate Bridge is the fourth by which the river is crossed in the heart of York. It is designed in the Tudor style. The central arch will have a span of 90 ft., those on each side 30 ft., while the land arches are each 24 ft. span; the height being 22 ft. 6 in. above summer level of river. As to the progress of the works, there is much which yet remains to be done before they can be called really complete. Most, if not all, of the stonework is finished, and the ironwork of all the arches, excepting that of the centre one, is in position. With regard to the large span, operations have now been commenced for the erection of a temporary platform, by means of which the girders may be fixed. Nearly the whole of the hydraulic machinery, which is from the famous workshop of Sir William Armstrong,

of Newcastle, is also laid down. With a view to the improvement of the navigation, a water-wall of considerable length has been made on the Castlegate side, widening the river at this point from 8 ft. to 15 ft. The wall extends from the bridge in the direction of the Blue Bridge about 220 ft., and towards Friars' Walls for a distance of 92 ft. The approaches from Tower-street and Castle Mills Bridge are also in a very forward condition. On the Skoldergate bank the improvement is no less apparent. A considerable amount of property has had to be cleared away, and it was likewise found that a portion of the old walls would have to be removed. This was done, and in order to preserve the ancient character of these historic defences of the city, a small tower has been erected at the foot of the steps adjoining Baile-hill. The clearances mentioned have enabled the corporation to make the approaches to the bridge on this side as complete as possible. All the property which is to fall hence not, however, yet been given up to be demolished, but only a very short time must now elapse before this will take place. The whole of the works in connexion with the undertaking (reserving our opinion as to the removal of the old walls), appear to be of a very substantial character, and to reflect much credit upon the consulting engineer, Mr. G. G. Page, of London, and Mr. Styan, the city surveyor, under whose superintendence they are being carried out.

DEVONSHIRE HOSPITAL, BUXTON.

VERY large extensions have been made to this building, under the direction of Mr. R. R. Duke, architect.

The superficial area now provided for wards is as follows:—For males, 11,614 superficial feet; for females, 10,912 superficial feet; thus providing accommodation for 300 patients.

The centre form of the hospital is an irregular octagon, with an inner circular area of 164 ft. diameter; within this there is a circle of columns 138 ft. diameter, forming a colonnade, 13 ft. wide, all round this inner area. These columns, with their entablature, rise 25 ft. above the floor; and from this panel springs the dome, covering the whole of this area. The dome is formed of wrought-iron ribs, twenty-two principal ones, and twenty-two intermediate ones, secured at the foot to a wrought-iron plate rim and heavy cast-iron girders, connecting the inner area wall and the colonnade, and thus securing a perfectly firm base for the dome. The ribs rise to a height of 50 ft. from the base, or 75 ft. from the floor-line, and are there secured to a wrought-iron ring, 40 ft. diameter, from which springs a lantern light, also having 40 ft. diameter, and being 18 ft. high. On the apex of this there is an ornamental finial, 25 ft. high, thus giving a total height from floor to roof of lantern of 93 ft., and to top of finial of 118 ft. In addition to the lantern light above named, there are eight other sky-lights on the roof, at the base of the dome; and together they give 4,500 ft. superficial of light to the central hall. The superficial area of this hall is just half an acre; and it is capable of holding 6,000 people. Its cubic contents are about one million of feet, a remarkable work.

SALE OF LAND, FULHAM.

THE United Land Company enlimited to public competition by auction last week, at the Windsor Castle, Hammersmith, 64 plots of freehold building land, being the first portion of "The Greyhound-road Estate," Fulham. Mr. Belton, secretary and auctioneer to the company, conducted the sale. For the plots, 16 ft. frontage and about 50 ft. deep, the prices given ranged from 69*l.* to 82*l.* each; the corner plot, of 20 ft. frontage and 53 ft. in depth, realised 134*l.* The six shop-plots, fronting on Greyhound-road, with frontages varying from 16 ft. 6 in. to 18 ft. 6 in. and a depth of about 80 ft., ranged from 156*l.* to 170*l.* each.

The sale was held under the usual conditions of the society, *id. est*, no charge for conveyance, or for roads and sewers, these having been constructed. There was a good attendance, and the acquirement of the property was keenly contested. The whole, which was disposed of in about forty minutes, realised the sum of 5,566*l.* Leaving out of consideration five plots which were much wider at the back than the front, in consequence of the position being a corner of the estate, the land may be stated to have been sold at 5*l.* 5s. 5d. per foot frontage.

MEMORIALS OF ROBERT RAIKES.

A STATUE of Robert Raikes, the founder of Sunday schools, has been set up on the Thames Embankment in the enclosed garden near the obelisk. It was unveiled on Saturday, July 3rd, last. It was designed and modelled by Mr. W. Brock, of Osnaburgh-street, and has been cast under the direction of Mr. James Moore, at the foundry of Messrs. Drew & Co., of Thames Ditton. The figure is of bronze, and 9 ft. 6 in. in height. The pedestal is of Cornish grey granite, and has been executed by Messrs. Freemen & Son, of Penryn. It bears the following inscription, which gives its history in a very concise form:—

"ROBERT RAIKES,
FOUNDER OF SUNDAY SCHOOLS,
1780.

This statue was erected under the direction of the Sunday School Union by contributions from teachers and scholars of Sunday Schools in Great Britain.
July, 1880."

The height of statue and pedestal together is 20 ft. 6 in. The figure is beautifully modelled, and stands well. The pedestal is on two steps, and produces an agreeable outline; in fact, the work as a whole must be pronounced very successful.

In Essex-street, Strand, hard by, another memorial has been set up to Raikes and other originators of Sunday-schools, going as far back as Cardinal Borromeo, in 1560, almost as if protesting against the position assigned to Raikes, placing him last on the roll instead of first. It is erected in the fore-court of Essex-street Chapel, and so placed that it cannot be seen excepting when in front of it. The pedestal, designed by Mr. Hugh Stannus, is of Portland stone and polished granite, and is surmounted by the figure of a boy (at present only in model) sitting on a school-box, holding a book in his hand, and looking upwards. The figure, also the work of Mr. Stannus, is characteristic, if somewhat small. The hands seem abnormally large. It is to be executed in marble.

ROYAL ACADEMY STUDENTS.

THE following gentlemen have been admitted:—

First-class Students.—E. J. Milner Allen, G. H. Coldwell, C. W. Davies, F. W. Kite, F. C. Lees, W. J. Millard, E. C. Shearman, L. Stokes, W. H. Wood.

Second-class Students.—A. M. Calderon, C. T. Fagg, J. B. Gase, A. Keen, W. F. Keen, W. R. Lethaby, E. A. Ram, B. A. Ravee, E. W. Smith, T. D. Wheeler, C. C. Wilson.

Probationers.—W. T. Allen, H. R. Beet, C. Burton, J. C. Carter, R. M. Gruggen, A. Hemingway, E. W. Jennings, J. N. Johnston, W. E. Lloyd Jones, E. Nevinson, J. F. Newton, F. Simpson, E. J. Slow, P. Thicknesse, G. W. Winchester.

DAMAGES AGAINST A DUBLIN BUILDING FIRM.

IN the Court of Exchequer here, before Mr. Justice Lawson and a common jury, *in re* William Byrne *v.* Michael Meade & Son, this was an action to recover damages for personal injury sustained through the alleged negligence of the defendants, extensive builders, of Great Brunswick-street, in this city. The case of the plaintiff, who is skipper of the yacht *Avalanche*, was that on the night of the 27th of February, when passing the new Town Hall, Kingstown, which is being erected by the defendants, a plank fell from off the scaffolding, hit him on the head, and inflicted such injuries as confined him to bed for five weeks afterwards. For the defence it was pleaded that the plank, which was secured with reasonable care, came down in a great gale the night before the Tay Bridge accident, and that the defendants were not responsible. His Lordship said the defendants, though not morally, were legally, responsible. The jury found for the plaintiff, assessing the damages at 40*l.*

Exhibition of Industrial and Art Productions, Manchester. — An International Exhibition of this kind is to be held under good auspices in the Agricultural Hall, Cornbrook, Manchester, in August and September next. Some particulars are given in our advertising columns this week.

SHARING COMMISSIONS.

MR. GLYNN, instructed by Mr. Walker, appeared for Mr. E. G. Wyatt, an architect, who sued for 10*l.* 18s. 1d., commission due to him by Messrs. R. & S. Batstone, quantity surveyors, for whom Mr. Metcalfe appeared, instructed by Mr. Angier. Defendant paid 3*l.* 6s. 1d. into court, and the dispute was concerning an item of 7*l.* 12s.

Mr. Wyatt deposed that he had been for four years manager to Mr. Collins, architect, and work was frequently sent to the defendants. The arrangement as to commission was, that Mr. Collins had two-fifths of their commission on the work, and he as manager had one-sixth of the balance. This item of 7*l.* 12s. was a commission on quantities taken out with respect to Storn House.

Mr. Metcalfe, for the defence, stated that plaintiff had agreed to forego this item.

Mr. Glynn said the law knew nothing of the abandonment of a claim without consideration, and this plea was worthless, even if plaintiff had foregone the claim, which he denied.

Mr. Roland Batstone deposed that their commission for the Storn House was 80*l.*, and the plaintiff's share 7*l.* 12s., but there was difficulty about the payment of the account, and they were offered 6*l.* 14s. 6d. as a settlement. They consulted Mr. Collins, who agreed to take 12*l.* rather than have his client sued in the matter, and Mr. Wyatt said that under the circumstances he would have no commission at all.

Mr. Sydney Batstone stated that he was in the office with his brother and Mr. Wyatt, when, in talking of the matter, Wyatt said he would have no commission on Storn House, and walked out. His brother said he would prefer to pay, followed Mr. Wyatt, and when he returned said he had arranged to pay him. His share of the commission received would be 4*l.* 8s.

The jury found for the plaintiff for 4*l.* 8s. beyond the amount paid into court.

PAYMENT FOR QUANTITIES BY BUILDERS.

DIFFERENCES.

SIR,—I was very pleased the other week to see you again open your valuable columns for the ventilation of this vexed question.

I read the letter of Mr. Scott [p. 778, last vol.] with some interest, and beg to refer him to my former letter on this subject, which you so kindly published in your issue of February 7th, 1880, and there he will find I made a direct attack on the Metropolitan Board of Works which they had not the courage to defend.

I am not a member of the Builders' Society (?) (so called,—for I do not know of any great work, either good, bad, or indifferent, it has ever accomplished), but if it will give me an invitation, I will deliver a lecture on "The Foolishness of Builders and the Knavery of those with whom they deal."

With your kind permission, I will give my opinion of the only straightforward way for an architect to obtain tenders for his client.

After the drawings are completed, let the architect take out the quantities in his own office; then, instead of expending a large sum on lithography, use a papyrograph, or any one of the many modes for reproducing several copies, and so let the office-boy save his client some 20*l.* or 30*l.* When the quantities are ready, instead of advertising for tenders, invite a few builders he may know, or some few in the immediate neighbourhood of the work, instead of inviting "the tag-rag and bob-tail" of England to tender for, perhaps, an important building in London, and then to let some unheard of man from the North or South jump into notoriety by carrying out, perhaps, one of our largest London works.

I shall be slightly wandering from the subject-matter in hand, but you will, I trust, pardon this digression, when I tell you how disgusted I feel to see such things before me as appear in your issue of May 8th, 1880, which happens to be lying before me. The first in the list of tenders is for the erection of the Staines Town-hall, where twenty-four builders compete for a 5,000*l.* job. See the result! The highest, that of Messrs. Cadee & Sons, amounts to 7,222*l.*, while Mr. Brunsden accepts the contract for 4,797*l.*, a difference of 2,425*l.*, with *quantities supplied*. The next list of tenders is even far more startling; but in this case quantities were *not* supplied, in which case the builders might have been stupid enough to cube the building (the most idiotic piece of performance I can imagine), when nothing better could be expected than Lidstone, 3,711*l.*, Temple & Foster, 1,845*l.*, a difference of 1,866*l.*

Now, had the architects acted upon the principle I have suggested, this, I feel sure, would not have happened.

By-the-bye, I do not quite understand why quantities cannot be issued for road-making and drainage works, so avoiding the great difference in the tenders one almost always sees when-

ever drainage works, &c., are put to competition and the lists of tenders made public.

I noticed something last week I cannot pass over, and it seems still more glaring and disgraceful than anything I have seen for some time (although I could enumerate instances by the dozen); it is for repairs, &c., at the Lion Brewery. Sharpe & Mills ask 3,330*l.*, and Mr. Allen 5044.,—a difference of 2,726*l.* No quantities supplied, it is true; but who is to blame? Some one, surely. I scarcely like to offer any suggestions, such as a vague specification, &c., but will simply confine my comment to the injustice of taking up the valuable time of some ten or twelve builders, and causing them to neglect other important work, or a useless expense in paying a clerk to plod through perhaps a long specification, and trudge up and down stairs probably *all* over a gigantic building like the Lion Brewery. I may add, *en passant*, that I hope the beer is not the culprit; it could not have been the weather, and I should scarcely think it was the change of Government.

I am acting wrongly in jesting upon a subject so serious, but I am anxious for both architects and builders to agree that either builders should be paid for their time in giving a tender, or quantities should be issued, which ought only to involve a small amount of time and expense.

I do not wish to ventilate all the grievances, imaginary and real, under which builders labour; for the reason that they are unfortunately far from perfect themselves; what I do wish to do is to obtain a remedy for some of them.

ELLIVREMOS.

ON THE ADJUSTMENT OF PROPORTION TO SIZE.

SIR,—The suggestion of "Meter" is ingenious because it seems so simple, but it is scarcely conclusive. "Distance," he may read, "lends enchantment to the view," and objects lessened by distance may not have their effects under the same law as those produced by mechanical reduction. If "Meter" will visit the Elgin room of the British Museum, he will see proportions, in the half-scale figures of the frieze, which he would hardly welcome in statues of heroic size. He may be sure that there are some grounds for what "Torenticos" alleges; and that the question of agreeable proportions varying with scale in the higher departments of formative art is not so much "in a nutshell," or so easy to crack, as may be supposed by some. It may be one of the *nuxæ*, or rather *nuces difficiles*, and yet no trifle. It is just one of such matters as, by affording a corner to the discussion of it in your columns, enable you to confer a boon on art. B.

MR. RUSKIN AND BAD WORK.

SIR,—Will you grant me space in your paper to say a few words relative to Mr. Ruskin's tirade against shoddy and "scamped" workmanship? It must be highly gratifying to every workman of taste and culture (and there are many such in all branches of trade) to find such an authority as Mr. Ruskin declaiming against inferior workmanship and shoddy products. In writing to Mr. Holyoake, he imputes too much blame to the British workman as being eager to do bad work, and rob his employer on the sly. The labour market abounds with men who, through incapacity and want of application to generate and cultivate a love of taste in themselves, are necessarily bad workmen. On the other hand, there are plenty of workmen to whom, even in their own particular occupations, "a thing of beauty is a joy for ever." Such are essentially good workmen, and will try to make the best possible job of everything they take in hand, if permitted to do so by their employers. Workmen do bad work either through inability to do good or through a desire to make as much money out of the job as possible, which is the case when the work is sublet to them, or because their employers demand quantity instead of quality; but no man does bad work for the mere sake of doing bad work, as Mr. Ruskin would have us believe.

The British workman of to-day will compare favourably with the mechanic of any age or nation. If it were not so, of what avail would be our numerous technical classes scattered all over the kingdom, the science and art schools, and the bulk of technical journals that teem weekly from the press? Let our architects exact good work, and they will find skilled workmen not wanting in ability to rear the "cloud-capp'd towers, the gorgeous palaces, the solemn temples," which, in delicacy of touch and finish, shall vie with the grand architectural monuments of ancient Greece and Rome.

J. F. WALKER, Bricklayer.

LODGINGS IN LONDON.

FLATS.

SIR,—Allow a mechanic to tell "A Working Man" what living in some flats in London really is. Let him go through London and look at the vast dismal blocks of bricks and mortar without a single redeeming feature of cheerfulness or the picturesque. To secure a comfortable and healthy home I went to live in a block at Kensington, and took (having only a wife) one of the smallest suites—a room and a half. For this I pay 7*s.* 6*d.* per week in advance—i.e., 5*s.* per week per room. The occupants before me were a man and wife and five children. The place, when I took possession, was dirty and swarming with vermin. No water could be turned on to the w.c. The top of the boiler was cracked, and worn in holes, so that the water was black with soot. The tap leaked so fast that the place was often flooded. After repeated applications, and waiting for months, the Cerberus of the "Improved Dwellings" came, grunted out that he was not going to wait on people, and plastered the holes with whitelead in an almost liquid state. In another two months he repaired the tap so that it would not turn at all. The sides of the chimney that were nearly falling down he only shook his head at. The duty of this official is to let the rooms; receive 6*s.*, independent of the rent to cover any damage that may have happened to the fixtures (which are of the most obsolete pattern and inefficient kind); answer no questions, give no information. There is another official who comes to the minute every Monday to receive the rent in advance. This is his only duty, which takes about half a minute per tenant to perform. The owner lives in a palatial residence, with a retinue of twenty servants. To attempt to make any acquaintance with him is certain dismissal. I have been here nearly a year, and no sanitary inspector has ever called; in fact, he dare not enter the place, except to give a highly flattering report, as occasion may require.

Now, sir, I contend these places are in many instances much worse than the small houses and cottages they are supplanting. They are owned by wealthy individuals, companies, or corporations, and the sanitary inspector, who is always overhauling the small capitalist, dare not criticise these places. Again, the tenant, in case of grievance, can appeal direct to the landlord, who, in many instances, comes himself for the rent. In the block system, some Jack-in-office is interposed to do the dirty work. And, lastly, the exorbitant rent charged for the tenements intensifies the very evil they are supposed to remove,—overcrowding.

Is it not a delusion to pretend to elevate the working classes, and at the same time allow this state of things to exist? Of what use are School Boards, magnificent schools, and churches, and all the institutions for the improvement of the masses, when home, even in the lowest sense, is made an impossibility to the industrious by the greed of the very class who profess to care so much for the advancement of their fellow creatures? Here in the richest part of London, with a royal palace and gardens, a magnificent parish church, and town-hall lately erected at a cost of many thousands, and also teeming with institutions patronised by royalty, there cannot be found any public-spirited people to erect plain and comfortable homes for the working classes, not as a charity or gift, but as a matter of business to return a fair dividend on the money laid out. The way the working classes are, in many instances, herded together here is a disgrace to any civilised country; and this in the richest part of the metropolis of the Christian world.

A POOR MECHANIC.

PROVINCIAL NEWS.

Hereford.—The foundation-stone of the new Foresters' Hall and Working Men's Club here was laid on the 14th ult. The premises consist of two dwelling-houses in Widemarsh-street, Hereford, the upper floors of which will be used for club purposes. The Assembly Hall will be erected in the rear of the club premises. It is intended to seat 500 persons. The style of architecture adopted is an adaptation of Romanesque. The tender of 800*l.* submitted by Mr. Thomas Lewis, builder, Hereford, has been accepted for the execution of the work, which is to be carried out from designs by Mr. Geo. Cowley Haddon, Hereford and Malvern, architect.

Rossendale (Lancashire).—The prospects of the building trade are reviving in this district. The parish church of St. Mary's, Rawtenstall, is to be enlarged and partially restored from the designs of Mr. L. Booth, of King-street, Manchester. Other works which the same architect has in progress in the neighbourhood are three large blocks of middle-class dwelling-houses for the Rawtenstall Industrial Society, a constitutional hall and club-house at Stacksteads; schools, &c., for 700 children in connexion with Trinity Church, Stacksteads; and schools for 600 children in connexion with the new district of St. John's, Rawtenstall, the latter to be followed by a church and parsonage-house. All the buildings are being erected of the excellent stone for which the district of Rossendale is noted.

Newcastle-on-Tyne.—Extensive stables are in course of erection in Percy-street, for the Tramway Company. The new range of stables stands on what was known as the Percy Gardens. The site is of an irregular shape. The buildings, which cover nearly three-quarters of an acre, are approached through George-place in the Haymarket, entrance being obtained by a bold archway, through which the cars coming from north or south, and crossing the Haymarket by the line now being laid down, pass to the numerous lines and sidings to be laid in the car-sheds. There are three car-sheds, one of 43 ft., one of 28 ft., and one of 16 ft. span. These will shelter about twenty cars, and the lines in the open yard will give standing-room for twelve more. Adjoining is a spacious workshop, having sidings for cars under repair, one of the sidings being over a sunk pit, which will give facilities for repairing the bottoms of cars. The stables are built in two ranges, the east range being divided into eleven compartments, one of four loose boxes, one of eight stalls, and nine of ten stalls each, the idea being to keep each man to his own horses, for whose proper management he can be thus better held responsible. The west range is one long stable of ninety-seven stalls. It was originally intended to arrange this group also in compartments of ten each, but the lessees, looking forward, are prepared to convert this range into an engine-shed should steam come into general use for tramways. An arch has been formed in one end wall with this object, capable hereafter of being opened out, the stable-fittings removed, and lines laid down for steam-cars. The whole of the doors to the stables run on top-rails, suspended by Hatfield's patent rollers. The work is being carried out from the designs and under the immediate superintendence of the architect, Mr. Edward Shewbrooks, Newcastle, by Messrs. Middlemiss Brothers, of Corbridge; Mr. Humphrey Atkinson, of Blaydon; Mr. John Pattison, Messrs. C. and G. Nicholson, and Mr. John Whitelaw, Newcastle, the contractors for mason and bricklayer, carpenter and joiner, plumber and gasfitter, slater and painter, and glazier works respectively.

STAINED GLASS.

Highbury.—Messrs. W. James & Co., Kentish-town, have just placed a stained-glass window in St. Augustine's Church, Highbury New Park, for Mrs. Hextall, of Canonbury House, Canonbury-square, in memory of her late husband, Mr. Henry Clay Hextall. The same firm have also done some decorative work in the church.

Yeadon.—Yeadon Town Hall has, by the liberality of Messrs. J. M. Barwick, of Low Hall, and A. Braysbaw, of Yeadon, been provided with two large six-light stained glass windows designed and executed by Messrs. Powell Bros., Park-square, Leeds. The subjects are illustrative of the staple woollen cloth industry of Yeadon. The one exemplifies sheep-shearing, following the description, by Thomson, the poet of the "Seasons"; the sheep lies "bound," and is being "of its coat bereft" by the "tender swain's well-guided shears." The companion-window portrays antique spinning and weaving in simple forms. The loom, verified in and copied from the British Museum Antiquities, is one which is believed to have been common to the early Syrians and the East, and to the Egyptians; and such as is probably yet to be found in the tents of the Arabs of the Sahara, and in the huts of the Impongwe and other native tribes of West Africa, whose cloth is woven from palm-fibre. Over this loom a Syrian man bends at his work; by his side sits a Syrian woman supporting a distaff with one arm, whilst her hands are engaged in spinning with a spindle according to the fashion in vogue before spinning-wheels were. Ten blazons of arms enframe the subjects, including those of York county and the Clothworkers' Company, and riband legends, traversing the open but enriched spaces, record the dedication of the gifts to "the people of Yeadon."

Pensford.—The east window of Pensford Church has been filled with the subject of the Transfiguration, in stained glass. The figure of our Lord occupies the centre of a glory, Seraphim and Cherubim in bright apparel holding converse with Moses and Elias, who stand on the right and left of our Lord, the one with the two tablets and the other with the camel's-hair robe illumined with the radiance of the central figure. Divided from this group by a band of clouds are the Apostles John, Peter, and James. The window was executed by Messrs. Camm, Brothers, of Birmingham.

PARLIAMENTARY JOTTINGS.

The Houses of Parliament.—In the House of Commons on the 1st inst., Mr. Schreiber asked the First Commissioner of Works when he intended to complete the mural decorations of the Central Hall of the Houses; whether he was in possession of the designs for the three vacant panels, and at what cost each panel could be filled in with mosaics? Mr. Adam.—The question as to the best mode of filling in the vacant panels in the central hall has given rise to much discussion, and was very fully inquired into in 1870 and 1871, but no definite conclusion was arrived at. I am of opinion that the vacant spaces should be filled up, but I am unable, without further consideration, to state when this can be done. No designs exist for the vacant panels. The cost of the panel already filled in was about 675*l.*, but I am unable at present to say what will be the cost of filling in the vacant panels.——On the same day, in answer to Mr. D. Grant, Mr. Adam said,—The question of lighting the House and approaches by the electric light has received and is receiving careful consideration. I will take care that it continues to receive full attention, but I am not prepared at present to recommend any definite course of action on so important a question, involving much change and alteration of existing arrangements, and which ought not to be finally adopted without going through the test of careful experiment.

The National Gallery.—Mr. Coope asked the First Commissioner of Works whether he was able to lay upon the table of the House the resolutions adopted by the Trustees of the National Gallery as to giving increased facility for admission to the public; and whether he was prepared to state what action the Government was willing to take in the matter. Mr. Adam.—The copy of the resolutions passed by the Trustees of the National Gallery, and their remarks explanatory of them, have been laid on the table of the House, and will shortly be printed. The initiative in this matter rests with the Trustees, and not with the Government; but the latter will be prepared to consider any proposals that may be made to them on the subject, with the view of giving, if possible, increased facilities to the public and students.

UNDERGROUND RAILWAY COMPLETION SCHEME.

THE Metropolitan and Metropolitan District (City Lines Extension) Bill was under consideration last week by a committee of the House of Commons. For the promoters, the first witness called was Sir Edward W. Watkin, M.P., chairman of the Metropolitan Railway Company, who went at length through the various negotiations which had taken place between the promoters and the Corporation and the Metropolitan Board of Works, for the joint construction of the railway and the new streets He said that 400,000*l.* was offered towards the widening of Eastcheap and Great Tower-street, a length of about 670 yards, and this he considered to be a "monstrously liberal" proposition from two small companies, with a large burden on their backs, who were the largest ratepayers. Their proposal was, however, refused, and they were asked first to make streets, which they had no business to do; and secondly, to take the whole risk of making these streets, as regards compensating all the City people whose cases would be brought before the Lord Mayor's Court. This they could not do, but they ultimately agreed to give 50,000*l.* more, or to pay a rent of 50,000*l.* a year if the public bodies would make the streets, the railway, and the stations. If, in order to make this railway, they had to pull down the most valuable property in the City, it would not be done. Therefore they must do one of two things,—either go under the property where necessary without pulling down, or they must have such a contribution from the public who make the streets as would pay for pulling the property down. The railway companies paid rates to the amount of 35,000*l.* a year, though they did no damage to the upper surface or streets, or anything else, and there was no obligation upon them to make streets with their shareholders' money; but their object was to follow the intimation of the joint report of 1864-5, and do their best to co-operate in a great public improvement; and he was enthusiastic enough to feel that it would be a grand thing to stand on the steps of St. Paul's and look down a fine street to the Tower. But, as it appeared there were to be no new streets, they came now to Parliament to get power which would enable them to make the railway without streets, as every conceivable attempt on their part to induce the great public bodies to do what was right and just had failed. By the Bill they sought power to burrow under City property without being compelled to take the whole of it; and in cases where they went through the basement or sub-basement to compensate only those whom they disturbed, without being compelled to pay compensation also to the tenants of the ground-floor or upper stories, whose business was not affected.

Mr. J. Wolfe Barry, engineer to the railways, stated that, as the width of Eastcheap was only 34 ft., and Great Tower-street only 24 ft., and the width required for the railway tunnel was 38 ft. to 40 ft., they would have to go under some of the houses, as the street was not to be widened. There was no engineering difficulty in doing this without disturbing the tenants, or any other portion of the buildings than the cellars and basements through which they passed. If they did not burrow, but were compelled to pull the houses down, it would involve immense sums for compensation. In a house at the corner of Mark-lane there were thirteen occupiers, and on the other side nine occupiers; in the next house there were eleven occupiers, and on the opposite side of the street thirty-four occupiers, none of whom would be interfered with except the occupiers of the basement and sub-basement. The tunnel would be about 10 ft. high in the cellars to go under the street. They did not take the ground-floor in any case. They would in some cases interfere with the traffic during construction.

Sir J. Hawkshaw, the joint engineer of the line, gave similar evidence, and said that in his judgment the interests of the owners and occupiers were amply protected. Work could be carried on in the upper stories of the houses during the whole time of construction. In making the East London Line there had not been a single crack in consequence of the burrowing. If vibration were caused it would be a matter for compensation.

Mr. Barlow, president of the Civil Engineers, said the effect of the railway would in many cases be to put good foundations where they were now defective. If the works were executed properly there was no fear of subsidence.

Mr. Forbes, chairman of the Metropolitan District Railway, gave similar evidence to that of Sir E. Watkin, and said they were not prepared to risk the responsibility of obtaining property from the new street upon the terms which had been indicated by the public bodies. The sum which their surveyor estimated would be required for the purchase of lands by the City and Metropolitan Boards was 1,080,000*l.* That was part of a much larger sum attributable to the formation of a street.

Mr. Ritchie, surveyor to the companies, gave instances where great saving would be effected by narrowing instead of being compelled to take and pull down valuable premises containing large numbers of tenants. In Great Tower-street, in almost every case there would be no disturbance of business. He had not found people unwilling to build over underground railways. He instanced Victoria-street as a place where mansions were built over a railway. That was precisely the same position which these offices in the City would occupy. In cross-examination he said the line could not be constructed unless it was done on the most economical principles. His estimate was 1,171,000*l.*, on the basis of the properties having to be purchased and businesses compensated for.

This evidence practically concluded the case for the promoters of the scheme, which is opposed by the Corporation of London, the Metropolitan Board of Works, and several of the City companies.

The Bill again came before the Committee on Tuesday last, when evidence in opposition to the scheme was given.

Mr. Hyman Henry Collins, architect, examined on behalf of the Metropolitan Board of Works, said he was district surveyor of the eastern division of the City of London, and surveyor under the Dangerous Structures Act. He viewed with apprehension the powers claimed in this Bill for going underneath the houses and not pulling them down. That course did not commend itself to him as a thing which might be safely and wisely done. It would greatly increase his duties, and entail very heavy responsibilities upon him. Many of the houses are very old, with shaken, bulged, and defective brickwork; they are tied in with iron ties, most of them from time to time altered, cut about, the brickwork cut away, and generally rendered very weak in construction; part of them have at the present moment the basement timbers shored up. The party-walls of these old houses, as a rule, particularly in this immediate locality, are generally filled in with decayed timbers, and the bricks composing the walls themselves are ordinarily found to be of a soft red and rotten clay: they crumble, and you can pulverise them. Another question of very great importance to the City is that there are chimneys built outside sometimes as much as 4 ft. wide; the chimney-breasts have been cut away on the ground-floors in order to obtain space, and really an overhanging mass has been left to drag on the party-walls. In addition to that, the party-walls themselves are only 14 in. thick, and sometimes, higher up, only 9 in. thick. Very often the whole of the back walls are entirely carried on girders and iron columns, and many of the front walls are entirely of iron and glass construction. That, by concentrating weight on certain points, adds another element of danger. The soil in the City, especially to this part near the river, is of a particularly treacherous nature, and sometimes he had gone down himself in those old buildings, and those which he had to survey, and he had found as much as 20 ft. or 30 ft. of *débris* and earth. In consequence of the nature of the ground, the walls are in some places supported on timber or plank foundations. These old buildings have been newly-faced in many instances. They are in no way bonded up by brickwork, and the slightest disturbance cracks them from top to bottom. If it was attempted to underpin those old buildings he thought they would inevitably fall, whatever care might be taken. His everyday experience told him this would be the case. He should be sorry to say that works going right through the middle of the basement and cellars of houses could safely be carried out. Judging from hundreds of houses, he never knew an instance in which there was not some slight settlement where an underpinning had taken place. He referred to work executed under able architects and engineers, such as Colonel Haywood, the engineer to the Commissioners of Sewers, Messrs. Mowlem & Burt. He knew instances in the City where the foundations, since they had been underpinned, were still sinking.

Mr. Reginald Roumieu, architect and surveyor, said his father was architect of Messrs. Hill, Evans, & Co.'s premises in Eastcheap, and he described them in detail. It was a heavy building, of a very strong and substantial character. It went down 19 ft. to the top of the foundation. The effect of making a railway under the front wall would be such that he should not like to guarantee its stability. He agreed with Mr. Collins's evidence very much.

Mr. Thos. Tayler Smith, architect and surveyor, called on behalf of the Cutlers' Company, described their property at the corner of College-hill and Cloak-lane. The Cutlers' Hall and adjoining houses were over 200 years old. They were fairly well built, but were very old. He thought oscillation would tend to bring them to the ground, as they had very small piers. Tenants of the company in Houndsditch had complained to him of the effects of the underground railway. The Metropolitan Railway runs within 10 ft. or 11 ft. of 1, White-street, and the oscillation was very great indeed. It was the property of the Cutlers' Company. In Blomfield-street the shaking of the premises was such that it prevented his taking offices there.

Mr. Price, estate agent and surveyor (of the firm of R. Ellis & Son), examined by Mr. Michael on behalf of Sir H. W. Peek, the Drapers' Company, Mr. Jeremiah Colman, and others, said since the passing of this Company's Act of 1874 he had found great difficulty in dealing in any way with the property in Great Tower-street or Eastcheap, either in letting or re-arranging leases. At present his firm had between 6,000*l.* and 7,000*l.* a year to let in those streets. He knew no street in which there was so much property to let as in Great Tower-street. Clients often refused to look at anything in the street because they would not go into a property likely to be taken by a railway company, or where they would suffer annoyance from the construction of works. In

one case they had to reduce the rent from 150*l.* to 110*l.* solely in consequence of the dread of this railway coming.

Mr. Charles Riley, of St. Swithin's-lane, surveyor to the Drapers' Company, said he thought their property would be deteriorated in value by this railway, as it would affect the stability of the buildings. The damage would be very difficult to ascertain for some time. He feared there would be very considerable settlement of the buildings. Basements were very valuable accessories to other parts of the property, and particularly in this vicinity. In some premises occupied by wine-merchants the basements were 20 ft. deep. It would be difficult to construct such cellars near to a railway tunnel. The Drapers' Company had eight houses at the Corner of Philpot-lane and Eastcheap. The lease expired Lady Day, 1879. They were re-let at a considerable increase on the letting twenty-one years ago, but as a matter of fact one of the tenants was now paying less than he paid on a sub-lease taken twelve years ago, so that there really had been a depreciation.

The proceedings were again adjourned.

TERRIBLE GAS EXPLOSIONS IN LONDON STREETS.

THE neighbourhood of Tottenham Court-road was on Monday evening the scene of a series of terrible explosions of gas, which killed two men, seriously injured many other persons, and wrecked as though by bombardment a large number of houses. This calamity occurred in the district between Bayley-street (formerly Bedford-street), on the east side of Tottenham-court-road, and the northern end of Charlotte-street, Fitzroy-square, a distance of over half a mile, along which route new gas-mains, 36 in. in diameter, have just been laid down by the Chartered Gas Company in renewal of their old supply system. The work of laying these mains has occupied a considerable time, and was in the hands of two different contractors, the junction of the eastern and western ends being intended to be made in Bayley-street, near the spot where it joins Tottenham-court-road. The undertaking was nearly completed. On Monday evening, two men, named Alfred Davis and William Burr, were in charge of the Bayley-street ends of the mains. Various suggestions have been made as to the way in which the charged mains were fired. All that is known for certain is that about seven o'clock there was at the Bayley-street junction of the pipes the flash of an explosion and the rising of a vast amount of flame into the air. This was immediately followed, at about 40 yards' distance, in Percy-street, by the upheaval of the ground, the throwing up of the paving-stones, and the rending down of the iron palings before the houses, accompanied by a rumbling like that of distant thunder. Before the beholders could turn, at the distance of about another 40 yards, the same thing occurred again, flame bursting from the earth. The explosions shook the adjoining houses, and damaged them from the foundations to the roof. These explosions followed each other from east to west. Fifty yards from the third explosion, in a north-westerly direction, is the southern end of the long thoroughfare known as Charlotte-street, Fitzroy-square, and at the junction of this street with Percy-street a horse and cart came past, driven by a man, as the third explosion occurred. The horse started and rushed on just sufficiently to save itself and the driver from the ruin of a fourth explosion, which occurred opposite Nos. 1, 3, and 5, making a terrific gap in the street, exposing the whole foundations of the houses, and casting up the contents of the underground cellars. The next explosion did not occur for nearly 80 yards further, where, opposite Nos. 27 to 31, another upheaval of the street occurred, a burst of flame, the shaking of houses, and the laying bare of the foundations following in a similar manner. Between 200 and 300 yards from this spot the gas again exploded, downwards as well as upwards, bursting in the sewers, destroying the water-pipes, and very greatly damaging the houses. The seventh explosion was in the four-cross way formed by Howland-street crossing Charlotte-street. East and west a large main runs, of the same dimensions as that down Charlotte-street, which it receives. Part of the Charlotte-street main burst in the middle of the road, upheaving the earth, but causing here no other damage. This last explosion appeared to nearly exhaust the gas, for though there was at other places a sinking in the ground showing indications of explosions, there was no further casting up of fire and earth. The unfortunate man Alfred Davis was taken to the Middlesex Hospital, and was pronounced by the house-surgeons, Mr. H. Smith and Mr. Palmer, to be dead. His companion, William Burr, aged 30, had his leg amputated in the same institution, and died on Tuesday morning. There were also admitted into the hospital several persons who were injured by the explosion.

The damage to property was extensive. Nos. 15, 16, and 17, Percy-street, at the scene of the second explosion, are more or less damaged. At Nos. 6 and 7, opposite to which the third explosion occurred, the foundations are laid open, and the front of No. 6 presents a wrecked appearance, and No. 5 has also sustained great damage. The roofs of these three houses are injured by the paving-stones, which were hurled up with terrific force from the road. The fourth explosion wrecked the lower parts of the houses Nos. 2, 3, and 5, Charlotte-street; the fifth shook very much the houses numbered 27, 29, and 31; while the sixth damaged Nos. 103 and 105. A great part of the neighbourhood was without gas for some hours, and from this cause the performances at the Prince of Wales's Theatre had to be stopped.

However this terrible occurrence is to be accounted for, it is remarkable that the explosions, occurring as they did at intervals along a route which crosses so crowded a thoroughfare as the Tottenham-court-road, should not have been the cause of a much greater loss of life.

The St. Panoras Vestry held a special meeting on Wednesday, and after viewing the scene of the calamity, and discussing it in its legal aspects, resolved,—

"That Mr. W. B. Scott, chief surveyor, be instructed to report fully on the circumstances connected with the recent explosion in Tottenham-court-road, Percy-street, Charlotte-street, and Howland-street, especially as regards the extent of the damage done to the property and works in the charge of the Vestry, including as they may be affected by the damage done to the various vaults, walls, and the areas of the houses along the line of the casualty, such report to be accompanied by such plans as may be necessary to illustrate the recital of the circumstances."

THE EMPLOYMENT OF CORPORATION ARCHITECTS.

THIS subject was discussed at length by the Birmingham Town Council on Tuesday last, and evoked an animated debate. Alderman Heaton moved:—"That the General Purposes Committee be instructed to inquire into the desirability, or otherwise, of appointing an architect who should undertake the whole of the Corporation work, except on such occasions when it may be deemed desirable to invite the assistance of professional gentlemen having special qualifications for what may be required. And with a view of enabling the Council to come to a decision on the matter, that the committee report the amount of architects' commissions that have been paid for the various works during the last five years, and the probable liabilities for architects' commission upon contracts now in course of execution." He contended that there was considerable dissatisfaction in the town with the existing system of employing one firm of architects only, and of not resorting to public competition. It was felt that by taking this step, and at the same time paying the usual commission of 5 per cent., the Council were really paying retail prices for wholesale orders.

The resolution having been seconded by Mr. Brinsley, Mr. Cook moved, as an amendment,—"That the General Purposes Committee be instructed to consider the present system of obtaining plans and estimates for the erection of buildings for the Corporation, and to report whether it is desirable that any change should be made in such system by the appointment of a borough architect or otherwise."

Alderman Kenrick seconded the amendment, and expressed the opinion that the various corporate committees should be empowered to make their own selection of an architect to carry out such work as they might desire to have executed. He objected strongly to the appointment of a borough architect.

Alderman Collings, M.P., had no objection to vote for the amendment, but held that any alteration of the present system would be prejudicial to the public service.

Mr. M. Davis said there could be no doubt as to the dissatisfaction in the town with regard to the Council giving all the work to Messrs. Martin & Chamberlain. They had no doubt done all that had been entrusted to them well, but why should they enjoy a monopoly of the public work to the exclusion of all other architects?

Alderman Biggs remarked that the Corporation for the last five or six years had been paying about 2,000*l.* or 3,000*l.* to architects, and he thought they could well afford to pay an accomplished architect,—a man of good reputation,—1,000*l.* or 1,200*l.* a year, and he 1,000*l.* a year the gainer. He did not say this question should be jumped to without some consideration, and he was willing that the matter should be well considered by the General Purposes Committee.

After considerable discussion, Mr. Cook consented to insert in his amendment the words "and report upon," after the words "that the General Purposes Committee be instructed to consider," and this alteration having been accepted by Alderman Heaton, the latter withdrew his motion, and Mr. Cook's proposal was carried unanimously.

SPECULATIVE THEATRE-BUILDING.

IN RE THE ALCAZAR COMPANY.

A PETITION was presented (Chancery Division, High Court of Justice) for the winding-up of this company by Mr. Edward Lonis Paraire, architect, as a creditor of the company for a large sum of money alleged to be due to him for preparing plans, and for consulting with the company as to the buildings intended to be erected. The company was incorporated in September, 1878, for the purpose chiefly of erecting upon the freehold ground on which Saville-house, Leicester-square, formerly stood, a spacious theatre of varieties, containing a *café* and *restaurant*, where it was intended to have dramatic and musical performances, with popular interludes, and attractive histrionic varieties.

The petitioner stated that he had prepared plans and elevations of the proposed building, and had assisted the directors with his advice and experience as to the manner in which the building operations should be carried out, and that he had obtained tenders from builders and contractors for the construction of the theatre and restaurant, according to the plans prepared by him. During the whole of the period from the incorporation of the company down to December, 1879, he had been summoned to the meetings and consulted by the directors of the company as their architect, with reference to carrying out the undertaking, and they availed themselves of the plans and measurements which he had prepared. Since December, however, the board of Directors had declined to accept any of the tenders for the construction of the building which he had obtained, and had entered into negotiations with another architect, and they had declined to carry out the building for which the plans were prepared. The petitioner had consequently sent in his claim for the debt due to him, amounting in the whole to 2,986*l.*, and he alleged that the company were unable to pay the amount due to him and to other creditors, and that the company ought, therefore, to be wound up under the direction of the Court.

The petition was opposed by the company, who alleged that the charges made by Mr. Paraire were excessive, and they disputed the debt, but they had offered him 500*l.* in settlement of his claim. They denied entirely that they were unable to pay the amount, and stated that the subscribed capital of the company was 23,350*l.* and it was calculated that when the building was erected a large profit would accrue to the shareholders. The building to be placed on the site was now being erected, and considerable progress had been made with the work, and it was expected that the building would be opened in October next. Under these circumstances they opposed any attempt to wind up the company by a person whose alleged debt was disputed, and who could bring his action to establish any debt which might be justly due to him.

The Vice-Chancellor (Malins) said it was evident that there must be a considerable sum of money to which Mr. Paraire was justly entitled. Even the prospectus contained a representation of the building intended to be constructed, which, he was told, had been prepared from the plans furnished by Mr. Paraire. However, it was impossible for the Court to make a winding-up order upon the petition of a creditor whose debt was wholly disputed. He should, therefore, direct the petition to stand over until the petitioner's claim should have been established in an action.

EMDEN *v.* CARTE.

THIS was an application, arising out of the building of the proposed new theatre in the Strand, for an injunction on behalf of the plaintiff, who was the architect employed to prepare plans, &c., to restrain the defendant from using the plans and drawings prepared by the plaintiff.

Mr. Glasse, Q.C., in moving for the injunction, stated that the plaintiff had not yet been paid for the plans and drawings of the theatre proposed to be erected by the defendant in Beaufort-buildings. It appeared that the defendant now expressed an intention not to make use of them, and if so, there the matter might end for the present.

Mr. Higgins, Q.C. (for the defendant), said he did not intend to use them, and should, in fact, be very glad not to do so.

Mr. Glasse.—As his lordship said this morning, "That is an ungracious remark."

Mr. Higgins.—Of course if we do not use them we shall not pay for them.

Mr. Glasse.—Nobody asked you. I shall show at the hearing that I am entitled to be paid for the work I have done.

Mr. Higgins said the true object of the motion was to prevent the defendant employing another architect.

Mr. Glasse desired to prevent the defendant injuring the plaintiff's professional character.

After some further discussion, an understanding was given by the defendant that the plans, &c., would not be made use of pending the trial of the action.

DISTRICT SURVEYORS' FEES.

At the Marlborough-street Police Court on Thursday, the 1st inst., before Mr. Man-field, Mr. Alfred Stonor, of 61, South-street, Grosvenor-square, appeared to an adjourned summons taken out by Mr. Robert Kerr, district surveyor of St. James's, under the Metropolitan Building Act, to recover a fee of 1*l.* 15*s.* Mr. J. A. Alsop, solicitor, appeared for the defendant.

Mr. Kerr said the defendant had executed some works at 18, St. James's-place. These works included the fixing of some hot-water apparatus. By the Building Act, section 21, paragraph 4, it was provided that no pipe for conveying hot water should be placed nearer than 3 in. to any combustible material. Mr. Stonor had in this case fixed the pipes nearer than 3 in. to woodwork. Witness communicated with him about this violation of the Act, and he promised to amend the work, and ultimately did so to witness's satisfaction. Witness then sent in his claim for his fee, which Mr. Stonor had neglected to pay, and hence this summons.

Mr. Alsop, for the defence, took several technical objections to the summons, all of which the magistrate overruled. He then went into the merits of the case, contending that, by the 9th section of the Building Act, 18 & 19 Vict., such work as that executed by Mr. Stonor in this case was excepted. The words were "Any alteration or addition or other work made or done for any purpose *except that of necessary repair not affecting the construction of any external or party wall* in or upon," &c.

Mr. Stonor, the defendant, said what he had to do was to take down the lead hot-water pipes and to put up iron pipes instead, in consequence of the lead pipes being in a defective state. The pipes had been repaired several times before.

Did you also take out a large kitchen range and put a small one in its place because the large range burned too much coal?—Yes; and we filled up the space thus obtained in the fireplace opening by putting a small gas-stove there which had previously stood in another part of the kitchen.

Mr. Mansfield said: I am of opinion that Mr. Kerr might have proceeded for penalties against Mr. Stonor, or whoever put up those pipes, from their not being 3 in. from the wood; but I utterly repudiate the doctrine that if I make a repair I am bound to repair with the same material as the original,—that if, for instance, a thing was made of cast-iron, I could not, in repairing it, use some other material for the same purpose without rendering myself liable to the Act. It is absurd to say if I put in a stone instead of a brick in the wall, that is not a repair. Therefore, I dismiss the summons.

In the case of Kerr *v.* Barron and Wilson, also heard before Mr. Mansfield, the District Surveyor of St. James's claimed 5*l.* for the inspection of work done by the defendants at the Conservative Club House, the work in question consisting of the removal of a stove from one part of a room to another, and the carrying of the stove-pipe through the wall into the extremity of the flue. It was work, Mr. Kerr contended, which properly came under his supervision, the building being a very important one, and no mercy would have been shown to the district surveyor if fire had resulted from his neglect to see the work properly done. The fee he was entitled to under the Act was 5*l.* In these cases of large fees he was always open to receive application for abatement, but in this case no such application had been made to him.

The Solicitor for the defence contended that the case did not come within the Act at all, or that, if it did, it came under section 50, as being work for which, not being covered by the schedule, the District Surveyor was bound to apply to the Board of Works to fix the amount of his fee. It was monstrous to contend that this mere alteration of a stove-pipe and flue came under sections 20 and 21, and entitled the District Surveyor to a fee half as large as he would be entitled to for the entire building of the Conservative Club-house.

Mr. Mansfield rather agreed that the sum claimed was exorbitant, as the work was much slighter than some of the works specified in the schedule as entitling the district surveyor to a fee of only 10*s.* At the same time, he believed that, under section 9, Mr. Kerr was entitled to claim the 5*l.*, and he was bound to give judgment accordingly.

Cromwell House.—At a representation of Mrs. Freake's original three-act comedy "Deeds," which was given on the 2nd inst., Mr. Herbert, of the Vaudeville Theatre, as *Henri de Clermont*, especially distinguished himself, and aided materially in rendering this the most successful rendering of the piece which has been given. Mr. C. P. Colnaghi, son of the late well-known Mr. Dominic Colnaghi, and who is good both as a singer and an actor, also deserves special mention. A very charming scene, representing the banks of the Thamee at Chelsea in the time of George III., was built up for the purpose with much skill. The financial result of the Waverley *Tableaux* recently given here was very satisfactory, and Mrs. Freake had the pleasure to send 600*l.* to the Irish Famine Fund, 600*l.* to the Orphan Fund of the Artists' General Benevolent Institution, and 600*l.* to the Victoria Hospital; receiving in return, from the latter institution particularly, many well-deserved thanks.

CHURCH-BUILDING NEWS.

Rhondda Valley.—On the 17th ult., Mr. and Mrs. Crawshay Bailey attended with a large party at Ystradyfodwg, in the Rhondda Valley, to lay the foundation-stone of a new church which Mr. Bailey purposes erecting there in the midst of his large mineral estates, at a total cost to himself of about 7,000*l.* The church is being erected on freehold land belonging to Mr. Bailey, on the hill-side immediately above the little town, the site of which, together with an acre and a half of land, he has conveyed, in fee, for the use of the Church of England for ever. The building is already in an advanced state, the side walls having been reared 8 ft. or 10 ft. above the foundations. The edifice will be more than twice as large as Llanfoist or Llanthewy Skirrid churches, which Mr. Bailey, at his own expense, has recently restored. It is to seat 550 persons, and the contract price is just 4,000*l.*, but when the extras, the value of the land, and the cost of approaches and of fences are added, the total is put down at from 6,000*l.* to 7,000*l.* The edifice is in the Decorated Gothic style, and is being built of native stone, with Bath stone dressings. On plan it will consist of a chancel and a nave with two aisles, or, more correctly speaking, a nave and south aisle. There will be a tower on the north, which will also form the porch or main entrance to the church, and will be surmounted by a small spire; the total height of the tower and spire to be 90 ft. There is also to be an organ-chamber and a large vestry on the south side of the chancel. The windows will be glazed with cathedral glass; the seats, of the modern open shape, will be of pitch-pine, stained and varnished, and both chancel and nave will be floored with Godwin's encaustic tiles. The building is to be heated with Grundy's patent stoves. The character and style of the reredos have not yet been decided upon. Mr. J. B. Fowler, Brecon, is the architect, and Messrs. C. Sheppard & Son, Cardiff, are the contractors. A peculiar feature in the church is that there is to be a tank fixed in the western corner of the nave for adult baptism by immersion.

Cottingham.—The Church of St. Mary Magdalene, Cottingham, has been re-opened, after alterations. The galleries, which occupied three sides of the building, and the old-fashioned high-backed pews, have been removed, the place of the latter having been taken by chairs. The church consists of a nave and side aisles, and these latter have been considerably extended. In the north aisle, at the chancel end, an organ-chamber has been erected. Further room was also obtained by the removal of the vestry to the south aisle. The chancel has been entirely rebuilt, and the whole of the windows, which are of cathedral tinted glass, have been reglazed by Messrs. Pepper & Co., of London. The clerestory windows, which were very irregular, have been removed and placed in uniform positions. There is now an entrance on the northern side of the church, the doorway which was closed up being re-opened, and a door removed from the west end fixed in place of the old one, which was scarcely 5 ft. in height. The building has been re-roofed, the present roof, which is slated (Westmoreland green slate being used), being of considerably higher pitch than was the old one, which was covered with lead. The materials composing the present roof are all new, with the exception that in the nave portion the old transverse beams have been utilised. The balustrades of the galleries have been re-worked into the new Communion-rails which have been placed in the church. The columns have been thoroughly cleansed, the paint and whitewash being removed by a chemical process. Of these pillars there is one that deserves special mention. It is in keeping with the others in every respect, except that the capital is composed of four figures handed together. The figures consist of a female, two knights, and a bishop. The pulpit has been lowered, and heating apparatus has been furnished by Messrs. Vipan & Headley, of Leicester. The new choir-stalls are of oak, with carved bosses, by Messrs. Phillips, of Northampton. Two new buttresses have been erected on the exterior at the east and west angles of the north and south aisles; the clock has been removed from the west end to the north side, and the height of the tower has been increased by about 15 ft. The original contract was for 2,100*l.*, but this amount has since been considerably exceeded. The architect in charge of the work was Mr. A. Hartshorne, the builder being Mr. E. Barlow, of Rotbwell; Mr. W. Simpson, of Cottingham, acting as clerk of the works. The iron portion of the work was by Messrs. Mohhs, Snow, & Wood, of the Eagle Foundry, Northampton.

DISSENTING CHURCH BUILDING NEWS.

Tulse Hill.—A new Wesleyan chapel has been opened at Tulse Hill. It occupies a fine position at the corner of the Norwood and Christchurch roads, being set back from the former 100 ft. It is in the early Gothic style, and built of Kentish rag and Bath stone. The main elevation has a five-light window and moulded tracery, below which is a doorway with coupled shafts and cusped head. The dimensions are 80 ft. by 52 ft. in the body of the chapel, with a semicircular sided chancel 30 ft. deep in addition, which, with the double entrance porches, gives a total length of 126 ft. The arcades are in five wide bays, of 10 ft. each, supported by polished Shap granite columns, with carved capitals. A shallow gallery, two seats deep, is placed behind the columns in the sides and at one end. The roof is wagon-headed and boarded, the principals having cusped filling-in with a hammerbeam treatment. There are five large traceried windows in each side, with small ones below. The chancel has seven lancet windows. The choir stalls have richly-carved bench ends, and, with the pulpit and sittings, are all of pitch pine. A large organ-chamber occupies one side of the chancel, and a vestry the other. In the basement is a large school-room, 51 ft. by 51 ft., with a height of 15 ft., and amply lighted. There are several other class-rooms and vestries. A lofty tower and spire of good proportion are in course of erection, the design being that of an octagon lantern on the tower, with pinnacles at each angle, and smaller ones at springing of spire above octagon. The tower is 20 ft. square at the base, and has no projecting buttresses. It is proposed to place a clock and bell in the tower by public subscriptions. The building is warmed by hot-water, and the gasfittings are by Richardson, Ellson, & Co. The architect is Mr. Bell, of New Broad-street, and the builders are Messrs. J. & C. Bowyer, of Norwood. The total cost will be, including fencing, upwards of 11,000*l.*

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Wolverhampton.—The new chancel, chancel aisles, chapels, sacristies, &c., of the (R.C.) Church of SS. Mary and John, Snow-hill, which have occupied more than three years in erection and completion, and have cost nearly 7,000*l.*, have been solemnly dedicated. The church, as it originally stood, consisted of nave, aisles, and transept. Mr. Hansom, of London, is the architect. The new chancel, which adds 50 ft. to the length of the church, is built in three bays, surmounted by a clearstory of six windows, delicate shafts rising between the arches and supporting a richly-groined roof. The chancel divides itself into sanctuary and choir. The altar and reredos are in Caen stone, elaborately carved, with alabaster shafts. The central window of the apse is filled in with stained glass, by the firm of Hardman. The central light portrays the Crucifixion, and below that a *pieta*. St. Mary and St. John are in the right and left lights, one on each side of the cross, and below these figures are the Blessed Virgin as the Mother of Sorrows, and St. John conducting the Holy Mother to his own home. The north and south aisles are almost as long as the chancel. They also have groined roofs, and each terminates in a chapel, that in the north aisle being dedicated to the Virgin, and that in the south aisle to the Sacred Heart. The aisles, again, are flanked by smaller chapels, with St. Joseph and St. Patrick as the patron saints. Between the chancel and the aisles are carved oak screens, by Boulton, of Cheltenham. The sculpture is by Shepherd, of Bristol. The exterior walls of the new chancel are of Gornal stone, the interior being of Bath stone.

Worcester.—St. George's (R.C.) Church, Worcester, has lately undergone costly alterations and additions, including the building of a new chancel. The church was erected just fifty years ago, in the then-prevailing manner, the plan being a simple parallelogram, 40 ft. in width in one span, with a shallow recess in front, adorned with a couple of columns and

pilasters to form a portico, and having a similar recess at the sanctuary end, in front of which the altar was placed. The columns, cornices, and other ornamental features were copied from Greek examples, and the whole was substantially erected. The church may now be said to be completed by the erection of a sanctuary, transepts, side chapels (dedicated respectively in honour of the Blessed Virgin and of St. Joseph), a baptistery, confessionals, and a sacristy, over which is a large room for use as a library: all designed in harmony with the original structure, but with the style more freely treated, and with greater variety of detail. The old recess behind the altar has additional openings to the transepts, so that the original massive columns and pilasters now form a screen to the chancel, which is lofty and spacious, lighted by a clerestory filled with glass leaded in appropriate forms. The altar-piece is of very rich design, principally of marble-work, inclosing in the centre the copy of Raffaelle's "Transfiguration," which formed the old altar-piece; to this has been added wings, arranged in the old triptych form, painted with figures of SS. Oswald and Wulstan, and of SS. Ignatius and Francis Xavier. Beneath, and immediately behind the high altar, the composition is completed by a painting on a gold ground,—archangels and angels adoring,—by Mr. Joseph Bouvier, of London, who has also painted the large side figures. The altar itself is of marble and alabaster, of simple outline, but adorned with sculptured foliage, the monogram of the Holy Name, and the emblems of the Passion of our Lord. The general contract has been carried out by Mr. J. Kendrick, and the three marble altars and pulpit have been executed by Mr. W. Forsyth, of Worcester, the whole from the designs of Mr. S. J. Nicholl, of Caversham-road, London.

Northampton.—The foundation-stone of a new chapel, in connexion with the Roman Catholic convent, Northampton, has been laid. The chapel, which is dedicated to St. Joseph, is to be erected on the terrace at the rear of the convent, the style being Romanesque. Mr. W. Hull is the architect, the builder being Mr. Dunkley. The building, when completed, will accommodate 150 persons.

Books.

Handbook of the Dyce and Forster Collections, in the South Kensington Museum. Chapman & Hall.

THIS, which is one of the series of South Kensington Handbooks, not only supplies an account of the Dyce and Forster Collections, but gives particulars of the two donors, and being, moreover, illustrated with portraits and *fac-similes* of autograph letters from eminent people, makes a charming little book, which has an interest of its own, quite apart from its purpose as a guide for visitors.

Miscellanea.

Industrial School for Girls.—The foundation-stone of the Middlesex Industrial School for Girls was laid on the 30th ult., by Mr. Edmund E. Antrobus, J.P. The site is within the parish of Bedfont, less than a mile from the Feltham Station, on the South-Western Railway, and forms a portion of the Spelthorne Sanatorium grounds. In a large outbuilding of the Sanatorium Mr. Antrobus reviewed the events which had led to the present attempt to provide the means of rescuing young girls, who, under the influence of bad associates, had committed, perhaps, slight offences, from the disgrace of being sent to prison. It was thought that, in dealing with girls, many of whom would be very young, the "Cottage School" system would be most likely to prove successful, and it was of the first cottage home for this purpose that they were about to lay the foundation-stone. A report to the subscribers showed that the committee had about 900*l.* in hand, over 1,000*l.* being required for the building, and a further sum to meet the cost of furnishing the home. The cottage, to accommodate twelve children and a matron, will be of red and black brick, with stone dressings. It will be Elizabethan in character, and from the designs of Mr. Charles Barry, the architect of the Middlesex Industrial School for Boys at Feltham.

Prizes for Metal Casting.—The Worshipful Company of Founders have offered a number of prizes for competition amongst persons carrying on business as founders, or employed or engaged by such persons. The list includes a prize of 10*l.* for the best, and one of 5*l.* for the second best, specimen in brass or bronze of an original nude figure, not to exceed 12 in. in height, including the base. The figure to be the property of the Company, the model to remain the property of the designer (with 10*l.* 10*s.* added by past-master Mr. James Franks); a prize of 5*l.* for the best, and one of 3*l.* for the second best ornamental bell, not to exceed 9 in. in diameter at the mouth. The first prize bell to be the property of the company, the model or pattern to remain the property of the designer. A prize of 5*l.* for the best, and one of 3*l.* for the second-best, specimen of *repoussé* brass-work of lock or hinge furniture for doors of Mediæval design, the design and the work to be by the same person. The first prize to be the property of the company; and the freedom and livery of the Company of Founders to the author of the best essay on the History and Art of Founding in Brass, Copper, and Bronze. To the winner of this prize an additional sum of 10*l.* 10*s.*, is the gift of Past-Master Mr. Robert Warner. The prizes for the metal-work seem scarcely large enough. If the Company hope to induce the production of anything worth having they should withdraw the condition that the rewarded works are to become their property. Moreover, we should think it very doubtful that they will obtain a well-designed and modelled nude figure and a good bronze of it from the same competitor.

University College, London.—A Professorship of Archæology has been instituted at University College, and Mr. C. T. Newton, of the British Museum, has been appointed professor. A meeting in aid of the fund for the completion of the college buildings was held on the 2nd inst. at the Mansion House. In the absence of the Lord Mayor, the chair was taken by Mr. Alderman R. N. Fowler, M.P. Lord Kimberley moved, "That the manner in which University College, London, has been conducted and developed in accordance with its original principles has greatly advanced the higher education of this country, and meets with the approbation of this meeting." He had been struck by the dearth of really eminent men. We could all attain to a certain standard of proficiency, but those who were, as he might say, a head, or even half a head taller, intellectually, than others were very rarely met with, and we could not afford as a nation to lose the advantage of cultivating and bringing forward such men if they were to be found in any class. Mr. F. W. Buxton, M.P., seconded, and Mr. Jervoise Smith supported, the motion, which was carried unanimously. Mr. Alderman Cotton, M.P., moved, "That this meeting recognises the claim of University College upon the City of London for assistance for raising the fund for the enlargement of the college buildings, rendered necessary by the continually increasing number of students and the extension of its teaching." Explaining that some 20,000*l.* was immediately required to complete the additions most urgently needed, he mentioned that the Earl of Derby, being unable to be present, had forwarded a cheque for 500*l.* to the fund. The resolution was carried, and a committee was appointed.

J. Sessions & Sons, Gloucester and Cardiff, whose productions in enamelled slate goods we have had occasion to mention on other occasions, had a very meritorious display of their manufactures at Sydney. Messrs. Sessions adopt the principle of using white marble instead of slate for the panels of chimney-pieces, and enamel on the marble. The advantage gained is that the natural veins of the marble assist the decorator in his art.

Mr. J. Ebenezer Saunders, architect, was, at the meeting of the Metropolitan Board of Works, on the 2nd inst., unanimously elected Chairman of the Building Act Committee for the ensuing year, his predecessor, Mr. Runtz, receiving the thanks of the Board for the services he had rendered by the discharge of the duties of chairman during the last two years.

The Leicester Church Congress.—Following the example of last year, an exhibition of ecclesiastical art will take place at Leicester during the forthcoming Church Congress, at the Skating Rink, in Rutland-street, which will be specially fitted up and decorated for the occasion. The exhibition will open on the 27th of September, and close on the 2nd of October.

The Electric Light is to have another trial in the streets of the City of London. At the meeting of the Commissioners of Sewers on Tuesday last, the Streets committee brought up a report on a reference to them in March last to consider as to the adoption of improved means of lighting the streets of the City. They stated that the Bridge House Estates Committee of the Corporation were desirous that the three City bridges, London, Southwark, and Blackfriars—should be lighted by electricity, and, that being so, they were prepared, as an experiment, to suggest the lighting of certain streets in the City by electricity at the same time—viz, Queen Victoria-street, Queen-street and Queen-street-place, King William-street, Mansion House-street, the Poultry, Cheapside, Ludgate-hill, Ludgate Circus, the north side of St. Paul's churchyard, and New Bridge-street, Blackfriars, together with the three bridges. They recommended, however, that before the experiment was undertaken, tenders should be invited with a view to ascertain the cost. Mr. Innes moved the adoption of the report, stating that the experiment in electric lighting upon the Holborn Viaduct was thoroughly successful as far as it went, but the cost was excessive. Since then, however, the Board of Works had carried on a similar experiment upon the Embankment and Waterloo-bridge, and had contrived to reduce the cost of lighting, and there was reason to hope that the expense might be still further decreased. The Corporation had expressed a wish that their three bridges might be lighted by electricity, and that being so, the Commission had determined to extend the trial by taking in all the important streets leading to the bridges. The report was adopted.

The Employers' Liability Bill.—It is intended to hold a conference in a few days with the view of arriving at some agreement between the supporters and opponents of the Employers' Liability Bill. A proposal will be submitted to the conference to introduce into the Bill a clause providing for a system of insurance. At a meeting of employers held at Birmingham last week to consider the Bill, Mr. E. Fisher Smith, chairman of the South Staffordshire Coal Trade, presided. Mr. Pease, secretary of the Mining Association of Great Britain, argued against the Bill, which, he said, would lead to a large amount of litigation. He contended that the solution of the problem of the relations of masters and workpeople with regard to accidents lay in a system of insurance. Mr. J. P. Hunt, chairman of the South Staffordshire Iron Trade Board, proposed a resolution to the effect that the meeting, after considering the effects of the Bill, viewed it with the greatest alarm, and strongly urged upon Parliament the desirability of referring the Bill to a select committee. Colonel Harrison (Brownhills) seconded the resolution, which was supported by Major Walker (Stourbridge). Mr. Wiggin, M.P., said that the employers of labour must make up their minds to accept a Bill of some kind. In and out of Parliament there was a general opinion that something ought to be done to enable *employés* to obtain compensation in case of accident. He was averse to a question which so greatly and gravely affected the interests of employers being hurried through Parliament in one short session, and for that reason he was in favour of the Bill now before the House being referred to a select committee. The resolution, after a lengthened discussion, was unanimously adopted.

Proposed Art Gallery at Birmingham.—The Mayor of Birmingham (Alderman Richard Chamberlain) read to the town council on Monday a communication from Messrs. Richard & George Tangye, the well-known engineers, offering, if the council will make provision for a permanent art-gallery, to contribute a sum of 5,000*l.* for the purchase of specimens of art for exhibition. Should an equal sum be subscribed by other persons, Messrs. Tangye offer to give a further sum of 5,000*l.* for the same purpose. A resolution was adopted thanking Messrs. Tangye for their generous offer, and expressing the desire of the council to comply with the conditions.

We are Advertising for Monday evening next a sale of building land at Tooting. The once-famous nursery of Messrs. Rollisson has been developed as a building scheme, and 133 plots of land, with a large block of one acre in the rear, will be competed for. The sale takes place at the inn near the property, and Messrs. Protheroe & Morris are the auctioneers.

West Anstey Church, near Southmolton, Devon, has recently been re-opened, after partial restoration. The church, dedicated to St. Petrock, consists of chancel, nave, north aisle, south porch, and western tower, and is built of local rubble stone, with dressings partly of local stone of very pleasant colour, and partly of Ham-hill stone and Bath stone. The roofs are covered with grey slates and red crimped ridge tiles. The gables are surmounted with crosses of red pottery of special design. In order to preserve the original proportion of the chancel, a pillar with a side-arch has been built. A new open-timber roof has been constructed, and the door and windows have been renewed. New roofs also have been put up over the remainder of the church, none of the old wood being available for the renewal. The porch roof has been replaced with new oak, the old design being followed as accurately as possible. It was found necessary to rebuild nearly the whole of the north aisle, and to insert new windows. New windows have also been inserted in the nave. The old entrance oak door has with great difficulty been preserved and repaired. The porch entrance has been rebuilt. The reredos consists of an oak canopied framing, with a cross in the centre panel, and angels painted on the double panel on either side. The tower at the west end is in a very dilapidated state, but it cannot at present be restored for want of funds. The church is paved with Maw's tiles, with diagonal coloured border. The pulpit is in Bath stone, with four panels. The architect for the work was Mr. W. White, F.S.A., of London; and the builder Mr. John Cock, jun., of Southmolton.

Burning of the Duke's Theatre, Holborn.—The Duke's Theatre, situated in Holborn, was entirely destroyed by fire on Sunday evening last. The fire was discovered a few minutes before five o'clock, and within a very few minutes of the alarm being given several steam fire-engines arrived on the scene. It was some time, however, before the firemen could gain an entrance to the theatre, owing to the fact that they had to break open the doors of the box-entrance in Holborn. By the time this was effected no fewer than twelve steam fire-engines were simultaneously playing upon the flames. After the fire had been raging for about twenty minutes the roof gave way, carrying portions of the gallery and upper boxes with it. The fire, although fierce, did not last long, all being virtually over within three hours of the first alarm. The fire is supposed to have broken out near the green-room; it was from that part of the building that the smoke and flames were first seen to issue. Thence it caught the property-room and stage, which it quickly destroyed, together with a quantity of machinery underneath the stage.

Worthing.—Mr. W. Oldham Chambers, of Lowestoft, has been appointed architect to the new infirmary and dispensary about to be erected at Worthing. The works will be commenced forthwith, the plans having been approved by the governors.

Messrs. Robert Boyle & Son have removed their London offices and show-rooms from Mansion House buildings, Queen Victoria-street, to more convenient premises situated in Queen Anne's-buildings, 64, Holborn Viaduct.

Proposed New Church in Exeter.—The Exeter Church Extension Committee have invited the architects of Exeter to send in designs for proposed new church in Newtown. The competition is limited to architects residing or having offices in Exeter.

The Cathedrals.—Lord Blachford, K.C.M.G., and Sir Walter Charles James, have been placed on the Commission to inquire into the condition of the cathedral churches in England and Wales.

TENDERS

For new offices, engine-house, &c., for the Local Board of Health, Wanstead, Essex. Mr. John T. Bressey, architect:—

Bregger	£3,320 0 0
Larter & Son	2,660 0 0
Rider & Son	2,582 0 0
Staines & Son	2,548 0 0
Garrud	2,483 0 0
Reading	2,470 0 0
Mundy	2,450 0 0
Howell & Son	2,430 0 0
Harper	2,357 0 0
Greager	2,339 0 0

For proposed villa, Burgess-hill, Sussex, for Mr. F. J. Cully. Mr. F. W. Hyde, architect:—

Downer (accepted)	£880 0 0

For the erection of new infant schools, Kingston-on-Thames. C. L. Luck, architect. Quantities by Northcroft, Son, & Neighbour:—

Adkins	£1,656 16 0
Manley	1,600 0 0
Jarvis	1,595 0 0
Beale	1,589 0 0
Crockett	1,577 0 0
Clemence	1,485 0 0
Vare	1,475 0 0
Dobson	1,446 0 0
Mudie	1,410 0 0
Havell	1,410 0 0
Higgs	1,409 0 0
Roberts	1,376 0 0
Todd	1,327 0 0
Mason	1,298 0 0
Haynes	1,285 0 0
Oldridge	1,265 0 0

For house, Wanstead Park, Wanstead, Essex. Mr. John T. Bressey, architect:—

Brown	£2,050 0 0

For taking down and re-building No. 4, Claremont, Hastings. Messrs. S. & A. Smith, architects, Hastings. Quantities supplied:—

Wormersley	£2,775 0 0
Vidler	2,072 0 0
Eldridge	2,050 0 0
Taylor Bros.	1,990 0 0
Howell & Son	1,950 0 0
Cousins	1,945 0 0

For alterations and additions to No. 10, Bolton-row Mayfair, for Dr. W. H. Corfield. Mr. Mark H. Judge architect:—

W. & E. Curtis	£585 0 0
Andrews	530 0 0
With New Story.	
W. & E. Curtis	£775 0 0
Andrews (accepted)	770 0 0

For new steam laundry for the Richmond Steam Laundry Co. Mr. Frank J. Brewer, architect. Quantities by Mr Barber:—

Jackson	£3,243 2 7
Seal	3,235 0 0
Sims	3,220 0 0
Sweet & Loder	3,120 0 0
Hampster	3,100 0 0
Mason	3,000 0 0
Carless	2,974 0 0

For stables, &c., for the Corporation of Leicester:—

Horspool	£1,459 0 0
Ramett	1,307 0 0
Riddett	1,304 0 0
Barnett	1,297 0 0
Tyrrell	1,272 0 0
Hewitt	1,256 0 0
Sharpe & Sons	1,247 10 0
Major	1,242 10 0
Diamond	1,222 9 0
Jewsbury	1,221 10 0
Plant (accepted)	1,217 10 0

For cattle-sheds for the Corporation of Leicester:—

Bland & Sons	£392 10 0
Jewsbury	391 0 0
Plant	382 0 0
Duxbury & Son	365 8 0
Hewitt	359 0 0
Major (accepted)	351 0 0

For the erection of a boat-house on Eel Pie Island, for the Twickenham Rowing Club. Mr. W. T. Mann, architect:—

Saunders & Son (accepted)

For the erection of a warehouse for Mr. W. Underhill South Lambeth. Mr. W. T. Mann, architect:—

Eede	£2,200 0 0
Deards	2,052 0 0
Fairhead	1,591 0 0

For repairs and decorations at Nos. 13 and 14, Randolph gardens, Carlton-road, Maida-vale, for Mr. Alfred Rawlinson. Mr. J. G. Raynes, architect:—

Pitt	£431 3 0
Langmead & Way	387 0 0
Yerbury	380 0 0

For the formation of new roads and sewers on the Willesden Park Estate, Willesden-green, for the Metropolitan Railway Company. Mr. Walter Graves, surveyor. Quantities by Mr. Walter Barnett:—

Williams, Son, & Wallington	£8,270 0 0
Botterill	7,864 0 0
Firbank	7,681 18 6
Mowlem & Co.	6,955 0 0
Crockett	6,924 0 0
Keeble	6,882 0 0
Wall Bros.	6,120 0 0
Meston	6,090 0 0
Nowell & Robson	6,073 0 0
Killingback (accepted)	5,800 0 0

For alterations and additions to house in the Neckinger-road, for the Bermondsey Vestry. Mr. Geo. Elkington, architect:—

Drake	£347 0 0
Batley	335 0 0
Brockwell	305 0 0
Almond	279 0 0
Buller	265 0 0
Eldridge & Gee (accepted)	221 0 0

For proposed new church (first portion) Ditchling-road, Brighton. Messrs. Scott & Hyde, architects. Quantities by Mr. F. W. Hyde:—

Barnes	£1,464 0 0
Lockyer	1,441 0 0
Cheeseman & Co.	1,428 0 0
Marshall	1,300 0 0
Patching & Son	1,266 0 0

For the erection of new premises, No. 15, St. Mary Axe, for Mr. Thos. Wright. Mr. Thos. Blashill, architect. Quantities by Mr. D. Cubitt Nichols:—

King & Son	£3,390 0 0
J. & F. J. Wood	3,128 0 0
Marr	2,928 0 0
J. & H. Cocks	2,890 0 0
Little	2,777 0 0
Ansell	2,762 0 0
Conder	2,689 0 0
Langmead & Way	2,600 0 0

For alterations and additions to stabling, Whitecross-street, Cripplegate, for Mr. S. Ham. Mr. A. B. Brede, architect. Quantities supplied:—

Temple & Foster	£1,343 0 0
Merrett & Ashby	1,111 0 0
Woodward	1,100 0 0
Ashby Bros.	1,087 0 0
Wall Bros.	1,055 0 0
Mattock Bros (accepted)	1,033 0 0
Crabb	993 0 0

For house and studio, Notting-hill, for Mr. C. W. Bach. Mr. A. B. Brede, architect:—

Grigg (accepted)	£2,090 0 0

For new warehouse, Rupert-street, Bristol. Mr. Henry Crisp, architect:—

Eastabrook & Sons	£2,800 0 0
Wilkins & Sons	2,510 0 0
Heatherley	2,495 0 0
Howell & Son	2,440 0 0
Cowlin & Son	2,375 0 0
Veals	2,374 0 0
Stephens & Bastow	2,249 0 0

For re-building the Dover Castle, and two houses and shops adjoining, at the Broadway, Deptford, for Mr. Overton. Mr. W. T. Hunt, jun., architect:—

Gill	£4,312 0 0
Hardy	3,990 0 0
Newman	3,655 0 0
Banks	3,495 0 0
Redman	3,465 0 0
Thomas	3,300 0 0
Holloway	3,293 0 0
Jerrard	3,289 0 0
Cockle	3,250 0 0
Crisp & Tomline (accepted)	3,017 0 0

For the erection of schools at Gildfield-road, Stoke Newington, for the School Board for London. Mr. E. R. Robson, architect. Quantities supplied by Mr. T. Thornton Green:—

Harrison & Wardrop	£9,065 0 0
Chappell	8,882 0 0
Scrivener	8,858 0 0
Sargeant	8,781 0 0
Williams & Son	8,713 0 0
Hobson	8,584 0 0
Rirk & Randal	8,560 0 0
Boyce	8,432 0 0
Wall	8,150 0 0

For the erection of a block of school buildings to accommodate 1,064 children, on a site in Abbey-lane, West Ham, for the West Ham School Board. Mr. J. T. Newman, architect. Quantities by Messrs. Curtis & Sons:—

Abrahams	£7,490 0 0
Reed	7,225 0 0
Boyce	7,183 0 0
North Bros.	7,112 0 0
Hearle & Son	6,984 0 0
Wall Bros.	6,983 0 0
Gentry	6,925 0 0
Nightingale	6,842 0 0
F. & J. Wood	6,570 0 0
Knight & Duston	6,556 0 0
Hoskings	6,496 0 0
Morter (accepted)	6,383 0 0

For the erection of a building on the site of Nos. 66 and 67, Cornhill, for the London and Lancashire Assurance Company. Mr. T. Chatfeild Clarke, architect:—

Trollope & Son	£17,873 0 0
Ashby & Horner	17,740 0 0
Higgs & Hill	17,464 0 0
Conder	17,332 0 0
Bywaters	17,168 0 0
Hall, Beddall, & Co.	16,850 0 0
Peto Bros.	16,800 0 0
Holland & Hannen	16,499 0 0
Ashby Bros	16,460 0 0
Brass	16,339 0 0
Lawrance	16,265 0 0
Colls & Sons	15,970 0 0

For certain works at Harvey-buildings, Strand. Mr. W. Paice, architect:—

Timewell (accepted).

For re-building portion of premises destroyed by fire at 13, Greek-street, for Mr. Wilson. Mr. W. Paice, architect:—

Timewell (accepted).

For proposed alterations and additions to the Hercules Pillars, Greek-street, Soho, for Mr. J. Higgins. Mr. W. J. Worthington, architect. Quantities by Messrs. Worthington & Canning:—

Earle & Son	£750 0 0
Grimwood & Sons	670 0 0
Phillips	637 0 0
Pickergill	619 0 0
Lamble	563 0 0
J. & H. Cocks	548 18 0

For Onslow College of Science and Art, King's-road, Chelsea. Messrs. John T. Stokes & J. E. Arpin, architects:—

Belham & Co.	£1,895 0 0
Strong Bros.	1,779 12 8
Stimpson & Co.	1,688 0 0
Smith	1,651 0 0
Sharp & Mills	1,645 0 0
Craske	1,620 0 0
Holloway, Lavender-hill (accepted)	1,573 0 0

For cast-iron pipes and special castings, Contract No. 2, Saltley (Birmingham) Sewerage Works. Mr. E. Pritchard, engineer:—

Macfarlane, Strang, & Co., Glasgow	£2,134	0	0
Jukes, Coulson, & Co., London	2,102	17	6
Firmstone, Stourbridge	2,036	0	0
Cochrane & Co., Dudley	1,920	0	0
J. & S. Roberts, West Bromwich (accepted)	1,816	0	0
Stennton Iron Works Co., Nottingham	1,808	0	0

For coffee tavern and public hall, to be erected at Woolwich, for the Woolwich and Plumstead Coffee Taverne Company (Limited). Mr. Wm. Rickwood, architect, by whom quantities were supplied:—

Coombs	£7,639	0	0
Steed Bros.	7,632	0	0
Wilkins	7,315	0	0
Stiff & Son	7,287	0	0
Beale	7,185	0	0
Reading	7,134	0	0
Staines & Son	7,057	0	0
Gaund	6,935	0	0
Prout	6,653	0	0
Hney	6,618	0	0
Harris	6,600	0	0
Julian & Co.	6,600	0	0
Tongue	6,528	0	0
Kirk & Randall	6,380	0	0
Lonergan & Sons (accepted)	5,908	0	0

For painting St. Thomas' Square Chapel, Hackney:—

Shurmur (accepted)	£233	10	0

For alterstions at the Lamb and Flag, Homerton, for Mr. Schnepp. Mr. H. J. Newton, architect:—

Shurmur	£1,071	0	0
Grimwood	895	0	0
Godden	855	0	0
Lamble	813	0	0
Anley	788	0	0
Impey	619	0	0
Wood	615	19	0

Counters and Pewterer's Work.

Mott	£135	0	0
Hilling	133	0	0
Rogers	131	0	0
Heath	127	0	0

For three villa residences, River-street, Islington. Mr. William Smith, architect. Quantities by Messrs. Brunsden & Budd:—

Friggens	£4,267	0	0 !
Little	3,648	0	0
Blow	3,410	0	0
Anley	3,390	0	0
Pritchard	3,337	0	0
Nihlett	3,120	0	0
Dunford & Langham	2,995	0	0
Saunders	2,794	0	0
Larke	2,694	0	0
Shurmur	2,681	0	0
Aitchison & Walker	2,669	0	0
Mattock	2,637	0	0
Herper	2,625	0	0
Steel Bros.	2,245	0	0 !

For alterations, &c., to the Lewns, Clapham-common. Mr. Hudson, architect. Quantities not supplied:—

Coney	£767	0	0
McLachlen & Sons	655	0	0
R. & E. Smith	612	7	0

For Lewisham Congregational Church proposed Sunday schools. Mr. Geo Sherrin, architect. Quantities supplied by Mr. Chas. Blomfield:—

Priestley	£5,433	0	0
Castle	5,285	0	0
Vincent	5,125	0	0
Reading	5,110	0	0
Tverman	4,997	0	0
Stephenson	4,934	0	0
Jones & Co.	4,750	0	0
Stephens & Bastow	4,699	0	0
Julian & Co.	4,690	0	0
Beale	4,690	0	0
Higgs	4,630	0	0
Staines & Son (accepted)	4,434	0	0
Battley	4,481	0	0
Evans	4,416	0	0
Hobern	4,300	0	0
Abley	3,965	0	0

For alterations and decorations to Nos. 171 to 175, Regent-street. Messrs. Batterbury & Huxley, architects. Quantities not supplied:—

Clarke	£347	0	0
Nightingale	280	0	0
Bywaters	248	0	0
McLachlan & Sons	233	0	0

For the erection of a pair of villa-residences in the Frien-road, Lordship-lane, Dulwich, for Mr. Smith. Mr. Lovett, architect. No quantities supplied:—

Fisher	£1,625	0	0
Eidridge & Gee	1,498	0	0
Watsou & Dennett, Dulwich	1,572	0	0
Goad	1,291	0	0
Hersham	1,224	0	0

For the erection of a residence (exclusive of domestic out-buildings), Dulwich, for Mr. James Henderson. Mr. Richard Peters, architect. Quantities by the architect:—

Mitchell	£2,420	0	0
W. & F. Crooker	2,310	0	0
Downs (too late)	2,275	0	0
Higgs	2,089	0	0
Watson & Dennett	2,075	0	0
Parrish	2,000	0	0

TO CORRESPONDENTS.

Strength of Staffordshire Bricks.—In the statement of experiments, commas should take the place of points marking decimals in the figures showing the "stress in pounds."

E. T. H.—J. J. L.—F. W. H.—P. & M.—A. R. B.—W. T. H.—T. C. C.—S. & B.—L. & W.—C. & Sons.—E. & G.—C. Bros.—R. & E. S—A. I.—F. J. B.—R. P. S.—J. H.—S. E. L—C. E.—J. T. B.—M. H. J.—C. S. S.—C. F.—W. C.—T. R. S.—W. S.—J. R. W.—E. P.—W. W. L.—D. W.—W. O. C.—Raleyayer.—J. J. L.—J. G. S.—E. C. S.—W. T. M.—H. J. N.—M. Bros.—F. G.—E. P.—A. C. (we cannot advise on *ex parte* statement. At any rate, fuller information would be necessary).—R. & Son (information not sufficient).—F. C. (ditto. We cannot interfere in private disputes).

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The Builder.

Vol. XXXIX. No. 1954. Saturday, July 17, 1880.

ILLUSTRATIONS.

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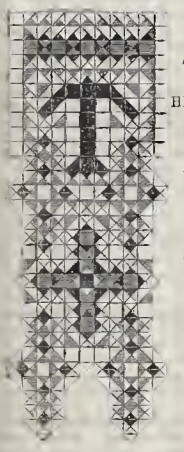


Urban Architecture versus *Street Architecture.*

THE decay of the picturesque element in urban architecture has been long and loudly lamented. It is possible that more cause existed for the complaint four-and-twenty years ago than is the case at present. Whether or no that be so, the general feeling has been by no means dissipated. But we question how far any architect, or any architectural writer, has set himself to probe the question to its core; to inquire, first, into the truth of the complaint, and then, assuming that truth to be clear, to inquire, further, into the cause of the change.

In illustration of the position that there is an absence from our towns of the special form of excellence known as the picturesque,—let us call attention to the view on the Pegnitz, Nuremberg, in a recent number (No. 1920) of the *Builder*. In offering it to our readers we made some remarks on the contrast it presented to much that is going on in the suburbs of London. Let us glance for a moment at the infinite diversity and quaint contrast of sky-line and lines of construction in that view. The picture is full of a vigorous and racy originality. It is the originality of a time when the burghers of a town wore iron by their side, and were by no means unhandy in its use. Look at the doubly-guarded bridge; the strong round tower that forms its outer entrance; itself approached by a wooden structure that seems to have replaced a drawbridge, and which, in case of any attack on the town, could be readily destroyed. The close-covered gallery crossing the river is supported by two arches giving ample waterway for floods, if we may judge by comparing the height of their soffit with the level of the river. Citywards a more lofty and ponderous tower, pierced for culverins, or for other ancient weapons of projectile force, dominates river, bridge, and entrance-turret. Under cover of this castellated building, and throwing down a flight of steps to the river itself, stands a mansion that was built for the abode of some well-to-do citizen. A stout iron cage protects the small windows necessary for the ground-floor. Above, a sense of more security has allowed the architect to think rather of habitation than of defence. A double gallery looks out on the river, telling of times when arms of precision and of long range could not be brought to riddle the palisades, or to sweep them of their occupants. The lofty gable, framed together like a piece of shipbuilding, rises to throw off the winter snow. Behind, the turrets of the church appeal to the invisible guardians of the city; and gables, and peaks, and weathercocks all assert their respective sturdy and substantial individuality.

In all this we see no striving after effect,—no effort to be romantic,—or Classic, or Teutonic, or anything else. In a rude but not ignoble state of society,—it would seem the architect knew what was needed for the burgher and what for the city. With a proper deliberation, and at an ample outlay, he provided what was needed. Hence the sense of fitness and of comfort that the perspective awakens in the mind. The building is picturesque as the reflex and the embodiment of a state of society so far removed from that which surrounds us, that it excites something of the sense of wonder when we regard it. Thus, in spite of simplicity and absence of any attempt at direct decoration, we linger with pleasure over such a view.

We refer to this peep at Nuremberg, because it furnishes a very striking illustration of the difference between urban architecture and street architecture. It is an example of the former. It has nothing to do with the second. We cannot doubt that, whether straight or crooked, there is a street that leads from the bridge to the church. But that street is not the motive or central feature of the scene. It exists as a necessity, not as a pictorial or architectural feature of the town. And so it is in Genoa,—so it was in all those Mediæval cities in which houses rose into inaccessible towers, and personal defence was more studied than freedom of intercourse, or open pursuit of trade.

With those cities that are the offspring of the present time (such as Birkenhead, for example), or in which the requirements of the present time are veiling, if not crushing, the ancient nucleus of city life under an ever-growing skirt of densely-peopled suburb, the case is altogether different. Accommodation for traffic assumes the foremost place. The idea of defence has evaporated. The houses have long lost the character of fortalice, because it is not against the strong hand of rapine or of oppression that the chief defence is now required. Next, they have lost the character of habitations. For a verandah in which the burgher of Nuremberg might calmly smoke his pipe and look forth on the river, we find substituted as large as possible an area of plate-glass, behind which the merchandise within is made temptingly visible to the passers-by. And so freely is this done, that in many cases there is not even the safeguard of iron bars so set as to prevent any one who broke the windows from making his entrance into the warehouse. A plate of glass, which a glazier's diamond, a pistol bullet, or even a short iron bar sharply applied, would at once shatter, is the sole defence of costly tissues, rich stores, even of gold and silver plate and jewelry. And the architect has, by slow degrees, come to consider this mode of fronting the street sufficient, because behind or without the glass is the invisible but ever-present safeguard of public order.

It will be evident to those who have thus far accompanied us in our reflections, that the passage from one phase to another of civilisation is faithfully represented by architecture. Nor must it be forgotten how hostile are such changes to structural beauty, and to real architectural effect. When a city is rebuilt after a bombardment, or after a fire, there is an occasion given for founding a new architectural order that shall correspond to the new political order. But when the change is insensible, individual, bit by bit, this is impossible. Often, too, in the course of change, something perfectly incongruous is introduced by some personal whim that is alike out of place in itself, and injurious in its effect on the older building. Thus in one of the most picturesque streets in any southern English town, in which houses of two, three, or even four hundred years old arrest the eye of the draughtsman in goodly succession, look at the new Stores!—a neatly stuccoed imitation of two or three Greek temples piled one on the top of another, with fine large plate-glass windows on the ground-floor to act as a *podium* to support the upper orders! Very clean, very neat, very exact, very charming, probably, to the builder; but as atrocious as any jumble could be. And that for the twofold reason that, in a climate like our own, a Grecian temple is not the kind of building in which to sell sugar and bacon; and that, if only shed-room and open window be required, it would be less obnoxious to supply them in the plainest and most unmistakable form, amid a company of Jacobean, Caroline, and Elizabethan houses, than to introduce the smug tidiness of Stuccoville.

It is tolerably certain that while our population increases at its present rate, the true requirements of making straight, wide, and commodious streets to accommodate the ever-increasing traffic of our towns, and at the same time the desire to tempt the wayfarer to become a purchaser by the display of articles in the windows of the houses lining the streets, will continue to control the efforts of the architect. In such a state of things the house will more and more cease to be individual and distinctive. The terrace, or the row, or the front, is all that the artist can hope to modify. In London, under the auspices of Nash and other architects, the first step in reconstruction that was taken on a large scale, since the time of Wren and Chambers, was the erection of Regent-street. As a rule, in London, we seem to have now passed into a stage when the arrangement of the street is admitted (not in every case, but in most cases) to be the first point.

On the Continent, where in many cases the urban builders have been at work as industriously as among ourselves, very much more attention has been given to street architecture regarded in masses and great lines. In Paris, in Marseilles, in Turin, in many other Continental

cities, lines of houses, with shops on their basements, are extending for mile after mile, which have a palatial rather than a petty commercial appearance. It is true that an amount of control is exercised by urban authorities as well as by central authorities in those cities, to which we should no more be ready to submit than to the (to us) intolerable burden of the *octroi*. We are not now arguing either way, for or against, such control. We are only investigating the facts. Urban architecture, in the Continental cities to which we have referred, and in many other cases, has become a special branch of the study of the architect. Not only the accommodation of traffic, but the exigencies of military command have been carefully studied. With the stratigraphic plans thus determined has been associated the conception of noble, and sometimes monotonous, elevations; treating the rows of houses that line the streets in somewhat of a palatial style, and thus producing an architecture which is more truly the child of the nineteenth century than any other mode of treatment or of conception.

Urban architecture of this class is, no doubt, at the same time street architecture. It might almost be named Imperial architecture, when we regard the era of its remarkable development in France. But we are precluded from the use of the term by the remembrance of the noble lines of new street, with arcaded footpaths,—leading to a fountain, or a palace, or some other central point,—which form the new part of Turin. Nor are other parts of the world to be left out of consideration. That the palatial street architecture of the nineteenth century has attained, in not a few instances, great dignity and beauty, no one familiar with Europe can deny. But two considerations have to be borne in mind with regard to it. One is, that there are special causes which oppose its introduction, on any comprehensive scale, into England; the other is that, by whatever term of admiration we may designate it, it cannot be described as picturesque.

What, then, is the real force of that word as applied to architecture? Since the word picturesque was coined, æsthetic study has advanced so far as to demand a new terminology. Thus, side by side with the more racy term, we have the Latin-like adjective, "pictorial." Both words mean "like a picture"; and yet they are not applied by the artist or the art-writer as convertible terms. We attach an idea of more stately dignity to the word "pictorial." We have some idea of rustic quaintness lurking in our minds when we use the word "picturesque." How shall we analyse the distinction?

Without being led to wander too far from our subject by an etymological hint, we think we may indicate one characteristic of the picturesque in architecture that will be enough for our present purposes. We should say, then, that for a building to be picturesque, the first requisite is a broken and distinctive sky-line. We must so far qualify this remark as to admit that a picturesque building may be seen which is not relieved against the sky, from the best points of view. It may, for example, be a cottage embowered in a wood. In that case, what we call sky-line does not properly exist. But there will be what corresponds to it, and takes its places,—relieved outline. If that outline be tame, regular, bi-lateral, perfect in its balance, the element of the picturesque will be, we submit, wanting. A turret here,—a gable there,—a lofty and twisted chimney,—an outline so like that of a wood or a copse that, at a distance, the observer may inquire whether the profile on the horizon is that of trees or of buildings,—that, certainly, is what we expect when we speak of the picturesque in building.

Against this marked individuality of structure (which is the most striking feature in the view of Nuremberg to which we have before referred) the street architecture of the nineteenth century makes a protest. We do not say that it is a protest that is absolute, or that will not be overruled. On the contrary, we have, even in London, buildings growing up here and there which, by their magnitude as well as by their architectural outline, will by and by impart the air of a true picturesque grandeur to their neighbourhood, if only we are able to prevent the uprising of forms so hideous in their neighbourhood as to destroy all that is either picturesque or pictorial. What would be the effect of Haddon, or Longleat, or the Papal castle at Avignon, or any other building, however romantic in its associations, on the eye, if it were neighboured by an enormous wagon-roof like that of the Charing Cross or of the Cannon-street Station? Such an ungainly neighbour would absolutely crush and obliterate the finest architectural *coup d'œil*. But apart from such monstrosities as these, or as the enormous cowl which deforms another London sky-line, the towers and pinnacles of some of our new buildings bid fair so far to dominate the lines of house and street façade as to give many picturesque effects to London architecture, especially in the neighbourhood of the Thames.

No better instance of what we mean can be cited than that which is afforded by the Houses of Parliament. We are not now about to talk again of the general elevations of this great palace, or to inquire whether, considering the style adopted, a greater diversity of elevation would not have been an improvement. We only wish to look at the fact. Take the river front. There can, we apprehend, be no question that the front would fail to impress the observer with as much sense of the real importance and dignity of the building as it now conveys, were it not dominated by the lofty and irregularly-disposed towers. If we suppose that a Victoria Tower had been erected at each end of the façade, while a certain sense of grandeur might have been produced on the mind on a very close approach,—we suppose no one can deny that the effect of the building from a distance would have been immeasurably impaired. The variation in the height, position, and proportions, of the three most lofty parts of this great palace, as defined against the sky-line, gives a charm to the whole which could not be attained, we apprehend, without this picturesque element of irregularity. Dominated by the towers, the uniformity and balance of the façade lose their otherwise artificial look. The towers raise the façade from the rank of street architecture to that of urban architecture.

If thus "the old order changeth, giving place to new," we may hope that out of the very needs and requirements of social life will arise buildings of a magnitude and beauty that will so far relieve and dominate the increasingly artificial regularity of our street fronts as to render the London of the twentieth century worthy of the noble river which was the cradle of commerce, and which thus determined the locality of the metropolis. And this is the more needful because of the special element of poverty in street architecture which is present in much of London, and also in Paris, Marseilles, Turin, Rome, or Naples. The truth is, that our ancient and sturdy boast, "Every Englishman's house is his castle," proud as it may be from a constitutional standpoint, is highly un-architectural when we come to deal with urban architecture. For the Englishmen are so many,—and many of them so poor,—that the castle shrinks to a very modest size. A six-roomed castle can hardly, by any stress of genius, be made imposing and architecturally happy. At all events, it is one of half a million of closely-packed neighbouring castles of the same kind. The Frenchman or the Italian who requires one, two, three, or more rooms, is content to take them in a large building. The Englishman, at all events, if he be married, is never happy without he has the key of the street door in his own possession. This disposition, unfortunately, is hostile to fine building. Even in the one item of ground-rent, where urban sites are continually rising in value, the small house system is a most extravagant one. The same thing may be urged as to almost every detail of building: a monastery, or a barrack or a palace, as we see these buildings abroad, may at once present true architectural dignity, and afford convenient and accessible accommodation for very poor inmates. In the magnificent view that meets the eye of the traveller from the summit of Vesuvius, as he looks northwards across the deep blue of the magic bay, to the white houses of Naples gleaming in the sun, there is a building which impresses the attention more than the Royal palace, the tower of Maganiello's church, or any of the really noble buildings within ken. It is the Albergo dei Poveri; we suppose we may call it a gigantic almshouse. It is a building erected on charitable grounds, to give shelter to the houseless poor. Yet so well proportioned is the edifice, as well as so large, that at the distance of eight or ten miles it appears to be by far the most important edifice in Naples. The only parallel to this in our country, and it is a very distant one, is to be sought in the union workhouses. The idea of combination in an abode is one so distasteful to the Englishman, as a general rule, that but small way has as yet been made in those well-intended efforts to introduce the system of flats, or other combined dwellings, to which we have on not a few occasions heretofore called the attention of our readers.

In one respect, indeed, the principle of combination of abodes has attained a remarkable development in London. In 1834, before the completion of the London and Birmingham Railway, the hotels of London had by no means assumed any special architectural character. They either resembled, and indeed were, one or two private houses run together, as in the case, if we rightly recollect, of the Clarendon, and later of the Trafalgar Hotel; or they were local inns, built for the cheap accommodation of coach passengers, as the Gloucester Coffee House, or the White Horse Cellar. City-ward there were, and in some cases there yet remain, inns of a somewhat Shakspearian stamp,—Green Dragons, and Bulls, and Griffins, and the like, in which external wooden galleries looked down on the inn yard, and gave access to the separate bed-rooms. Whether built as hostelries or not, these ancient inns were revivals of an early form of that architecture. A large gateway, took up great part of the street front; and the body of the building extended rather at right angles to, than along, the main street. The Euston Hotel, considered an enormous structure when completed, was a bold anticipation of the requirements of the passenger traffic to be developed by the Birmingham Railway; and was an instance of confident and verified foresight. Now the Euston and its twin brother are by no means conspicuous for size. Hotels are more and more swelling into palatial buildings, and that not in London alone, but at Brighton, Bournemouth, and elsewhere. The Langham, the Victoria, the Charing Cross, and the Midland hotels are among the buildings that first catch the attention in a bird's eye view of London; and each addition to the number endeavours to out-top, or to outswell, its predecessor.

That combined residences for the permanent bachelor inhabitants of London, or for the small family, will follow in the wake of the hotels, we think extremely probable. Even as it is, those central spots that have been successively cleared for purposes of improvement, as close by Holborn-viaduct and in Northumberland-avenue, are being lined by houses of what, years ago, would have been regarded as a prodigious height. How far the "mansions" which have raised legal difficulties on account of their great elevation, have answered, or are likely to be imitated, we are not now prepared to say. But it will be seen that street architecture is assuming a phase of magnitude and costliness which is transforming the face of London. Whether the assertion of individual taste (or the absence of that quality), will lend us in a jumble of costly monstrosities, or whether combination, instead of competition, among proprietors and architects will give a more harmonious character to our street architecture, we may not venture to predict. The one point which strikes us as indubitable is this: Unless the grandeur of public buildings, and the features of lofty towers, spires, or pinnacles, erected, not to gratify private fancy, but in true architectural symbolism of the object of the edifices which they adorn, keep pace with the increasing hugeness of private or of business structures,—of shops, warehouses, and hotels,—whatever cost may be lavished on the street architecture of London, the element of the picturesque will be absent. Rows of large houses, when smoke and decay have been at work on them for thirty or forty years, will not be much more imposing than rows of small houses; unless the public building assumes its true position as dominant over building that is private, and unless a varied and picturesque sky-line counteracts the level sameness of interminable rows of parapets or of chimneys.

Brixton.—The foundation-stone and three memorial stones of the proposed new church of St. Paul, Brixton, were laid on the 1st instant. The site of the new edifice is in Santley-street, Ferndale-road, Brixton. The building will be of brick, with Bath stone and terra-cotta dressings. It will seat 1,640 people, and will be provided with galleries on both sides. The architects are Messrs. Habershon & Fawckner, of Bloomsbury-square, and the builders are Messrs. D. C. Jones & Co., of Gloucester. Mr. J. R. Manning will act as clerk of the works.

THE CAUSE OF THE EXPLOSION OF GAS NEAR TOTTENHAM COURT ROAD.

IT is now seventy-eight years since the Soho Factory, near Birmingham, was first lighted with coal-gas by William Murdoch, and it is sixty-seven years since Clegg, Manby, & Murdoch erected apparatus for the lighting of London by the same agency. The first public display of the new illuminating power was made on the occasion of the visit of the Emperor of Austria, the Czar, and the King of Prussia to the City, when they received the hospitality of the Lord Mayor in the Guildhall. At that time the direst predictions were made as to the danger that London would be blown up. With the exception of local cases of damage (such as that in the house of Mr. Gambart, in the Avenue-road, Regent's Park), due to neglect in shutting off the gas-cocks, no approach to the fulfilment of such menaces has occurred until, on Monday, July 5th, the series of explosions in the neighbourhood of Tottenham-court-road, described in our last number, led many persons to form the conclusion that London had been visited by an earthquake.

The reason of this long immunity from mischief is simple; and simple is the reason of the catastrophe which has just occurred. And while lamenting the loss of life, the terror, and the distress occasioned by the explosion, it is satisfactory to be able to point out the causes both of the safety which is the rule, and of the destruction which is the exception, and to show that alarm has been exaggerated, and that recurrence of such an event is rendered more unlikely than was the explosion itself, after an experience of three-quarters of a century.

We do not forget, of course, the explosion of a gas-holder, or deny the danger attendant on the use of coal-gas, except under proper supervision. But we can reassure our readers against such a thing as the sudden discovery of a new source of danger for the inhabitants of the metropolis, which has been the comfortable prediction of certain sensational announcements. Although caused by the explosion of gas, the catastrophe in Tottenham-court-road cannot be brought under the category of accidents likely to arise from the ordinary use of gas. In fact, it has a much closer analogy to those explosions of which, year after year, we have so many instances to lament in our coal-mines.

Coal-gas, our readers pretty generally are aware, as it is sent through the subterranean pipes which honeycomb the metropolis is not by itself either explosive or combustible. To burn or to detonate it requires an admixture of oxygen. This may be supplied from the atmospheric air. And so far is the carburetted hydrogen gas used for the illumination of our cities from being a dangerous explosive substance, that the slight pressure which is measured by half an inch of water is enough to maintain such a current as to allow the issuing gas to burn freely, without the least fear that the flame should make its way into the pipe that supplies the burners.

The reason of this safety lies in the fact that coal gas is only explosive when mixed with a certain proportion of oxygen. Pure hydrogen burns with a pale blue flame of intense heat, and carburetted hydrogen with a more luminous, though less hot, flame, if allowed to catch fire at the moment of its coming into contact with the atmosphere. The brilliant oxyhydrogen light is produced by the inflammation of these two gases at the moment they are brought into contact in the proportions which constitute water. The action, comparatively, is gentle. But, on the other hand, if carburetted hydrogen be mixed with a certain proportion of oxygen, or of common air, it forms a dangerous explosive. Quiet combustion is then impossible; and on the contact of flame, spark, or red-hot metal, the whole mixture instantly explodes.

This is what occurs in the workings of the collieries. From all newly-cut bituminous coal, carburetted hydrogen gas more or less rapidly issues. At times stores of this gas are tapped by the miner, and a large volume issues from the workings. One main aim of the ventilation of coal-mines is to keep up such a constant circulation of air as shall prevent the formation of an explosive mixture. And, as it is known that this precaution will at times fail, the other element of safety is the absence of any naked light with which the gas may come in contact: the use, in fact, of the safety-lamp.

What occurred on the 5th of July was this. Gas had leaked from the mains in use into a new main which was in process of fitting, and which had not yet been connected with the gas-works. It was supposed that this pipe, which is of the large diameter of 36 in., was in the same condition as the surrounding atmosphere, that is to say, that it merely contained ordinary air. By some unsuspected filtration, however, coal-gas had made its way into this pipe. Of course no current of ventilation had been provided, and the phenomena which occurred showed that the mechanical mixture which had taken place was irregular and imperfect, attaining in some places highly explosive proportions, and in the intervals only combustible proportions. It is to be borne in mind that this infiltration of gas was entirely unsuspected. The terrible warning which has occurred will teach the gasfitter hereafter to regard an empty pipe as a possible source of danger. But we are unaware of any circumstance which pointed in that direction before last week; and we apprehend that, if any engineer had been asked, "Can there be any coal-gas in the 'dead main,'" he would have replied, "Certainly not." How it got in is matter of question. But its presence is proved by the explosion. So also is the fact that explosive mixtures were only locally formed, although there was enough carburetted hydrogen in the mains to communicate flame from one to another of these local mixtures along the whole length marked by the successive explosions.

It may be regarded as most unlikely that such a catastrophe should recur. The laying of a 3-ft. main is not an ordinary occurrence. And for the future, being now aware that such a main may become a possible source of danger while being laid, the engineer will take precautions of which no one ever dreamed before the recent event.

As to the questions, "How was the light communicated?" and "How did the gas get into the main?" it is possible that we shall not be able certainly to reply. With regard to the first, nothing could be more straightforward and honourable than the evidence of the witness Hawkes. Under the circumstances we have mentioned, it is clear that no blame can be thrown on any of the officers or men employed. The peril was not, indeed,—or rather will not be in future,—as mysterious as that of earthquake, but it was quite as much unforeseen. As to the other question, the lesson is more practical. The gas companies and the water companies of London are aware of the constant loss of a proportion of their gas and of their water. The gas sent into the mains is not accounted for by the consumers by some five per cent. The loss of water is yet more considerable. If we ask how this can be, we have an immediate explanation afforded by one of the great barbarisms of our present arrangements. For a delicate system of closed pipes, conveying either water or the more subtle fluid of gas, the first element of secure maintenance is, that the joints should be undisturbed. How do we effect this? We dig a trench in the ground; lay the pipes with due care; shovel in the earth, and turn carts, vans, omnibuses, and even traction-engines and steam-rollers, over the top. We might, with as much good sense, set a gang of men to drill holes in the pipes at such intervals as pleased them. Displacement must begin as soon as a road is opened for traffic. After a time leakage results. When the leakage has become so serious as to be perceptible to the nose, or by the dampness of the street, a gang of men make their appearance. They quietly deposit logs of wood or other obstacles in the way of the traffic, pull off their coats, and commence an attack on the road with enormous pick-axes. Pitching, paving, asphalte, macadam,—whatever be the artificial surface of the roadway, yields at once to the attack. The sextons of the mains delve down as if intent on carrying out a burial ceremonial of their own in the heart of the metropolis. Then come men with devils, that is to say, iron fire-baskets, which are known by that profane title, and solder the joints of the pipes. The work is carried on with the utmost coolness, the traffic having to stop or to go round, as best it likes, mean time. A good job, no doubt, is made of it. The leaks are stopped as far as they are discovered; and as soon as they are stopped, measures are taken for re-opening them. The earth is shovelled in again, the traffic is turned on again, and the difference between the resisting-power of newly-filled earth and of that which has been consolidated by pressure is thus set in operation as a sure and rapid mode of producing more leaks. The whole process is good for trade. It employs a certain set of workmen in a work which, with proper arrangements, would be wholly unnecessary. It is thus in exact accordance with the ultra democratic theory of the true mode of conducting public work. The freedom of the subject is respected, the independence of the various companies is respected,—independence alike of one another and of the public convenience. If a street is ripped up to-day by the water companies, that is no reason why the gas companies should not have their innings. Thus every one is served in turn. The cost of water and of gas is increased by preventible leakage, by preventible work done in search of the leaks, and by cost of reparation. That principle which is held by some persons to underlie the social compact,—namely, the duty of the state to provide work for the working-man, is carried out to a great extent by the provision of a good deal of unnecessary work. That under such conditions leakage has for once occurred into, instead of merely out of, a pipe, need surprise no one. It has, however, had the effect of calling public attention to the one real cause of the calamity that has recently occurred.

There are certain subjects on which the public writer, after a time, learns to be silent. Not for the reason that he has nothing to say, but for the reason that, having something very important to say, he knows that so deaf an ear will he turned to his remonstrances that he loses heart in the matter. Such has been the case with regard to preventible explosions in collieries. We have more than once or twice pointed out the fact that, if a convenient and luminous safety lamp (of which we could with certainty suggest the principle) were put in the hands of the miners, and if the men were properly searched before being allowed to descend the shaft, explosions would cease,—that is to say, if the proper regulations as to the use of powder were also enforced. In the same way we have pointed out, over and over again, the great waste of money involved in our inexcusable mode of laying the mains of the water and gas companies through the streets. If the bill of costs were cast up, it would be a heavy one. Look at the cost of repairs and reconstruction of road, the extra wear and tear of carriages, the loss of time, the injury to horses,—of all this we have often spoken. Now we have a very serious item to add to this cost, namely, that of the leakage of the gas and water pipes, at all events to a very considerable extent. If we set down 100,000*l.* per annum as an approximate estimate of the loss by leakage, we shall probably be far within the mark. Then comes the question of the amount of damage effected by leakage; and here is a very grave and important consideration. In the present case, loss of life and great alarm are added to the foregoing results of neglect. Nor need we hesitate, however much light may be thrown on the actual facts of the present case, to attribute the leakage which had so fatal a result to the false mode of laying, and to the disturbing effect of traffic. The evidence is precise as to the good condition of the valve connecting the two mains, when examined. The state of the connexion at the time of the explosion cannot be arrived at from any other source of information than that furnished by the explosion itself. If other points at which gas may have filtered into the main existed,—which the successive occurrence of the explosions indicates as most probable,—it has yet to be pointed out where they were. But along the whole course of the main, actually or potentially, the great disturbing element of traffic over the pipes had to be contended with. The cost that would have been saved in London if the principle of a subway, for the purpose of sewerage, water-supply, and gas or electric lighting, had been in good time adopted, it is not easy to estimate.

Plasterers' Society. — Our attention has been called to the alleged worth per member in this society of 51*l.* 9*s.* each, and it is asked how 1,850*l.* 3*s.* 2½*d.*, divided among 4,580 men, can amount to 51*l.* 9*s.* each. The figures given are quoted from the comparative table on page 51 of the report, in which the several sums stated are set forth. If the general funds only are given in the one case, and branch funds are included in the other, the secretary or auditors ought to have notified the fact; as they now stand in the comparative table, the total worth per member is only 2*l.* 10*s.*,—not 51*l.* 9*s.*, as there stated.

A HISTORY OF PAINTED GLASS.

THIS* seems likely to be, and is, as far as it has proceeded, an exceedingly useful and interesting work. It is intended to be completed in four volumes, of which the first deals with the subject from the earliest known specimens to the end of the thirteenth century; the other three respectively with the fourteenth, fifteenth, and sixteenth centuries. The greater portion of the first volume is now before us; the whole is to be issued in parts, either two or three to a volume, at intervals of three months. The author has long delayed the intended production of the work on account of the frequent discovery of new facts and materials, but he has wisely determined not to postpone it longer on this account, but to make use of what he has already collected. From the business-like manner in which the work is put together, we have no doubt that the production of the successive parts will be continued in due order to the end (which, as many of us know, does not always happen with works that are promised in serial parts); indeed, we are assured in the preface that the majority of the blocks for the illustration of all four volumes are already completed.

Mr. Westlake has excellent qualifications for his task, in being both a student of ancient, and a designer of modern glass-painting, and he understands the subject both from a practical and artistic point of view. The two parts at present produced are copiously illustrated, but the author has abstained from attempting illustrations in colour, for reasons which may be said to be good and sufficient. In the first place, coloured illustrations would have "more than quadrupled the price of production," and thus put the book out of the reach of many who may now profit by it; and, secondly, he is of the opinion that it is nearly impossible to render the effect of coloured glass by painting: "the illustration thus produced is a gaudy deception, and in most of the works so published it rather misleads than assists." Even highly-elaborated drawings often fail to give any real impressions of the character of the original, partly in consequence of their very elaboration. The comparative roughness of execution which makes so much of the character of the original is lost sight of, and the whole is represented in a state of finish and delicacy which it never had in reality. Those who have compared chromo-lithographic representations of Egyptian or of Mediæval coloured ornament with the originals will know how much difference there often is between the coloured publication and the original. We see Egyptian ornament, perhaps, represented with a precision and clearness of line, a brilliancy of colour, and an entire symmetry in the drawing, which we find to be entirely wanting in the original, not only from the fading of colour which the illustrator has restored, but from the careless and irregular drawing which the illustrator has represented as a modern draughtsman would have drawn it if a sketch of the design had been handed to him to work up. In the same way the sumptuous tone of early glass is represented in the "chromo" by a flat tint which gives no idea of its real texture, and which in all probability is very often not true in tone either. The history and character of design in stained glass may be given in engravings; the colour must be studied in the originals if it is to be studied to much advantage. This is what Mr. Westlake wishes to recommend to the student, and in this respect his work is of the greatest value in giving detailed information as to where the best examples are to be found, and, in cases where the collection is extensive, giving a key-plan of the positions of the windows, with the names of the subjects, as far as they are known. Whether it is altogether true that "it is impossible to design well for stained glass, without studying the old work *in situ*," depends to some extent exactly on what is meant by designing well. If it means reproducing the character of Mediæval glass work, we agree entirely; but if it means original design and style, we are inclined to think that the tendency of constant study of old work *in situ* is apt to lead,—perhaps with most people almost inevitably leads,—to mere archæological copying, sometimes without the student having at all deliberately intended such a result. The study of any particular school of art-work in its old examples, is very apt to develope in the student an artificial standard of judgment, too favourable to the class of work which he has become familiarised with, and has learned to see more in than others less committed to its study can discern in it; and from this influence Mr. Westlake does not seem to be free. His taste seems to have become to a certain extent Mediævalised, and he speaks with great admiration of figure-designs which, if presented fresh to an artist who had not become "acclimatised," as one may say, in regard to them, would certainly not excite admiration. This, however, seems the fate of students of Mediæval art, and we cannot criticise Mr. Westlake decidedly for a weakness which he shares with so many others.

In regard to the conditions of the art of glass-painting, Mr. Westlake takes a very decided stand in favour of figure-painting as its leading object, and places very little, as it appears to us far too little, value upon ornamental mosaic design, in self-coloured pot-metal,* with which such rich and indestructible polychromatic effect can be realised. This he seems to regard as a glazier's art, and he is still more indifferent to the beautiful effect of Cistercian grisaille windows, which he merely alludes to in a paragraph in passing, and gives one small illustration of. We need hardly remind our readers that this Cistercian form of glass has been regarded by some of the best authorities on architectural effect as one of the most beautiful and suitable treatments of window-glass that has ever been invented. We are not, of course, putting it on a level, in regard to artistic importance, with highly-coloured glass introducing figure design; but it is a more important and suggestive form of glass treatment than the author seems disposed to admit. Mr. Westlake, however, draws the line distinctly between painted glass and coloured glass, his book being especially the history of *painted* glass, under which term he does not include pure pot-metal leaded into mosaic,—that he calls *coloured* glass. He says at the close of his introduction, "It is upon the use of enamel paint that the art depends; this separates it by a chasm from all the other arts in glass." Enamel process on glass is often used to indicate the later method of merely painting on the surface of the glass, without any burning, a process which all who understand the subject have condemned as deficient in transparency and certain to decay. We cannot, of course, suppose that Mr. Westlake here uses the word "enamel" in this sense; he, of course, uses it for vitrifiable colour painted on and fixed by firing; but there seems an undesirable confusion of terms among writers on the subject.

In regard to the earliest examples of glass-painting, there is a good deal in the first part of the book which is either actually new or presented in a new combination. The portions of the old window from the cathedral of Le Mans, figures apparently forming part of an Ascension picture and placed together for preservation in one of the windows of the cathedral, are given as probably the earliest extant example of painted glass, dating from the eleventh century. Other authorities have claimed higher antiquity for these; but the reasons for fixing it to the eleventh century, probably the latter part, seem nearly conclusive. Mr. Westlake gives a diagram of the probable original composition of the window, and the place which the still existing figures occupied in it. One of the most important conclusions to be drawn from the Le Mans window is in regard to the very different and, from a decorative point of view, very inferior appearance which a painted window must have presented when the window was divided only into large squares by the iron supports necessary for the glass, before its division into small medallions and before the mullion system was developed, which inevitably suggested the breaking up of the whole design of the window into small compartments.

One point which Mr. Westlake has attempted to work out with considerable success, and which is of no little interest, is the existence of a central school of stained-glass design in France, in the twelfth century, the teaching and influence of which gradually extended through France and to this country. It would require a larger number of links and examples than now exist to establish this beyond controversy; but the examples collected and compared by Mr. Westlake point very strongly in favour of his conclusion, and, at all events, illustrate the progress of the art in a very interesting manner. The head quarters of this early French school, the author supposes to have been Chartres and its neighbourhood; and the chief evidence in favour of his theory is presented by the comparison of figures and details in the Jesse window at Chartres with parts of a window of similar design at St. Denys, and with some of the remains of twelfth-century stained glass at York. The resemblances between these are, as Mr. Westlake observes, more than accidents of style; they are those of a school. "The foundation of the design of all the ornaments is clearly traceable to the Greek." This is undoubtedly the case; and we may suggest, as Mr. Westlake omits to do so directly, that this fact in itself seems conclusive as to the importation of the school into this country from France. It was only through the latter country, which had so much relation with Byzantine art and Byzantine artworkmen, that reminiscences of Greek detail could be introduced; there was no reason why anything should be known of it in this island at that period. The whole conclusion Mr. Westlake sums up at the end of his chapter ix., thus: "That the art is of French origin, and that it was cultivated first by French people, or foreigners in France, and that it was slowly but surely making its way from a centre not a hundred miles from Paris, to England and Germany, towards the close of the twelfth century. It was then still a great luxury, and I should doubt whether a dozen churches in England had any quantity of painted work before 1200. As the thirteenth century progressed scholars developed into masters, and schools multiplied, and before 1400 it became one of the most popular and common of arts. It had not been raised by this demand and supply one whit in grandeur of design or excellence of material, but a certain *finesse* of execution became developed by the great practice the executants attained, and as design lost dignity it gained facility: this is not a remark peculiar to this art or to this period."

It would have been more correct, according to the meaning which is obviously intended to be conveyed, to have inverted the latter sentence, and said that "as the art gained in facility it lost in dignity," since if there is any cause and effect in the matter it is in that direction; loss of dignity could in no way lead to facility, but the reverse may and often has been the case. But we very much question whether the conclusion as to the essential deterioration of the art is so true as Mr. Westlake would have us think. That it deteriorated in the close of the Mediæval period, at the same time that the greatest facility of execution was attained, is true enough; but the author seems to imply that this deterioration had commenced in the thirteenth century. If we understand him right, one of the instances of this lies in the fact that towards the end of the thirteenth century the figures began to assume a more naturalistic appearance; as he expresses it, they began to "pose"; in other words, a certain power of drawing the figure in varied positions was acquired, in place of the stiff monumental attitude, or rather absence of anything which can be rightly called attitude, in the work of the previous period. Now, even admitting the fact that stained glass demands a certain severity of style in figures, is it a true criticism which can regard the attainment of this power of representing the balance and pose of the figure in varied postures as a sign of decline in the art? Surely not. Then take the heads: compare the head of an angel from the north rose-window of Lincoln, given as an illustration on p. 75 of the work, with any of the heads of figures of the older period illustrated in previous pages,—the advance is great and unmistakable, unless power of drawing and expression are really to go for nothing in stained-glass design. In the older figures the heads are either shown in stiff front elevation, or when shown in half or quarter face they are wrongly set, and the features drawn with no perception of true perspective: in this Lincoln head there is real freedom and grace, and the power has been attained of showing correctly, or nearly so, the difference in contour of the two sides of the face and of the orbit of the eyes in a head half turned away; and are we to regard this as a decline in art? Such a conclusion seems to us an example of the way in which, as we have observed above, critical judgment becomes warped by the constant study of a favourite, but incomplete and archaic style of art, until its very shortcomings are regarded as beauties. It might be urged with more reason that the

* A History of Design in Painted Glass. By N. H. J. Westlake, F.S.A. Vol. I., Parts I. and II. London and Oxford: James Parker. 1879.

* Mr. Westlake appears to use the term "pot-metal" indifferently, either for glass coloured bodily in fusion, or for colour laid on the surface and then fixed with a flux.

character of ornamental accessory detail deteriorated; but we doubt if even this is fairly true: some qualities were lost, some of that solidity of character which marked what may be termed French-Byzantine detail; but our English thirteenth-century detail had other beauty of its own, in its elegance and variety, equal to that which it displaced. The grandeur of the subjects, the solemnity with which the great Christian legends were contemplated, may have declined as the church became more mingled with the comparatively modern world of action after the fateful year 1000; but it may be doubted, again, whether our idea as to the greater solemnity of feeling of the older art is not partly due to the effect inevitably conveyed by an art which cannot express passion or natural feeling, and which, therefore, appears more solemn and earnest through its very deficiencies.

This defect, as we think it, in the critical views of the author, hardly impairs the value of his work, which we recommend as, so far as the executed portion of it is any criterion, the best work on the subject which has yet appeared in this country. Mr. Westlake would do well, in a literary point of view, to cultivate a little more simplicity of style and avoid occasional lapses into "fine writing"; and we may point out that there are some errors in regard to the reference numbers to the plates, which a more careful correction of the press would have avoided. But we shall look with much interest to the continuation of the work.

THE ARCHITECTURAL CONGRESS AT ST. GERMAIN.

EVEN regarded from a professional point of view, not the least interesting of the excursions made by the Architectural Congress, recently held at Paris, was the visit to the Gallo-Roman museum, at St. Germain-en-Laye, made additionally instructive by the help of the accomplished curator, M. Bertrand, whose enthusiasm led him, in that delightful way that enthusiasts on one subject always have at their command, to inoculate the whole party with sympathy in his collection.

It would be difficult to say what feature in the history or topography of the country old town of St. Germain-en-Laye has given it the worldwide reputation it enjoys,—whether the stay of Louis XIV. in its Renaissance château which Francis erected and beautified with his picturesque emblem of the salamander, whether the residence of an heir to the English throne, the unfortunate "Pretender," in the same château; whether the beautiful terrace, with its famous view, or the proximity of Marly (certainly St. Germain is familiar to many through Turner's exquisite sketch of the old town, as seen from the Seine), or whether, in more recent days, M. Thiers's residence and death there; certain it is that St. Germain, its château, and the old Pretender are known to many who have never heard of the museum that has been formed in the old home of "James III.," which, after many generations of neglect, has now been placed conscientiously into a state of thorough repair, from the designs of the late eminent architect, Eugene Millet."*

The museum has long been known to archæologists, but lately a number of valuable additions have been made, enriching a collection in which are carefully-classified, with a simplicity beyond criticism, a characteristic series of relics of the past existence of the human race, from its earliest known development down to the Christian era. It is more particularly to France that the contents of the museum are confined, but no less clearly do the collections show us the contemporary existence of Great Britain, and, in fact, the whole European continent. From the excellent system of arrangement of the various objects which compose it, the St. Germain "Gallo-Romano Museum," as it is termed, possesses in a high degree that quality which it has always been the endeavour of museum authorities to develop,—the quality of affording sound information accessible to the intelligence of all students. No object is placed in such a manner as to attract exceptional attention, liable to interfere with a general study of the whole, but every object, from the most insignificant to the most important aids in leading to the same end (the reconstruction of the existence of the innumerable generations which have succeeded each other on the soil of what is now called France, from pre-historic times down to the commencement of French history proper) is set forth.

Whirled from the St. Lazare Station at Paris, an hour's journey, passing rapidly on the way many a quiet and historical suburb, brings one, along the first railroad established in France, almost to the foot of the old château, with its piazza, and the little church in which repose the mortal remains of "James III. of England." From the hustle and roar of the "modern Babylon," fifty minutes have sufficed to land us in the age of the cave-dwellers, represented in the "salle des cavernes." Man is living in a den which he endeavours to render inaccessible to the terrible beasts that surround him. He defends himself against them with those flint instruments and arms now so familiar, and which geologists find in the quaternary alluvial deposits. No date can be fixed, it is a crisis of the world in a state of formation, a purely geological period. Art, however, has already shown itself. The hairy wild being called "man" has already been moved by a superior instinct; with the animals he daily chases vividly before his mind's eye, he tries to reproduce their image on his stone weapon and his bone implement.

The second room is the "Salle des Dolmens." We have reached the period of those mysterious works of man which in the time of Carnak,—prolonged without interruption over a length of nearly thirty miles,—have given rise to so many contradictory theories. To erect such enormous stones which are found, strange to say, throughout the whole of the west of France and in England, an organisation, relatively advanced, must have existed. The bracelets, necklaces of jade, and of turquoise found in the excavations prove this fact. These dolmens reveal a civilisation in its infancy, but the secrets of which still remain unfathomed. In spite of every research, these strange monuments rise like an enigma before every inquirer. The "Salle de Garrinis" (an island off the Brittany coast), completes the relics of this mysterious period, relics on which are to be found more than one symbol to be met with in Egyptian art, the spiral and the hatchet being particularly noticeable.

Perhaps the most plausible explanation, and one now generally admitted by the learned,* of the peculiar civilisation represented in the dolmens, is the arrival in Gaul of one of the emigrations of Joraelites who fled from the bondage of their Egyptian task-masters. These partial flights were not unfrequent before the great move organised by Moses. The fugitives, as was natural, would bring with them the recollection of the huge monuments on which they had been obliged to work. In considering these funerary dolmens and menhirs, which so resemble ill-shaped obelisks, if we do not find them ornamented, it must be borne in mind the manner in which the hugh monoliths of Egypt were covered with hieroglyphics. These monoliths were, in the first place, set up as they came from the quarry; generations of artisans then continued to shape them in their place; and finally came the artists, who, initiated into the sacred rites, engraved on them their hieroglyphics. Captives, as we know the Israelites to have been, they knew little but the mere manual portion of their work; they transported the huge stones from often distant quarries, but beyond this knowledge their position forbade them to go. But of this mystic period, which bears the vague name of "the stone age," all is as yet supposition.

The epoch of the lake-dwellers on which we enter in one of the rooms is equally in a state of dim uncertainty. Humanity is still groping onwards in an embryo state. The epoch may be co-eval with that of the dolmens; but it is characteristic of the age that these two contemporary and parallel societies should have each developed themselves almost side by side without our finding any apparent trace of the slightest mutual acquaintance. This lacustrine civilisation possesses certainly a peculiar interest; unknown to antiquity, buried—for who can tell how many thousands of years?—under the blue waters of a Swiss lake, it was alone discovered but a short time since through a phenomenal decrease of the level of the lake. But better organised than the society of the dolmen builders, the lacustrine city enjoyed many of the advantages of material comfort. The cereals were cultivated on the land near the shore; fruit-trees were planted, as we find in the vases which have fallen into the water nuts and apples half calcined. The ox and the horse were already utilised; flax was used and spun; bronze was known; and iron, though rare, was beginning to be introduced.

Like the dolmen civilisation, the lacustrine civilisation left its onward movement incomplete, and it disappears without our being able to trace its downfall. Both may be compared, indeed, to the comparative civilisation of the savages of America and the aborigines of Australia, who, for thousands of years, have never advanced, and are disappearing without ever improving,—without ever being affected by the arrival of the Europeans.

Civilisation proper only penetrates to Gaul with the great Indo-European invasion. Then appears the Celt, of whom we know, it is true, but little, but who, we can trace, brings with him traditions from his original home in India, and remembrances of the archaic art of Persia. To the dolmen, which will, however, still continue to exist in the West, succeeds the *tumulus*; and the arms, particularly the sword-hilts, found in the *tumuli*, of the purely Celtic period, before the arrival of the Gauls, recall strikingly those borne by the warriors in the bas-reliefs of Persepolis.

In company with this immigration, Druidism enters Gaul,—the Druid who again, from so many points of view, seems to have come direct from India, with his Brahmanic traditions, and who is to play so important a part in a civilisation which this time is to lead to onward progress.

After the Celts came, probably from the same regions, the Gauls or Galateans. With them we have entered the domain of history. In the rooms devoted to the Gaulish relics, there are few objects of which we do not possess some historical notice. There lie the famous swords of which Polybius has spoken, the swords which were so long and imperfectly tempered that the Gauls, in the midst of the battle, were obliged from time to time to bend them straight under their feet; in another case the short Iberian sword which Hannibal gave to his soldiers, and which the Gauls adopted. With the relics we possess, and which can be all seen here, the appearance of the Gaul can be easily restored, wearing the *sagum*, the plaid which our Scotchmen have still preserved, and which, like that garment, served the Gaul as clothing and as blanket; his face scrupulously shaved, the hanging moustache excepted, with the bronze razor which is found in every tomb. Luxury is confined alone to the warrior. The race is still half nomad, although in the tombs will be found choice vases revealing Greek and Etruscan art; but these came from the sack of Rome and Delphi. Little by little the race settles down, its social organisation powerfully aiding in the work. This organisation betrays an evidently Indian origin; it resembles the hierarchy of India, the type of all the societies of antiquity, the Brahman, the Xatria, the Soudra, the priest who prays, the soldier who fights, the masses who labour. This civilisation appears to have been singularly varied in different regions: thus in Cæsar's time, Belgium had arrived at a high degree of culture; the commonest pottery is of an elegance of form which is remarkable, and recalls the Etruscan models which the Gauls had brought home from their Southern invasion.

But it would be no easy task to speak of all the interesting features which the museum contains of the life and manners of the Gauls. Let us hurry on to the period of Cæsar's conquest. With his "Commentaries" as a guide-book, one is able to trace, almost step by step, the incidents of the struggle. Here are models of the *oppida*, or camps, specimens of the famous fortifications of Alesia, and a large plan in relief of the field of the celebrated battle. Act by act can be traced the drama in which the independence of Gaul was to succumb before the superior organisation of Rome.

What this organisation was, the rooms to be shortly opened to the public fully show. The members of the Architectural Congress were enabled, by the courtesy and under the guidance of the enthusiastic director, M. Bertrand, to visit these interesting rooms. Here we see displayed in thorough working order the literally marvellous Roman administration with which classic students are not unfamiliar, but of which so much still remains to be learnt.

No sooner were the Romans installed, than they commenced without a week's delay a

* See *Builder*, vol. xxxviii., p. 737.

* See *La Liberté*, Dec. 6, 1879.

series of works of a magnitude such as modify more deeply the social conditions and ideas of a nation than the most stringent and cruelly-executed laws. For league after league, over land uncut by any but the roughest paths, were opened huge causeways which, starting all from the Roman Forum, were to reach the smallest hamlets of still Druid-ruled Brittany. Huge mile-stones are planted at regular distances. In the humblest hamlets rise villas, baths, and circuses. The stone age seems to have been revived. The simplest document, such as we should be content to paste on the boarding of the town-hall, is indolibly engraved in stone.

A fresh revelation into the life and manners of the past is afforded in the room reserved to the symbolic mythology of Gaul. With the Roman conquest a marked transformation is noticeable in the religion of the country. The Druids, as representing the spirit of independence, are considered dangerous, and are oppressed, and to their imaginative and symbolic faith succeeds a coarse polytheism. The artists whom the Druids had forbidden to represent the Divinity develop wildly their power in innumerable idols. Every element becomes a god, the river, the mountain, the fountain Sequana (the Seine) becomes a goddess, and has her adorers. Here again a strange phenomenon is observable, the superstitions brought from India with the earliest settlers seem again to re-appear after remaining dormant for centuries. In a figure of Cernunnos with his legs crossed under him, with his hands in a hieratic attitude, on his head the horns of the Indian Bacchus, how is it possible not to see a Buddha? Are they not from the same land, the three-headed divinities which are found so constantly, and of which several specimens are to be seen in the museum? Models of purely Indian origin are exhibited by M. Bertrand for the purpose of comparison.

This strange religious disorder reigns contemporaneously with the strongly-settled organisation of the Roman conqueror. In another room we see this system at work; the whole details of the Roman military life of the period are, in fact, plainly shown. The soldier is not a poor slave; in addition to the land allotted to him he receives a good pay. Of whatever origin, whether Thracian, Spaniard, Hungarian, or even Gaul, the camp becomes his country: he knows alone his centurion; his duty is to defend the frontier against the enemy over whom his superior organisation will insure him, for many centuries, an easy superiority; within the frontiers he maintains throughout the empire an order which is rarely ever disturbed. There exists no reason for revolt. The directing classes are enfeebled by their debauchery; the smaller people are relatively happy. The tradespeople are left in peace, and are proud of their profession. The relics gathered in one of the rooms curiously prove this: *Negociator lardarius*, pork-butcher; *negociator vinarius*, wine-seller; the tinker, the tailor, the clog-maker,—all are represented on their tombs, holding each in his hands the instruments of his profession. Among these tombs, it will be understood that no small interest was aroused among the members of the Congress by the tomb of an architect, but who, by the trowel, the square, and the compasses surrounding him, it was generally agreed, among the less archæologically-disposed, must have been rather a builder than an architect.

The last room serves as a species of epitome of the long history which we have passed successively through. This room is almost entirely occupied by a series of casts from the triumphal arch erected at Orange after the defeat of Sacrovir; in the bas-reliefs of this monument will be seen all the types, all the classes, all the costumes of imperial Gaul.

It will be seen that we have commenced with the Gaul of the cave-dwellers; we leave it at the moment that the missionaries spread through the land the "good tidings of the Gospel," relating in these distant lands the prodigious events which had taken place in Galilee, at the moment when, on the banks of the Rhine, the barbarians are preparing to pour down on the civilisation of Rome, so brilliant, so refined, and so corrupted.

It is the peculiarity of this museum, and for this we must again thank the unaffected director, M. Bertrand, that the visitor is able, almost without the slightest fatigue, to embrace at a glance a comparatively immense portion of the history of our political, our social, and our artistic development. We are far from the æons of centuries of which our scientific professors speak; but, to the artistic world, this smaller range of many thousands of years is somewhat more simple to grasp, and more interesting to study.

EXPERIMENTS IN SHIP-BUILDING.

THE LINES AND THE SPEED OF THE "LIVADIA."

ALL persons interested in naval architecture will watch, with some curiosity, for the details of the actual performances of the *Livadia*, the anomalous raft-palace recently built for the Czar, in the Fairfield Yard at Govan, on the Clyde, and launched on the 7th of July. The *Livadia* is the latest modification of the famous circular, or rather soup plate shaped, craft invented by the Russian Admiral Popoff. It consists, in fact, of a sort of raft, in the form of a turtle, or, as the designer, Captain Goulaeff, prefers to call it, a turbot, with a palace on its back. The daily papers have given such full details of this yacht,—the *Times* having even produced a kind of diagram representing it,—that it is unnecessary to reproduce them here. But it is desirable to call attention to those main principles of structure as to which the Russian naval architect entirely ignores all rules consistent with the best results of experiments like those made for our Admiralty by Mr. Froude, to say nothing of the long labours of Mr. Reed and Mr. Scott Russell. The "wave-line theory" is altogether ignored by the builders of the *Livadia*. The possibility of floating over waters liable to stormy disturbances, without offending a squeamish stomach, has been the great point at which Captain Goulaeff aimed. The experience of the *Great Britain*, the *Great Western*, and the *Great Eastern*, has shown that great steadiness, as regards the pitching motion of a ship, may be attained by making the keel long enough to ride on the crests of two or three waves at a time. It may be taken as a corollary of this proposition, that if the bottom of a craft be made wide enough, immunity from rolling may be attained in the same way. The only drawback to this theory is, that the proportions which tend to give a lateral stability are incompatible with speed; at all events, without the incurring of an enormous expense. It will be seen at a glance that the Russian naval architect is not ignorant of this fact. The length of the *Livadia* is 230 ft., while what may, in courtesy, be called its beam, is 153 ft. The displacement is calculated at 4,000 tons, spread over an oval area of 14,500 square feet. The proportions of the length and beam of modern ocean steamers range from 6·38 to 1, to 10·61 to 1; and the resistance to the passage of a ship through the sea is taken, by the usual rule adopted by the French naval architects, as proportionate to the area of the midship section, multiplied by the cube of the velocity. The English rough rule gives two-thirds of the displacement, multiplied by the cube of the velocity. The velocity which the *Livadia* is expected to attain is stated at fourteen knots an hour. That of our recent war-ships is eighteen knots an hour; and the speed attained by an Indian despatch-boat for the Orissa canals, built by Thornycroft, of London, has been minuted at 24·61 miles per hour. As resistance is now regarded, we have the practical rule, that the indicated horse-power employed in a steamer is proportionate to the cube of her speed. The cube of 18 is more than double the cube of 14 (being respectively 5,832 and 2,744); so that the resistance overcome by the *Livadia*, in proportion to its midship section, is less than half that overcome by such an English man-of-war as the *Iris*, as far as is due to the speed maintained. But the horse-power provided per ton is more than three-fold in the case of the *Livadia*. The indicated horse-power proper to give the speed of fourteen knots an hour to a vessel of this length and beam, taking the draught of water as 6 ft., according to the practical formula given by Mr. William Allan, in his "Shipowner's and Engineer's Guide," is under 8,000 h.-p. That provided by Captain Goulaieff is 10,500 h.-p. The first is 2 h.-p. per ton of displacement. The second is 2·625 h.-p. per ton of displacement. The proportion in the English war-ships may be taken at seven-eighths of a horse-power per ton of displacement. Thus for a speed which gives less than half the resistance overcome by such vessels as the *Iris*, more than three times the indicated horse-power per ton is provided. In other words, the cost of fuel for the steam propulsion of the *Livadia* will be more than six times as much as that required for a vessel of normal proportions.

The calculations given of the displacement of the *Livadia* do not come out quite exact. If a weight of 4,000 tons is distributed over an area of 14,500 feet, there will be 3·625 square feet of surface per ton; and taking the weight of water at 62 lb. per cubic foot, we require 10 ft., instead of 5 ft., of immersion to balance the weight of the vessel. But the screws are said to draw 16 ft. of water, or 10 ft. more than the intended draught of the vessel. There is good reason to suppose that such a disposition will naturally diminish the speed of the craft, as in the case of towing a rope through the water.

Nor is this the only point to be regretted as to the arrangements for propulsion. The battle between flotation and engine-power is one as to which, by the use of steel, and the constant improvements in engines, the advantage is tending to the side of the latter. In an enormous flat-bottomed craft, if in anything, it might be hoped that so much power might be placed as to produce the known, but not thoroughly understood phenomenon, of the rise of the vessel, and its skating or sliding over the surface of the water—as a canal-boat will do if tugged at a great speed. We can conceive such a result to have been possible in the case of the *Livadia*, if the efforts of the engineer had been directed to produce it. We should anticipate that the deep submersion of the screws will be fatal to such a hope. Any way, we shall look with interest to the test of actual navigation, and shall be very glad to hear of any results of use to the shipbuilder from the construction of this abnormal floating palace.

THE SURVEY OF PALESTINE.

SCARCELY a month passes without the announcement of some startling addition to the range of our historic knowledge, including that of the history of art. It is not very many weeks since one of those magic interpreters who have been formed and nurtured in the British Museum translated to the members of the Biblical Archæological Society a contemporary record of no less obscure and important an event than the capture of Babylon by Cyrus. The whole sequence of Medic history, according to the length of reign preserved by Herodotus, has now been absolutely fixed in astronomical time by one line of one precious cylinder. More recently still, a like cylinder has been read, which is of the time of Antiochus the Great. No very valuable information was inscribed But the mere fact of the discovery proves that the Assyrian mode of inscribing records on cylinders of baked clay was continued under the reigns of the Greek kings of Asia. And this renders it more than probable that we shall yet discover contemporary records of the campaigns of Alexander the Great.

The backbone, however, of all recent explorations in the East, is the great one-inch survey of Palestine It is now some time since 250 persons came forward to subscribe thirteen guineas each, in order to ensure the engraving of this map, and the publication of an exhaustive memoir, enriched with plans of all the ancient ruins and places of importance, of which the sites were to be indicated on the survey. It should be borne in mind that the map itself is not a mere chart,—valuable as such a chart, if accurate, would be. There are few parts of the world in which the time which it takes to go from one spot to another depends so little on the visible distance as in Syria. Profound ravines cleave the country, descending sometimes almost perpendicularly for a height of 1,500 ft. and upwards. Thus two neighbouring knolls, from the summit of one of which the voice is audible on the other, may be severed by a valley which it will take two or three hours to pass. Such was the spot occupied by the garrison of the Philistines, marked by the two opposite rocks of Bozez and Seneh, from which issued the mocking invitation to the royal youth, "Come up to us, and we will show you a thing!" As to this spot, the survey shows the broad chasm which divides the three rounded knolls, rising above a perpendicular crag, still called "the fort" by the peasantry, from a crag of equal height and apparent inaccessibility, on the south. The geological notes will afford an explanation of the word "Bozez," or shining, as characteristic of the gleaming white of the

chalky face of the northern cliff, reflecting the rays of the sun, to which the cool shadow of the southern cliff, dotted with Seneh, or acacia, affords a surprising contrast. Hardly a goat would he thought likely to make the ascent. But in the winter of 1871 the survey party, with horses and mules, actually made their way down the face of Seneh.

The map consists of twenty-six sheets, each comprising an area of 22 minutes of longitude by 15 minutes of latitude. The survey was commenced in 1871, and completed in October, 1877, the cost having been about 15,000*l*. About 6,000 Arabic names are on the map, the outline and lettering of which are in black, and the hill shading, which forms so important a feature of the survey, being printed in sepia. In itself a representation of the physical aspect of the country, the map further serves as a key and index to the memoirs, in which all the detailed information collected by the expedition will be found.

For that information as to the plans of ancient tombs, temples, fortresses, cities, forts, and other structures which will be most eagerly sought by our readers, they will thus have to wait for the publication of the memoir. Certain points connected with one or two sites which are revered alike by the Jew and the Moslem (as, for example, the areas within the Sanctuary walls at Jerusalem and at Hebron), yet await opportunity for determination. But with these few, though important, exceptions, we believe that the memoir will afford all the information that the architect can seek as to the plans of the ancient buildings, so far as is now attainable. To these will be added scientific notes of the trigonometric work of the survey; lists of the Arabic names, as well as of the Bible names, and the ordinary nomenclature; and the outlines of the geology of Palestine. The first instalment of this store of information is the map itself. This has just been delivered to the 250 subscribers, and we believe that before long it will be obtainable by the public. As to that fact, the Palestine Exploration Fund will, no doubt, give due notice, as well as with regard to the completion of the successive volumes of the memoir.

The map of Palestine is not altogether solitary among the surveys which have been executed of those countries which now so powerfully attract the attention of the explorer. As an example of the application of the latest method of geodesic delineation, however, it is unique. And to all future time it will possess a permanent value as a faithful record of the aspect of the country at the date of its execution. The two maps which may be considered as to some extent affording similar information as to the topography of the East are, the large map of Egypt, by M. Linant de Bellefonds and the survey of the course of the rivers Euphrates and Tigris, with the Cilician Taurus, and part of Northern Syria, by Lieut.-Col. Estcourt, Lieut. Murphy, R.E., Colonel Chesney, and the officers of the expedition of 1832. This series of maps, stretching from the Mediterranean at the mouth of the Orontes to the westernmost bend of the Euphrates, at Kalah (37° 18′ N. and 37° 50′ E.), and thence to the Persian Gulf, is on the scale of $\frac{1}{4}$ in. to the mile, or one-fourth of that of the Survey of Palestine. It is little more than a chart of the rivers, with a reconnaissance of the adjoining country; and can only be taken as a preliminary datum for an accurate map of the whole district. The map of Egypt is less careful in its technical execution than are the charts of Colonel Chesney. It has the great disadvantage of making no distinction between known topographical identifications, and the theoretic identifications of the author. And as the northern limit of the delta has advanced four miles seaward between the date of the survey under the French, and that made under the orders of the English Admiralty by Captain Mansell, in 1857, it is evident that much of Lower Egypt must now be very incorrectly represented. On neither of these maps is there any attempt to give a true physical indication of the orography of the country; and geological details, which are of primary importance when any question of antiquity or site has to be discussed, are entirely wanting. The extension of a trigonometric survey from Port Said to the southern boundary of Egypt, and from the bay of Iskanderoon to the Persian Gulf, is one of the first requisites for the full knowledge and adequate development of the valleys of the Nile and of the Euphrates, those ancient cradles of the human race.

There is a signal difference, in one respect, between the value and importance of a map of Palestine and the interest excited by a map of any other portion of the world. This depends, in part, on the long range of time covered by the history of the Holy Land. In other parts of the East our glances are directed to a yet more remote past. But with the historic past the interest of the scene is exhausted. The present aspect being one either of entire desolation, or of a squalor worse than desolation itself. In other countries, where the present is active, or where the future excites the imagination, the past is brief or unknown. But we can trace back the history of Palestine for above 4,000 years. The history of Jerusalem has successive epochs of interest. We can trace the fortunes of the Holy City under seven distinct dynasties of rulers. We have some record of the rule of the early Jebusite kings; of the 466 years of the reign of the kings of the tribes of Benjamin and of Judah; of the supremacy of the kings of Babylon, of Persia, and of Macedon; of the struggles for independence against the Greek kings of Asia and the Greek kings of Egypt; of the priestly Asamonean line; of the magnificent builders of the Idumean dynasty; of the fierce struggle with Imperial Rome; of the Persian, the Saracen, the Turkish, and the Egyptian conquests; of the century and a half that glitter with the arms of the Crusaders; and of those incidents of later history which, over and anon, have started into unexpected life, testifying to the undying interest taken by the people of Christendom in the cradle of the Christian faith. Nor has the interest at the present moment become dimmed. There are not a few among us who look forward with a conviction, which in some minds attains the force of certitude, to a proximate return of the Jews, as a nation, to Palestine. And even those who stoutly disbelieve in the probability of such an event, point to the great hospice planted by Russia, as so many fortresses, in the Holy Land. They regard the occupation of Palestine as one of the main elements of the tremendous Eastern question. And they look to the great probability of a final conflict between Western civilisation and Eastern or Northern barbarism, as impending on the natural battle-ground of Megiddo,—the Armageddon of the Hebrew prophets, and the key of the Suez Canal, according to the modern strategist. The historian, the politician, the poet, the devotee, each has a special interest in the Holy Land. Each of the great Powers whose successive action has made the world what it is, has left its name deeply scored on the map of Palestine. The feudal system, in the Holy Land only the dream of a century, built here its keeps and castles; and the pennons of the oldest *noblesse* of Europe fluttered in the defiles of Judea. The once awful dignity of the Papacy sent pilgrims, and bishops, and soldiers, to Jerusalem. On this spot imperial Rome terribly proved her relentless force. The lines of circumvallation round Masada yet exist, as if they had been left in a recent campaign. The conquering path of Alexander, who passed over the East like a whirlwind, was checked before Tyre; and the great victor reverenced the High Priest, whom he had seen in a prophetic dream. For a thousand years the smoke of the morning and evening sacrifice ascended from the temple hill. The great legislator of the monotheistic faith was borne, in this region of earth, to a sepulchre unknown to man. The cradle of Christianity lay in a country which Christendom has been unable to call its own for more than a single century.

By the completion of the map and the accompanying memoir, the position of the Palestine Exploration Fund towards the public will be wholly changed. Instead of coming forward as a body appealing for subscriptions and furnishing, in their quarterly reports, somewhat meagre results of the application of the funds, varied as they have been from time to time, they will hold the status of an association which has succeeded in endowing the scientific world with one of the most successful outcomes of the patient toil of the explorer. It is one thing, moreover, to explore, and another to survey. Any one can do the first,—after a fashion. Few people can do the second,—in any fashion. And of those few, perhaps the officers of our Royal Engineers comprise the greater number,—so far as those who speak our own language is concerned. The Ordnance Survey of England, yet unfinished, and that of India, with its magnificent lines of triangulation, are large operations compared to the construction of the map of Palestine. But they are neither more scientific nor more accurate, within the required limits; neither more original nor more exhaustive. The latest improvements in the technical work of the surveyor and the map-maker have been introduced in the survey of the Holy Land. The officers who executed it braved danger, ill-health, and hostile attack. Literally, they shed their blood in the service; and that with as much devotion as did the crusading knights. All the party suffered seriously in health. One member of the exploration actually sank beneath the toil and the climate. Judged by this kind of cost,—a cost that no money can repay,—the survey is a costly affair. Judged by the outlay of money, on the one hand, and by the graphical and literary results on the other, it must be considered wonderfully cheap. In the actual state of the East, the map has a daily increasing value. Were it not actually in the hands of the subscribers, very conclusive reasons might be urged against its publication at the present moment. As, however, it is now so far before the world, the best thing to do is to let all those who are interested in the East know of what a valuable document they may become possessed. One of the most venerable of English scholars connected with Bible study, recently said that "he blessed God that he had lived to see the completion of this map." It is a work done once for all,—well done, and worthily done; and we trust that all concerned in its production will receive their due share of the recompense for faithful and long-sustained labours. We need name no names. Honour is rendered to whom it is due in the title and signature of the map, and in the details of the memoir; and we think it will be felt that Christendom owes a debt of gratitude to all the faithful labourers who have combined to produce this important monument.

FROM THE BANKS OF THE SEINE.

By the time these lines appear, the great national fête of the Fourteenth of July, as it is called, will have become a matter of history. It is not alone the whole of Paris, with the exception, of course, of "the Faubourg Saint Germain," that has made extraordinary efforts for the occasion, but the whole of France has taken part in the rejoicings, the peculiar feature of which has been their spontaneous unanimity. Perhaps, were it not that architecture plays a certain part in the show, it might be out of place to mention in these columns what is more suited to the pages of other journals, but the architects have been called largely into requisition; triumphal arches and various other architectural motives have been rising in different parts of Paris, while a full-sized model of the monumental statue to be eventually erected on the Place de la République, the former Place du Château d'Eau, has been in preparation for some time past. But it is in unlimited lanterns and endless yards of bunting that the popular joy has found expression. We, in England, have no idea of preparing weeks ahead for such an occasion, but here for a month and more past every little mercer's shop has been displaying its stock of tricolour bunting. This extraordinary impetus given to the bunting-trade by the rejoicings in honour of the great Flag Fête of the Fourteenth, recalls to our mind very appositely a certainly little-known story narrated to us many years since by an interesting old lady, well known to English residents on the banks of the Arno. A friend of Sir Walter Scott, she was once on a visit to Abbotsford on the birthday of the illustrious author, who had for the occasion displayed on his lawn a large number of flags. How he had obtained these Sir Walter told his guests. A shipowner having asked the author of "Waverley" to become sponsor to a ship recently built, Scott not only acquiesced, but presented the captain with a full set of ship's colours. It happened that the vessel, being one day in a famous foreign port on Sir Walter's birthday, the captain determined to mark the day; every colour was run up, and would have probably fluttered till sun-down, had not the vessel been suddenly boarded, and in the name of the admiral whose ship was in the port, the captain was summoned to forfeit the whole set of flags. Marine etiquette, composed no less of a series of touchy formulæ than that on land, forbids a merchant vessel, while the admiral's ship is in port, flying her colours. The colours forfeited were duly sent to the

Admiralty, the First Lord of which time-honoured institution happening to be a friend of Scott, told him of the little adventure, begging him in addition to accept the forfeited flags as a remembrance of the amusing incident.

Of the many thousands of English readers who will read, or have read, this week the account of the anniversary of the taking of the Bastille, which the fête of the Fourteenth commemorates, there can be but few still living who can say that their father was present on that memorable July day of the year 1789. Among the many curious letters written from France in the last century by Dr. Rigby, and recently published by his accomplished daughter, Lady Eastlake, one, perhaps the most interesting of the whole collection, vividly describes the scene in Paris on the day of the taking of the Bastille. How much are we indebted to those who preserve with affection the memorials of their relatives, and who have the ability and the generosity to give to the world the benefit of their care? We can imagine with what peculiar interest the accomplished authoress would recall within the last few days events of such a momentous character described in the beloved lines of her father.

One of the features of the past few days has been the opening at the Cercle de la Librairie in the Boulevard Saint Germain, of an interesting exhibition of old and modern books. After having been adjourned several times, the cards were at length distributed a few days since. It will be remembered how, when the Publishers and Printers' Club-house was thrown open, some account was given in these pages of M. Garnier's design, and a view given of its exterior.* The exhibition has enabled those familiar with the club from the boulevard to see the finished effect of the interior. Our respect for M. Garnier's reputation can scarcely be said to have been increased by his design of the Publishers and Printers' Club-house, which we should have imagined would have been an inspiring subject for an artist such as M. Garnier undoubtedly is; but the building of a colossal Opera-house, which in the past would have more than amply occupied the lifetime of an architect, cannot be expected, we suppose, to be good training for the refined work necessary for a not very large club-house. The exhibition has been installed in the two large rooms and the rotunda of the first floor. The exhibition is divided into two sections,—that of the old books and that of the new. In the glass cases which protect the treasures of the printer's art of the fifteenth century, M. Firmin-Didot, M. Claudin, M. Reiher, and many other well-known collectors, have placed some of their choicest treasures. The works are all French, and in most cases are specimens of the first works printed in France. Paris is represented by more than one work from the presses of the German workmen invited by why Louis XI. to Paris, and installed by him in the classic Sorbonne and the narrow, steep Rue Saint-Jacques, Ulrich Gering, Michel Frihnrger, and Martin Krantz. Lyons, the second great centre of the printed book trade of the Renaissance, is represented by the works of Pierre de Sainte Lucie, and more than one other contemporary: books printed with a care and a beauty that are the despair of modern printers; illustrated with wood-cuts of extraordinary grace and historic interest. But not alone are Lyons and Paris represented among the several hundred rare volumes exhibited in the cases; here are works which issued from the modest "*librayries*" of many a smaller town then active, and which now knows little of such zeal. Caen, Angoulême, Rennes, Limoges, Abbéville, Troyes, Perpignan, Dijon, and Dôle; and even from smaller towns, such as Salins, Treguier, Haguenau and Chahlis, Louheac and Cluny. The collection, in fact, represents a history of the introduction of printing into France. Among the modern exhibits several cases of superbly-bound volumes are shown by the well-known firms; books, marvels of luxurious expense and reckless splendour, but never more than imitations, alas! sadly wanting in the noble character of the original models. In the third room a collection has been made of all the principal works issued by the publishers of Paris within the last two years. Each publisher has his case; and, what is a pleasing innovation, the books may be freely handled and inspected. The show of books, the artistic works especially, is creditable in the extreme, and is certainly calculated to make the English visitor somewhat modest in referring to the works published in the same time by our London firms. There only remains to describe the catalogue, the printing of each sheet of which has been entrusted to one of the renowned printers of Paris and the provinces. Entire freedom has been allowed to each to carry out his fancy. The competitive desire to excel has produced a curious volume, which, though to the professional visitor it may be interesting, as showing the skill of the printers, cannot be said to be so to the outsider. The binding of the catalogue has also been confided to various firms. This exhibition is the first of a series, we learn, of biennial exhibitions, all to be connected with printing and books. For 1882 there is a proposal to have a show of book-illustrations, again divided into sections, one retrospective, the other modern. This, we may feel sure, will reveal some extraordinary treasures.

Of exhibitions, we have not yet seen the last, but they are gaining a fresh instructive value, in each assuming some special subject of interest, the leading idea which regulated the annual exhibitions held at South Kensington, and which unfortunately collapsed. On the 31st inst. opens at the Palais de l'Industrie, under the direction of the Union Centrale, an exhibition devoted this year specially to the art and industry of the metal-worker. It has become now evident to every thoughtful observer that the universal exhibitions held from time to time have not entirely carried out their object, a fact to be attributed to their too general nature. The managers of the Union Centrale have, with this warning before them, advised a rigorous and analytical arrangement of their exhibitions, as being more directly instructive (their object in the advance of the industrial arts), without ceasing to satisfy the curiosity of the public. This year's exhibition commences a series of three biennial and special exhibitions, "the divisions of which are based on the natural products themselves of which the artist makes use, and which he transforms according to his skill and taste," and, continues the recently-printed report of the Union Centrale, "as we live at an epoch of experimental method and of analytic science, we wish that these exhibitions should possess a *technological* and didactic character; that is, they will each present in well-arranged order, the raw material, the tools and processes, the artists' models, and finally the works of art themselves." This excellent system is to be pursued in each of the exhibitions to be held, the first this year devoted, as we have already stated, to metal; that of 1882 devoted to tissues, paper, skins, and wood (in its application to furniture); that of 1884 devoted to wood (as applied to building and decorative purposes), stone, glass, and earthenware. When this series is completed, the Union Centrale will certainly have done much to carry out their intention "to classify the trades, follow their history, mark their progress, and analyse their elements."

Writing from the banks of the Seine, the announcement that a new Thames steamboat company is about to be formed is of sufficient interest to attract attention. As, probably, the "plant" of the company is not yet purchased, let us venture to suggest the use of screw-steamers in lieu of the paddle-wheelers in use on the Thames. Apart from the fact that the space occupied by the screw-steamer is considerably less (the whole paddle-boxes being lost space), the advance against stream is much more rapid, the management is less difficult, and accidents are less frequent; but, above all, and this is the chief point we urge, the muddy river will not be churned up each time a steamer passes. The rapidity with which the *bateaux-mouches*, or fly-boats, as they are termed here, speed up and down stream from one end of the city to the other on week-days, for the modest sum of two sous (one penny), makes them essentially floating omnibuses, — conveniences for all. Let us hope that the new Thames steamboat company will take a lesson from the Seine company, which carries its millions of passengers yearly.

Technical Education for Plumbers.—We are informed that the Plumbers' Company are prepared to grant their freedom to workmen, so as to make the company really representative of the trade whose name it bears. With this view forms have been prepared, which can be obtained by those concerned on application to the clerk, Mr. J. B. Towse, 6, Laurence Pountney-lane.

* See *Builder*, vol. xxxviii., p. 98.

"THE CONSTRUCTION OF GASWORKS."

THE little book under this title, originally written by the late Mr. Samuel Hughes, has been re-written and much enlarged by Mr. William Richards, C.E.* The various improvements that have been introduced since the first appearance of the book are treated of, and the successful application of gas for heating and cooking purposes, as well as for producing motive power. The book will be found most useful by all interested in the subject. In connexion with other information concerning gas and gas-works given in our present issue, we quote from the book in question part of a chapter on the construction of the necessary buildings:—

An ordinary gas-works comprises the retort-house, coal-store, purifying-house, engine and exhauster, station-meter and governor houses, valve and regulator room, workshops, dwellings, and offices, with the ordinary appliances for testing the quality of the gas, the yard and chimney, together with the necessary plant for the manufacture of the sulphate of ammonia.

The Retort-house and Buildings.—The retort-house, as its name implies, contains the ovens, or, as more generally termed, "settings" or "benches" of retorts, in which the operation of distillation, or carbonisation of coal, is conducted. With very few exceptions, this is a rectangular building, covered usually with iron principals, and slates or tiles, and sometimes, although rarely, with sheet-iron. The retort-houses of large works some years ago were limited to 50 ft. or 52 ft. in width, but they are now generally built 75 ft. wide, whilst the largest retort-houses of the Beckton works are 100 ft. in width and 480 ft. long. As this work, however, is intended for those interested in small establishments, our attention will be more particularly directed to them. For the very smallest of gas-works, having only one retort, no rule concerning the dimensions of the retort-house can be given, beyond the simple observation that, for the proper working of the rake, a clear space equal to at least one-half more than the length of the retort should be allowed. In small works the retort-house is usually about 26 ft. wide, which, allowing 12 ft. for the width of the retort-stack with the space that is usually left between it and the wall, together with the mouthpieces, leaves 14 ft. clear for working. There should always be an intervening space between the ends of the stack and the walls of the retort-house; as in the absence of this, when the stack abuts against the wall, the latter is bulged out by the expansion of the brickwork on its becoming heated. In retort-houses of this width, of course only single settings of retorts can be employed; but when the number of the benches or ovens permit of it, then double benches, where the retorts are set back to back, with a firing-floor on each side of the retort-house, are usually constructed. The flooring of the retort-house should always be kept in good repair; the slovenly method of leaving it in recesses and ruts, as sometimes observed, is reprehensible, as by these ruts the coke is jerked out of the barrow, and, as the flooring cannot be properly swept after each charge, it is attended with loss; besides, in a gas-works, like every other establishment, considerable order is essential to success. The roofs of some retort-houses are formed, as observed, with iron principals and sheets, which may be desirable where rigid economy is necessary; but generally the economy is very misleading, as when iron sheets are exposed to the action of the steam arising from the process of quenching the coke, and the vapours of the retort-house, their durability when of ordinary thickness seldom exceeds seven years. With galvanised iron the duration is somewhat increased; and unless Professor Barff's or Mr. George Bower's system of preserving iron may be found suitable for this part of a gas-works, we would certainly recommend the use of slates for the purpose; by which, however, in consequence of the principals and laths being required of greater strength than when iron sheets are used, the cost is materially increased. For ordinary small buildings the front and back walls of the retort-house need not exceed 9 in. thick; usually the sides are made 14 in.; and in constructing, an essential point is to avoid a draught passing through the building. In larger works these dimensions are

* The Construction of Gasworks, and the Manufacture and Distribution of Coal Gas. Sixth edition. London: Crosby Lockwood & Co. 1880.

augmented according to the magnitude of the building. A few of the largest establishments have the retort-house very differently arranged to those of the great majority. In the centre, and extending from end to end, are a series of arches built on suitable piers. On these are constructed the ovens or benches, the piers of which correspond with those below. On a level with the furnaces of the retorts there is a stage or firing floor, where the stokers work when charging or drawing the retorts. This is about 6 ft. 6 in. from the ground, and is commonly formed by cast-iron columns and plates, extending on each side throughout the length of the retort-house, leaving an opening of about 2 ft. wide immediately in front of the furnaces, through which the coke drops when drawn from the retort into the space below, which is called the coke-hole, or coke-vault. The coke-vault possesses some advantages, for where it exists the stokers are not exposed to the continuous heat of the coke when drawn from the retorts, which falls immediately into the vault, where it is quenched by other men. Moreover, the furnaces are also clinkered from below, which saves some trouble; and the convenience of loading the coke direct into the carts from the coke-vault is also a recommendation. The objections to the coke-vault are the expense in construction; the coke in falling breaks, and is further injured on account of the very limited space for spreading, extinguishing, and storage. There are few works, and these only of the largest magnitude, which have coke-vaults attached to the retort-house. In large works of the present day the retort-house is employed as a coal-store, for which purpose their width is very considerable. Generally the ovens employed in large as well as medium sized works are built on suitable foundations, ensuring solidity to the structure, and preventing as much as possible radiation of heat from beneath. In the event of the foundations being in gravelly soil, an increased thickness will be desirable to prevent loss of caloric at that point. The coke when drawn from the retorts falls into iron barrows, and is wheeled away to a separate place for the purpose of quenching. In retort-houses of this description, the tops of the ash or evaporating pans are a few inches below the level of the ground, which is usually paved with fire-bricks on edge. Sometimes cast-iron plates have been tried as a substitute for brick paving, but the metal conducts the heat to the feet of the men with such facility as to render it objectionable. The benches of the retorts are either placed side by side the whole length of the retort-house, and having one charging floor; or, as in medium-sized works, where retort settings are placed back to back. In this case a building containing, say sixty single benches, thirty of them have their open ends or mouthpieces on one side of the retort-house, the other thirty mouthpieces being on the other side, and a 9-in. or 14-in. wall separates the benches. These are called single settings. This method was superseded some years ago by dispensing with the partition-wall, and thus the two single beds form one continuous oven, each retort being about 18 ft. or 20 ft. long, open throughout, and having a mouthpiece at each end, which are called double beds, or through-retorts. The economy derived from this plan is very considerable; but they can only be employed in large establishments, where there are at least six stokers, to charge both ends simultaneously. At a works we recently saw through-retorts changed to single. In deciding on the dimensions of the retort-house every consideration must be made, not only of the present requirements of the locality to be supplied, but also that of the future; for gas, even at the present day, is very far from being fully appreciated, and it is impossible to anticipate the various future uses to which it may be applied; but the experience of the past demonstrates the necessity of making every reasonable provision for extension. It is also important to have a good margin, and not to estimate the power of carbonisation too highly; for by unforeseen circumstances the supply of the ordinary coal may be temporarily discontinued, when recourse must be had to that of inferior quality, which yields less gas, and in consequence requires more retorts. No definite rule can be laid down for the dimensions of the retort-house; this must entirely depend on the mode of setting. With one kind of setting having a given number of retorts of given dimensions, considerably more coal is carbonised than with another; it also depends whether they are single or double, the kind of coal employed, and other circumstances.

There is nothing peculiar in the construction of the walls of the retort-house more than any other buildings of the same height. Of course precautions should be taken to secure a good foundation, to extend the base by footings, and, where necessary, to use piling or concrete according to the nature of the foundation. On these points no general directions can be given, as the treatment must vary with the special circumstances of the case; the general rule, however, applicable to ordinary foundations will apply here. The cost of erecting retort-houses will, of course, vary with the price of labour and building materials in the district. The magnitude of gas-works and plant is generally estimated by their annual production; thus, a works of "twenty millions" signifies a production of that number of feet of gas per annum, and in the height of summer will produce about 30,000 ft., and in the very depth of winter about 90,000 ft. daily. In a works of sixty millions per annum the minimum production will be 90,000 ft. and the maximum 270,000 ft. per diem. In modern large works retort-houses are built in blocks, having free communication with each other, and provided with a ventilating shaft constructed of wrought iron, having a valve or door by which the heated atmosphere of the building is considerably moderated, contributing much to the comfort of the men. And, to the credit of many engineers, it must be said that the comforts of the men employed in their respective companies have had their greatest consideration. In some gas-works libraries are established, in others baths and mutual benefit societies; and there are gas-works that can boast of having a musical band, composed of the stokers and men of the establishment,—circumstances alike praiseworthy to the employers and employed.

The Coal-Store.—This is generally attached to the retort-house, with every facility of communication for the purpose of transporting the coals. The dimensions of this building must depend on circumstances. If the railway is the means of transport, then small stores may be sufficient; but should the ordinary means of obtaining the supply of coal be by sea, river, or canal, then in order to provide against the probability of frost, or loss or delay of vessel, the store should be ample for a proper supply, and whenever there are increased difficulties in obtaining the coal the store should be augmented in proportion. It is sometimes advisable to have the coal-store sufficiently large so that in summer, when not required for coal, and coke is abundant, it can be converted into a store for that residual. When employed as a spreading-floor it should by all means be paved with fire-bricks, as stone is liable to crack with the heat. When not used for that object ordinary common paving will answer the purpose. As already mentioned, it is highly desirable that the coke should be sold as speedily as possible after it is produced.

Purifying-House.—The purifying-house has the sides open, to permit a good current of air to pass through the locality and carry off any noxious gases. There should also be a ventilator in the roof, so that in the event of the lutes "blowing," the gas may escape readily at the top. The roof of the purifying-house is usually of wooden principals and tiles. Iron would be very speedily destroyed by the action of the sulphur emanating from the waste purifying material. In some works the purifiers are uncovered, which has the inconvenience of unnecessarily exposing the men at times to the inclemency of the weather, and ought always to be avoided by a suitable roofing.

According to a modern construction, the purifying-house is built of a ground and two upper floors, of which the uppermost and lowest serve as reviving-floors for the oxide. The purifiers are on the first floors, and in the centre of each purifier is a shoot, through which the foul oxide passes to the floor below, and when requisite the door on the top of the shoot is luted. By mechanical appliances the oxide is lifted from the bottom to the top floor, from where it passes down a shoot into the purifier to be charged. The saving of labour and the rapidity of action are both recommendations to this system of working.

Engine, Boiler, and Exhauster House.—In the most moderate-sized gas-works at the present day the steam or gas-engine is an important auxiliary. Formerly the only use of an engine in a works was for pumping water, or for keeping in motion the wet lime purifiers, and in many works of considerable capacity, where neither of these was requisite, no engine existed. The use of clay retorts has caused motive power for working the exhauster to be introduced into works of all dimensions, except the very smallest kind. In large works the engine, boilers, and exhauster, being attended by the same man, are generally in the same building, and more care is usually displayed in this than any other part of gas-works. The edifice is often constructed with taste, and is no doubt an inducement to the men who have charge of the machinery to keep it cleanly and in order with the building itself. In small establishments the exhauster is generally adjoining the retort-house, the stoker having charge of it. The improvements recently introduced into gas-engines, by which they are rendered practical and economical motors, should induce every gas manager to adopt them, on account of their safety, efficiency, and as an example to consumers to employ them.

Station-Meter and Governor-House.—These, like the engine-house, should only be accessible to the manager or foreman, or the man in charge. When there are several gas-holders together, it is not uncommon for the station-meter to be placed close to them, and the valves of the various gas-holders fixed adjoining the meter-house. On other occasions there is a distinct house for the valves; but more commonly they are attached to their respective holders. The governor is sometimes placed in the same building as the station-meter, but more frequently a detached building is constructed expressly for it. In large works there are several lines of mains issuing from the works, each of which has its corresponding governor, with the various pressure-gauges and pressure-registers. And in establishments situated at a distance from their distributing stations a telegraphic communication exists between the various localities, as well as the company's offices.

Chimney or Stack.—High stacks possess an advantage in consequence of their great draught permitting a reduction in opening of the damper; but against this they present the evil, that, if the dampers are not well looked after, the draught occasioned by them will cause the fuel in the furnaces to be consumed very extravagantly without any good result. High stacks are constructed principally for the purpose of carrying off the smoke or offensive products to a great height, where they are diffused over a large space, and a nuisance which otherwise would exist is prevented. In some chemical manufactories the stacks are made of great dimensions,—one near Glasgow is 400 ft. high. By means of this all noxious gases that may be generated are carried to and issue from the top of the chimney, without the least prejudice to the neighbourhood. The largest chimney for a gas-works is that of the Edinburgh Company, and is a fine piece of building, being 329 ft. above the level of the ground, perfectly plomb, and without the slightest crack or fissure throughout the height. The current therein, when in ordinary working order, is equal to an exhaust of 2½ in. of water, a strong current in an ordinary chimney seldom exceeding ½ in. exhaust. The cost of this stack, with the lateral flues, was upwards of 4,000*l*. Chimney stacks for gas-works are constructed in various manners, the simplest and cheapest being the square form; but these are somewhat unsightly, and, offering greater resistance to the wind, require to be built strong accordingly. Some stacks are made circular and others octagonal; the latter, when surmounted on a square pedestal, with a neat capital on the summit, has a remarkably good appearance, while the cost does not exceed that of the circular form. Chimney-stacks, unless when placed in the centre of the beds, should never be built in the retort-house, as they occupy the space unnecessarily. Wherever constructed, they should always be detached, and, on account of their great weight and height, extraordinary precautions are necessary in their foundations. The area of these must be determined according to the degree of solidity of the ground where erected; the softer the soil, of course the greater will be the area required for the footings. The pedestal for the base is usually square, one side of which is one-eighth of the total height of the shaft. Stacks for gas-works are always lined with fire-brick either for a portion or the whole of the height. Sometimes the lining is detached from the chimney, leaving a space for a current of air to pass between the former and the latter,

which prevents the stack cracking. Small chimneys are usually constructed entirely of fire-bricks. A mistaken notion often prevails, that by materially contracting the stack at the top, the draught is increased: this, however, as already shown, can only occur when it is of too great capacity. The stack, although tapering on the exterior, is internally nearly of one uniform area throughout; there being offsets at certain distances, according to the height and form. In erecting, every eight or ten courses should be built with hoop iron; when this is not done the stack frequently cracks, afterwards demanding the use of hooping on the exterior, which is unsightly. At many large works a number of dwarf chimneys are erected, each of which is about 1 ft. 6 in. or 2 ft. square internally, and serves for three or four double settings. The area of a chimney compared with the number of benches leading to it is the main consideration, irrespective of the height.

Very recently Mr. Valon has adopted the use of a separate dwarf chimney to each bench of retorts, with beneficial results, as the temperature of the settings is maintained with greater regularity than by the ordinary method, whilst any leakage from the retorts is readily detected. The ordinary chimneys in gas-works vary in height from 35 ft. to 150 ft. above the level of the ground; their cost for a given height depends mainly on their internal area and the nature of the foundation. The ground being favourable, the price of a square chimney, 35 ft. high, with an internal area of 4 square feet, will not exceed 35*l*. An octagonal or circular stack of 8 ft. internal area, and 60 ft. high, under the same conditions as the former, will cost about 85*l*. A similar stack of 10 ft. area, and 100 ft. high, would be 180*l*. to 200*l*. Where there is no probability of a nuisance being occasioned by low chimneys, for the ordinary use of a gas-works they are not required to be more than 45 ft. high.

TUNBRIDGE WELLS GAS-WORKS.

THE accompanying drawings illustrate, so far as they go, modern gas-works which have been erected for the Tunbridge Wells Gas Company, from the designs of Mr. R. P. Spice, C.E., of Parliament-street, Westminster.

This is an instance of that spirit of private enterprise for which Englishmen have rendered themselves famous, and their country great and prosperous, and we certainly are not amongst those who desire the time when, by absorption into Governmental centres of the various great industrial undertakings of the country, this spirit of enterprise, which has been the corner-stone of the edifice of our commercial greatness, should be so discouraged and enervated as to sink into a subordinate place.

The old works at Tunbridge Wells had become unequal to meet the wants of the gas-consumers, and were so "cabined, cribbed, confined" as not to admit of further extension. This state of things rendered it necessary to provide entirely new works of larger capacity. Accordingly, application was made to Parliament for power to enable the company to provide the means for meeting the demand, and ultimately the usual powers and privileges were obtained, accompanied by those safeguards which have been devised by modern legislation in the interest of the British public. The only contention in this instance, between the company on the one hand and the ratepayers on the other, was as to the site of the new works. In any locality where nature has been lavish with her charms, so that the scenery is unusually attractive, it is difficult to find a convenient corner in which to plant gas-works, the name of such a concern conjuring up visions of ugliness, smoke, vile smells, and dirt, and the opposition to the first site selected, in a sequestered valley at Tunbridge Wells, was of this sentimental character. However, in the end, after three applications to Parliament, the present site was decided on, and the works erected. They have been designed to embrace all, or nearly all, the scientific improvements introduced into gas-working in recent times, by which the best results are attained; first, as to the quantity of gas obtainable from the coals carbonised; secondly, as to the quality in illuminating power and purity; and, finally, as to economy in all those items of expense which go to make up the first cost of gas, and it is believed that, in all these respects, success has been achieved. It is further hoped that public opinion has not been shocked by that of ugliness, a fear of which inspired the old opposition, and more than that, it may be anticipated that a view of these structures, which have been raised on the hill-side to the left of the down-line of the South Eastern Railway, may give pleasure rather than otherwise to the tourist and wayfarers. The builder was Mr. Henry Potter, of Hackney. The various fittings and apparatus required were supplied by the following firms:—Cutler & Son, Millwall, gas-holders, condensers, and scrubbers; Messrs. Cockey & Son, Frome Selwood, purifiers; West's Gas Improvement Company, of Maidstone, retorts and fittings of stack; Korting Brothers, patent steam-jet exhausters; Abbot & Co., Gateshead, hydraulic crane; Owens & Co., Whitefriars, hydraulic lifting apparatus and steam-boilers; Head, Wrightson, & Co., Stockton-on-Tees, iron roofing; A. Wright & Co., Millbank-street, Westminster, station-meter and governors; Bailey & Pegg, Bankside, London, trunk-mains from works to the town. The cost has been about 70,000*l*., including land and Parliamentary expenses.

The following remarks on coal-stores and retort-houses, with reference to the works we have illustrated, are from a book on "Gas Manufacture and Distribution," by Mr. W. B. King:—

"The primary object to be aimed at in setting out the ground-plan of a new gas-work is the arrangement of the several parts of the whole, from the coal-store, and the reception of the coals into it, to the gasholder, so that the cost for labour throughout may be reduced to the lowest practicable amount; and to this end the designer and the manager should direct their closest consideration.

It may be taken as an axiom that it is a waste of power to lift any quantity of material daily and hourly in perpetuity in any case where the same material may be made to fall into its proper place instead of being lifted; and the difference between the two will be felt in the annual balance-sheet of the undertaking.

This fundamental principle of causing all weights to fall instead of being lifted, except in the single point of raising the coal by West's system, by an endless chain of buckets, kept in motion by a small steam-engine, is illustrated in the design which accompanies these remarks.

The railway by which the coal is brought to the works is some 20 ft. above the general level of the ground of the works. The trucks will run into the coal-store, and, having dropped their contents, will go through to the tail of the siding; the coal, being admitted as it may be required to the breaker underground, is raised by a chain of buckets into overhead fixed hoppers, whence it falls to the travelling hoppers, and thence into wagons, which are, with a very small amount of muscular energy, wheeled into each retort, and as they are withdrawn thence the charge of coal is deposited therein in a layer of uniform thickness.

When the charge has been worked off, the resulting coke is drawn, by the aid again of a mechanical appliance, into barrows, and quenched; and then, running upon the level floor to a near opening in the side wall of the retort-house, each loaded barrow is run down an inclined plane from the retort-house floor to the coke-yard, the general level of which, in this case, is intended to be about 2 ft. to 2 ft. 6 in. below the floor-line of the retort-house.

The same remarks applied to coal and coke will equally apply to the water used, not only in a retort-house, but generally upon a gas-work, not a single gallon of which should ever be lifted by the direct application of muscle and sinew. With ample boiler-power, steam can be raised at the lowest possible cost upon a gas-work by means of a slow-combustion furnace, fed by breeze or fuel of the cheapest kind, so that the cost of raising water into elevated tanks is infinitesimal compared with that of raising it by manual labour, even from very shallow wells. The convenience and economy, therefore, are great, in having at hand, in close connexion with each bench of retorts, and everywhere about a gas-work, a good supply of water, obtainable at sufficient pressure by turning a tap or valve.

The plan and elevation of the retort-house annexed will bear favourable comparison with most others for economy in first cost, general effect in appearance, practical utility, and comfort of the workmen employed, taken in connexion with Mr. West's system of charging and drawing retorts. Special attention is called to the application of ridge and valley roofing, with abundant ventilation, and it may be mentioned that in this instance, each bench of retorts will have its own separate hydraulic main, commanded by a valve fitted on at the back, and connected with a main supported on iron standards, resting on the retort-stack, the gas being taken therefrom at convenient distances, and delivered into a main led along the inside of the wall of the house, which latter main is suspended by rods, the length of which is capable of adjustment by nut and screw, all converging to a point or points, from which the gas will be taken by the exhauster, and sent forward through the condenser. The productive power of the retorts for which this house has been designed is equal to one million and a quarter cubic feet of gas in twenty-four hours."

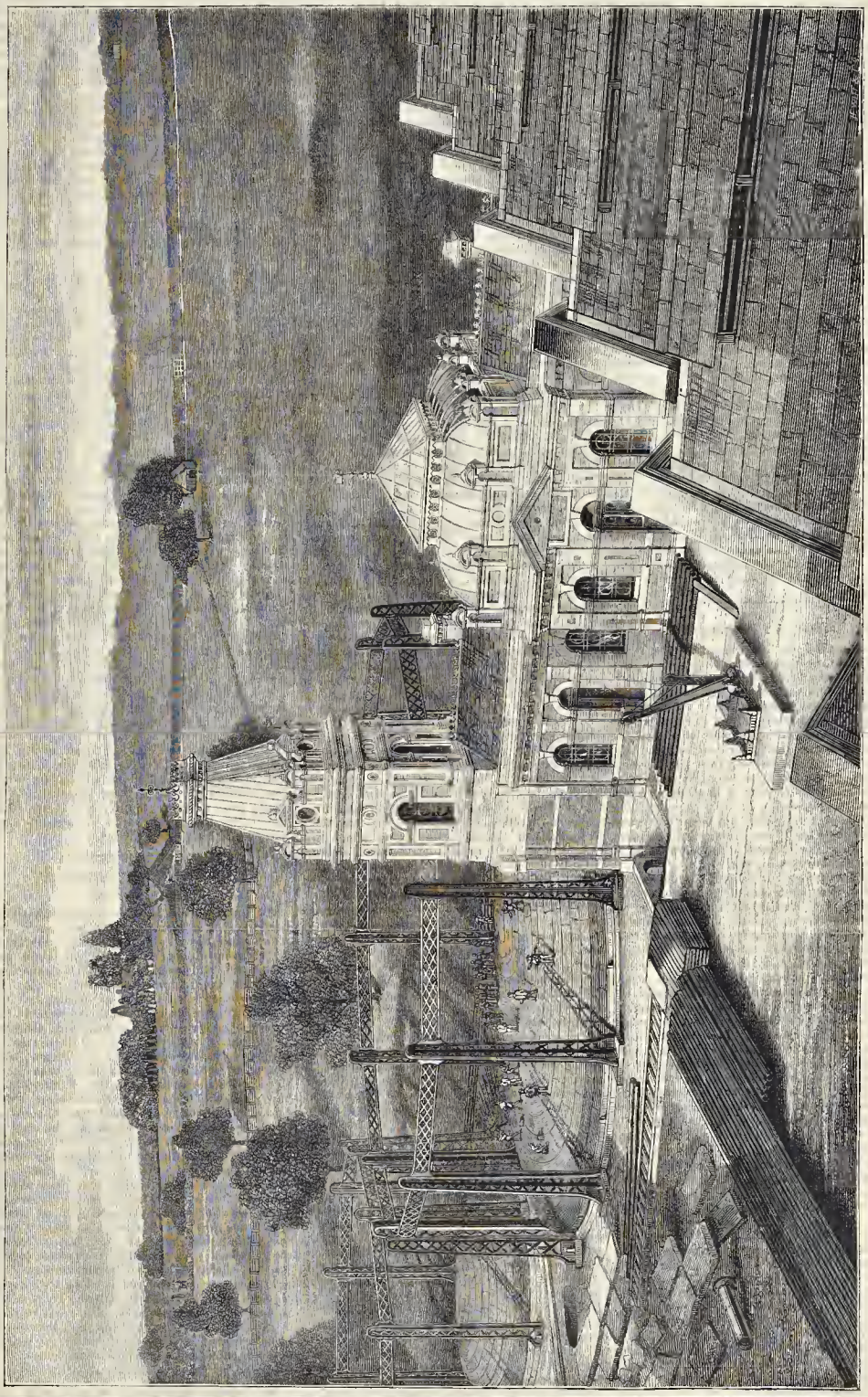
A NEW WHOLESALE MARKET AT LIVERPOOL.

THE Markets Committee of Liverpool have unanimously agreed upon the erection of a spacious new wholesale market, in consequence of the present inadequate accommodation for this branch of market business. In the course of a discussion on the subject last week, the chairman of the committee stated that there was at present no proper market accommodation in Liverpool for live fowls, and one large poultry dealer had informed him that he had frequently as many as 800 or 1,000 geese arriving in Liverpool, for which he could find no market-space whatever. It, therefore, appeared to him that they required a very large space of ground on which to erect the market. The intended new market is to have space for the wholesale disposal of poultry, pigs, and other live stock, as well as vegetables and general agricultural produce, the chairman stating that the demand for the last-named articles was so great that the railway companies had taken the matter up, and the London and North-Western Company had actually set up a market of their own. The site of the intended new market is at the north end of the city, and known as Nash-grove, already in the possession of the corporation, and originally intended for the erection of workmen's dwellings. The area of the proposed market is 7,480 yards, or upwards of an acre and a-half in extent, the whole of which, at the very least, the chairman said, would be required. The estimated cost of the market is 100,000*l*., the value of the site being set down at 80,000*l*., and the building itself at 20,000*l*. Speaking of the site, the chairman observed that it might be said it was wanted for workmen's dwellings, but if those who thought so would take a walk around the locality, they would see that there were at present large numbers of unoccupied houses.

THE ROMAN PAVEMENTS AT WOODCHESTER.

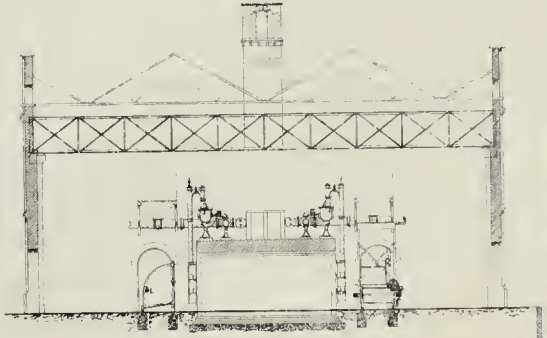
ANTIQUARIES will learn with much gratification that, after being covered with earth for many years, one of the magnificent pavements of the great Roman villa at Woodchester has been again laid open to view. This pavement has been very carefully depicted by Lysons, under whose care it was first opened, in 1793. It was afterwards re-covered, as were all the others, since it was found impossible to preserve them in any other way, through the cost of raising suitable roofing and buildings. The clearance recently effected has been done through the exertions of the Rev. F. Smith, the newly-appointed Rector of Woodchester, aided by a small grant from the Bristol and Gloucester Archæological Society. A visit will be paid to the remains on Thursday, the 23rd, by that society, and, according to present arrangements, the pavements will remain open for public inspection, at a small charge, until the 5th of August, after which it is proposed to re-cover it again with earth. It is greatly to be hoped that funds may be forthcoming to erect a protecting building and roof over this one pavement, to ensure its being always open for public inspection, that visitors to Woodchester may be able to see at least one pavement, as a specimen of the others, which it may hardly be possible to roof over, in consequence of the vast extent of the villa. The colours of the pavement prove to be but little, if at all, injured by the length of time that has elapsed since its discovery.

Mr. Henry Robinson, M. Inst. C.E., has been appointed Professor of Land Surveying and Levelling at King's College, London.



TUNBRIDGE WELLS NEW GAS-WORKS.—MR. R. P. SPICE, C.E., ARCHITECT.

TUNBRIDGE WELLS GAS WORKS.



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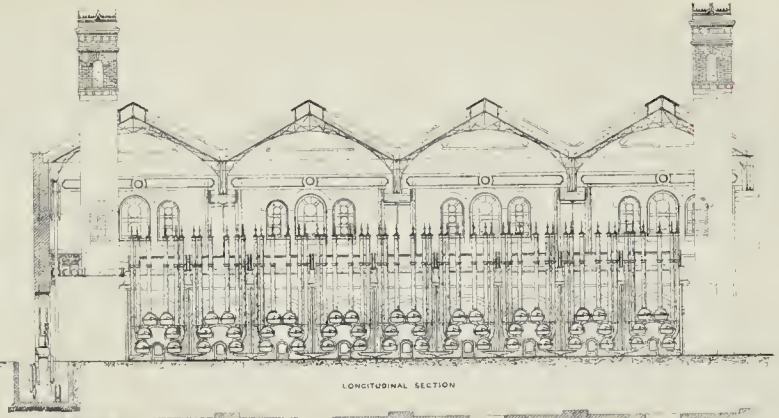

LONGITUDINAL SECTION

GENERAL ARRANGEMENT OF RETORT HOUSE

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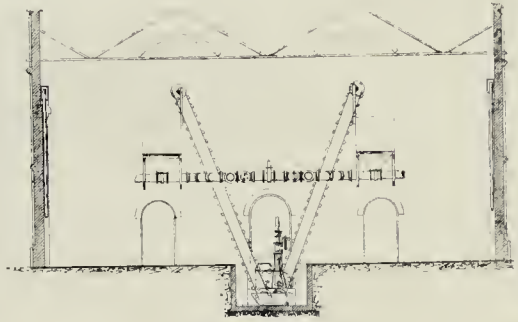

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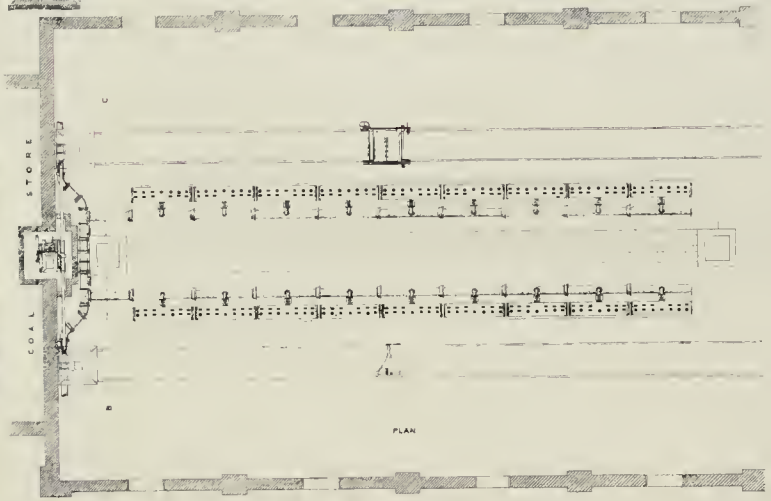


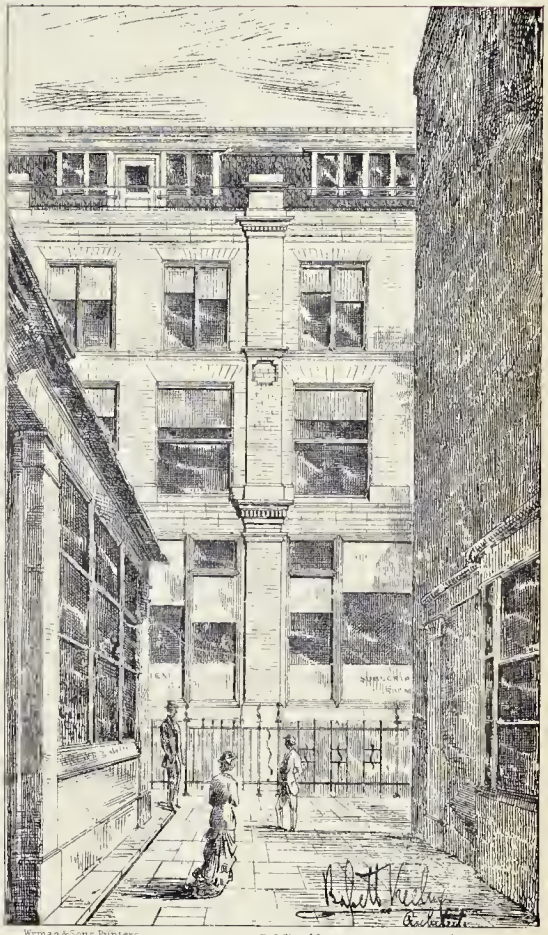
PLAN

As approached from Birchin Lane.

THE JERUSALE

AS R

17, 1880.



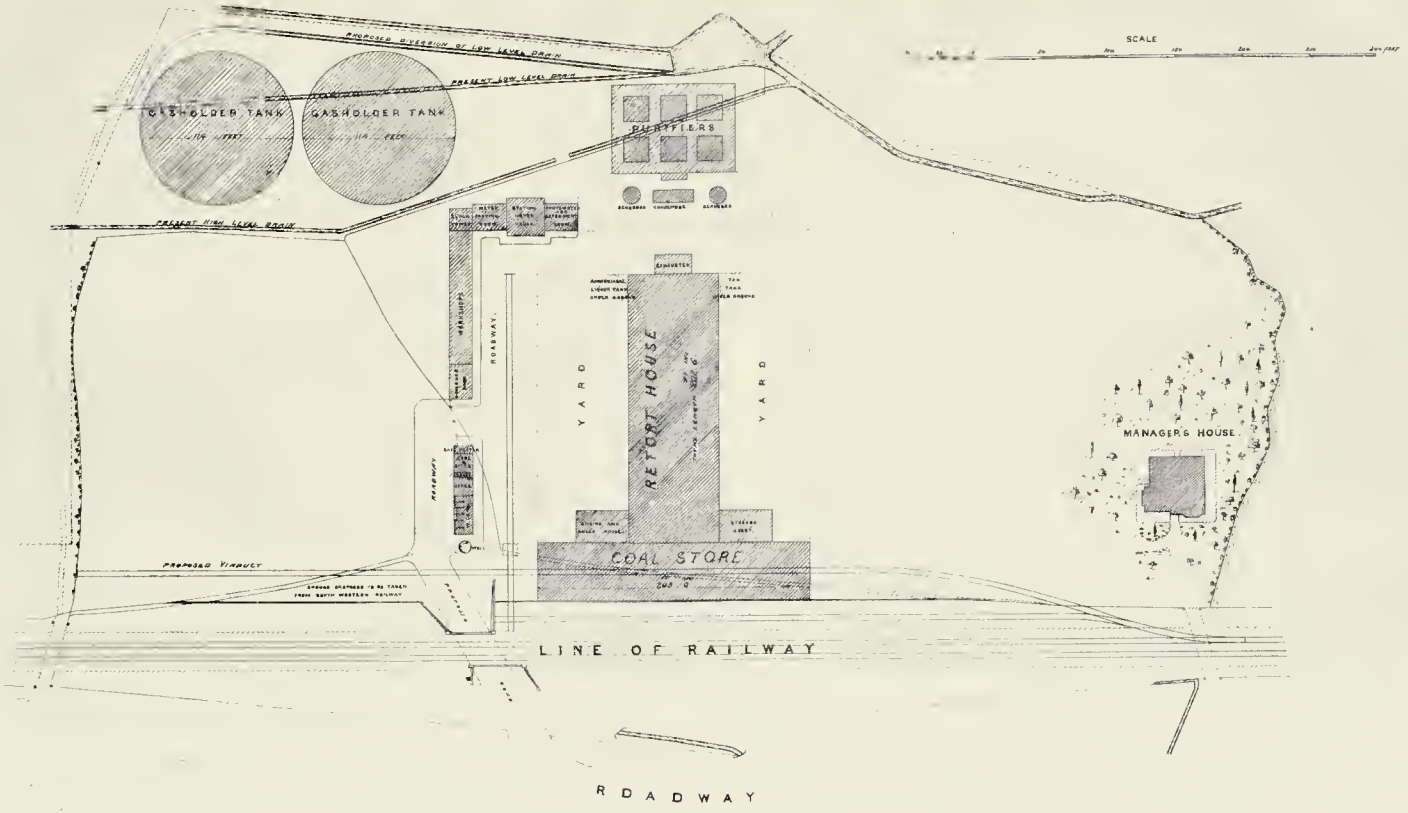
Wyman & Sons, Printers

OFFEE HOUSE,

T.

Mr Bassett Keeling
ARCHITECT

As approached from Cornhill.



TUNBRIDGE WELLS GAS WORKS

PLAN OF SITE & BLOCK PLAN OF BUILDINGS

THE "JERUSALEM," COWPER'S COURT, CORNHILL.

WE give in our present number a sheet of illustrations of the "Jerusalem" as recently rebuilt, showing the new building as seen from Cowper's-court, and also as it appears from the two narrow approaches to Cowper's-court, *i.e.*, through the passage in Cornhill immediately opposite the Royal Exchange and next door to the National Discount Company's offices, the other view being as approached from Birchin-lane. The old building it has replaced,—and to carry on the business of which the new one has been erected,—was known as the "Jerusalem Coffee-house," and its history as such carries us back considerably over two centuries to a time when the term "coffee-house" had a signification so utterly distinct from its present one that, like the "Jamaica," "Garraway's," and others, it has for generations been familiarly known as it is now designated, simply the "Jerusalem." Established early in the seventeenth century for the convenience of those who liked to talk business over a cup of coffee, at that time a somewhat rare and costly beverage, it soon acquired one of the special features it has retained ever since, that of a rendezvous for merchants, brokers, and captains interested in trade with the ports of the Mediterranean.

The original building was destroyed in "the Fire of London," and in excavating for the foundations of the present building, large beams in a more or less charred condition, and portions of a curiously-constructed tesselated floor, were discovered, which may have been either portions of the ruins of the original building, or of its successor, which was also destroyed by a great fire (on March 25th, 1748), when eighty-eight houses in Cornhill shared the same fate. Though the vaults and foundations of the building the present structure has replaced were of the most solid and massive character, it is apparent from this and other evidences that after the fire of 1748 little care was taken to remove the *débris* before rebuilding, which may be explained by the total absence of the terms "District Surveyor" or "Metropolitan Board of Works" in the records and chronicles from which we have culled much more of the history of the "Jerusalem Coffee-house" than would be appropriate in this notice of the new building.

The prosperity and fame of the "Jerusalem" were coincident with the rise to greatness of the East India Company; and it is asserted by some that the Company was actually founded at the "Jerusalem," and the fact that it was more frequented by East India merchants at the time than any other place in London, lends some countenance to this hypothesis.

The coat of arms over the entrance to the new subscription-room is that of the defunct East India Company, and was purchased at the sale of the old Company's House in Leadenhall-street, when demolished to make room for a large block of offices by Messrs. Tite & Clifton, embracing East India Avenue. It was then placed over the entrance to the old building in Cowper's-court, where it remained until the rebuilding of the "Jerusalem" in its present form, where its position forms a link with the past history of the institution, which, though marching with the times in adapting itself to modern requirements, still retains its original characteristics.

Of course, the old associations which have so long hound it to the East will be preserved; but the increase in the commerce of Great Britain has created the necessity for an extension of the scope and influence of the "Jerusalem." Every consideration likely to affect merchants and others having mercantile relations with India, China, Australia, New Zealand, the Cape of Good Hope, &c., will be dealt with. Files of the principal newspapers belonging to these places, as well as those of St. Helena and other intermediate stations, will be accessible to members, and every sort of information regarding the arrivals, departures, or casualties of ships.

It is worth noticing, in connexion with this, that the "Jerusalem" possesses a chronicle of the arrivals and departures of all the ships of the East India Company's service.

Every afternoon an exchange is held, attended by ship-owners, ship-brokers, and merchants, for the purpose of arranging for freights or charters, and other similar transactions. It is in contemplation to arrange for the establishment of telephonic communication, of course for the use of subscribers only.

On the ground floor is a spacious hall, in which members meet for the discussion of business.

On the first floor, which communicates with the ground floor by a private staircase, is a large and handsome reading-room for the use of the subscribers. This room will also be used for the sales of ships, produce, &c.

The rooms on the second and third floors, and those on the first, second, and third floors over the entrance to the subscription-room, are to be let as offices, and with a separate entrance facing the approach from Birchin-lane, are designated "Jernsalem-chambers."

The basement under the ground-floor subscription-room forms one spacious and well-lighted room, with a floor area of over 2,000 ft. This room is approached from the outside by a flight of wide stone steps, and has also an internal staircase communicating with the subscription-room over.

A peculiarity of this property, which is leased from Lord Cowper, is that, in addition to the land covered by the building, it includes very extensive cellarage, extending under the whole of Cowper's-court and some of the adjoining buildings.

The property being fully licensed, the whole of the basement, sub-basement, and the old cellars, have been let on lease to Messrs. Lavery & Co., of "Bodega" celebrity, who have fitted up the large basement-room, under the superintendence of the architect of the building, in the most solid and substantial manner, as a wine-room, with sandwich and cigar counters.

The floor is of white marble mosaic, all woodwork of teak, walnut, and wainscot, and wrought-iron is substituted for the wood "boarding" usually adopted; and though there is a total absence of any attempt at ornament or decoration, no expense has been spared to economise space and light, and to secure comfort and convenience. Though the general characteristics of their business will be maintained, some innovations and novelties have been permitted where a commensurate advantage could be secured.

In the planning of the new building, the difficulties of assimilating the rather complex requirements were considerably increased by the questions of light and air with which the site is surrounded, and though these have been all arranged without litigation or compensation, it has involved some peculiarities of arrangement and construction.

The building, though devoid of ornament, is constructed in a solid substantial manner, and may be considered fairly expressive of its purpose as the resort of business men of the most matter-of-fact and unemotional class.

The front elevation is of kiln-burned red brickwork (entirely without dressing or pointing) and dressings of brown Portland stone; the window-frames and sashes are of walnut, with plate-glass (that of basement being embossed so that the interior cannot be seen from the court). The treads to the staircase of chambers are of teak, and the whole of the wall of back elevations is faced with white glazed bricks.

The building has been erected by Messrs. Dove Brothers, under the direction of the architect, Mr. Bassett Keeling, of Weavers' Hall. There has been no clerk of works, the contractors' foreman of works, Mr. Paxty, having had the superintendence, under the control of the architect.

The constructional ironwork, which was a considerable item, has been supplied by Messrs. Homan & Rogers; the pavement lights and wine-lift are by Messrs. Hamilton; the marble floors in basement are by Mr. J. F. Ebner; and the gas-fittings and brass work are by Messrs. Richardson, Elson, & Co.

Exeter Hall.—Six well-known men have guaranteed 25,000*l.* in order that the lease of Exeter Hall may be secured, and the building preserved for the use of the Young Men's Christian Association. Mr. J. D. Allcroft gives 5,000*l.*, Mr. R. C. L. Bevan 5,000*l.*, Mr. S. Morley, M.P., 5,000*l.*, Mr. C. Williams, the treasurer of the Association, 5,000*l.*, Mr. T. A. Denny 2,500*l.*, and Mr. E. Denny 2,500*l.*

Font for Sheffield Church.—Designs are sought for a font proposed to be set up in the parish church of Sheffield; as our advertisement columns show. More than one correspondent condemns the proceeding on the ground that perfectly competent architects are now engaged in the restoration of the building, and ought to be employed.

THE CIVIL SERVICE ESTIMATES DEBATE.

THE sitting of the House of Commons in committee on the Civil Service Estimates on Tuesday last afforded one of those opportunities which occasionally recur for the airing of all kinds of minor grievances and suggestions, and what an American would call "notions," in regard to the matters under the control of the First Commissioner of Works. The ingenuity of some members in finding matter for complaint out of what the rest of the world regard as manifest improvements is really edifying. The skirmishing began upon the question of the vote of 112,577*l.* for public parks and pleasure-grounds. An Irish member led off with the complaint that Ireland got far too small a proportion of the money spent on parks and pleasure-grounds; and if, as Mr. T. Sullivan afterwards remarked, only about 6,500*l.* is spent on the Phœnix Park and 112,000*l.* on the London parks, and that the united area of the latter is not equal to that of the former, there does seem a disproportion. It depends, however, on what kind of park it is intended to keep up. A very large park, the chief value of which may be its freedom, as a kind of semblance of open country, may be kept up for less than a much smaller one in which ornamental gardening, a very expensive amusement, forms a part of the attraction. The large park may be sufficient unto itself, in its mere extent; the small park, not presenting the freedom and extent of open country, must be treated ornamentally to compensate for its limits in regard to space: it cannot be "wild," it must therefore be pretty. The next speaker, Mr. Magniac, quarrelled with the Government on this very point, and complained that so much of Hyde Park had been made into ornamental flower-beds that its use as a recreation-ground for the public was seriously obstructed. We doubt very much if "the people" will thank any member for this kind of protection of their rights. Our impression is that there is nothing the poorer classes appreciate, in this way, more than the sight of well-kept and gay flower-beds. The complaint that the large trees in Kensington Gardens are decaying is more to the purpose, and was not denied by the First Commissioner, though it must be remembered that, after all, trees have their allotted span like human beings, and it is looking for rather too much from a merely human First Commissioner to expect him to confer immortality upon them.

That too large a part of the Regent's Park is inclosed is a complaint which, in the interest of the general public, may, perhaps, appear reasonable; it should be remembered, however, that residents in a park have their reasonable rights and expectations, and, perhaps, landlords whose house property will be depreciated in value if the privileges attached to it are interfered with, may think they have some claim to be considered. As for the site for the Byron statue, which was declared by the same speaker to be most unsuitable, the question is, whether the Byron statue can be put in any place where it will look suitable. If it were a good statue, no one would complain of it being where it is, though in that case one would feel the desire to open it out a little by some re-arrangement of the inclosure and railing.

From the reply of the First Commissioner to his critics it would appear that some other suggestions were made which were not reported in their proper place. Some one appears to have renewed the plea for the resuscitation of the prostrate architecture of the old Burlington House portico, the fossil remains of which are now a puzzle to the curious on the river margin of Battersea Park. Mr. Adam thinks the cost of re-erecting it "a very doubtful expenditure." If he meant that it would not be possible to make it pay a per centage, no doubt he was quite right; but it seems a very pitiable thing that a piece of rather historic London architecture should lie rotting on the ground, instead of being preserved in a place where it would be effective, and even perhaps useful. Surely it might be made to add a beauty to Battersea Park itself, as an adornment to one of the entrances, or as the front of a shelter; and to set it up again so near its present resting-place would not cost very much. Another suggestion which was only to be gathered from the First Commissioner's reply, as reported in the *Times*, was that trees should be planted near the Marble Arch, in regard to which it was stated that there was in the Office of

Works a general echeme for tbe improvement of the Park,—a statement of eome interest. Before this is carried out (if it is to be), we may presume that something will be publicly known about it; in the meantime, we may eay that if it includes planting up near the Marble Arch, we are entirely with the scheme as far as that goes. The Arch at preeent stands up in an almost uneightly and unreaeonable manner from the barest corner of the Park, and very much wants some maeses of foliage to flank and lead up to it. Among tbe curiosities of the debate (or conversation, we may perhaps rather call it) was the indignation of an honourable member at the laying down of gravel (whioh he called "mud and soft earth") for riders on the eastern drive of Hyde Park, wbereby, he said, pedestriane were splashed, hnt for which tbe Commiesioner had received divers lettere of thanke. It may be presumed the bonourable member for Preston does not ride in the Park: pedeetrians and equeetrians often take very different views of euch matters. But, then, the gravel was laid down "in the expeotation of June, July, and August being fairly fine months."

"By Heavan, this gallant would command the sun!"

Certainly, tbe First Commissioner bas been badly nsed in that reepect.

One enggestion that was made for an asphalte walk from Marlborough House acroes St. James's Park recalls a much larger suggestion of our own some little time since. Mr. Callan's suggestion ahont the asphalte is not otherwiee than to the point, for the walk from the park suspension-bridge up to the Mall ie very soft and clayey in wet weather. But the fact is, that we believe a carriage-bridge over the water at this point, connecting St. James's-street and Pall Mall more directly witb the Westminster and Victoria district, is a want that will have to be provided before long. The huge blocks of residences tbat have heen built between Birdcage Walk and Victoria-street, ugly as they are, are what may he called residential facts, so are the maseee of residences, and the Army and Navy Storee, in Victoria-street. Carriages to the latter come in crowds, and have mostly to go a very roundahout way. The improvement we bere allude to formed part of a very exteneive suggestion for the fnture of the Westminster distriot wbich we published a little while since, and which membere of the Legislature who are intereeted in the laying-out of London might do well to look at; for some, at least, of its provisions, we are convinced, must be carried out.* The whole of thie part of Londou is ohanging rapidly and inevitahly, and might jnst as well be ohanged on a scbeme as allowed to grow up by accident. As to this particular part of the suggeation, we may merely add that by a little give and take of levels it would be possible to arrange a bridge so as not to interfere with the walks along the park at all; the upper walk by the Mall would cross on the carriage-way level, and the lower one by the water would be taken under the carriage-way just as it is under the bridge over the Serpentine between Hyde Park and Kensington Gardens; tbe carriage-way would have to rise a little to the bridge in order to give tbe neceseary beight, and that is all. The bridge, if properly treated, might be made a real ornament to the park, muoh more so tban the preeent suspeneion bridge, which, moreover, interferes with the rowing in summer and the ekating in winter very materially, while our proposed higher bridge would leave the water-way quite nuobstructed.

Having skirmiehed about the parke, the committee were brought againu into a lengthy statement of grievances hy the vote of 35,000*l.* for the Houses of Parliament. In wbat this sum is expended or to be expended we do not precicely understand; but it raised a cloud of complaints at once. The Reporters' Gallery wae absurdly too small; the Ladies' Gallery (an old bone of contention) was contemptible. Mr. Sullivan often took foreign ladies to the gallery, and wished the other members could see how American ladies turned up their noses,—"always pretty ones,"—at the accommodation provided for them. He concluded with a recommendation that during the recess members should take into consideration the possibility of providing a new House worthy of the country; so tbere is a holiday taek for honourable members in tbe intervals of grouse-ehooting. This proposal, bowever, seemed to excite considerable alarm, and the probable expense was dwelt upon hy some membere, while Mr. Peddie (wbo is, we believe, the only architect in the House) made some practical remarks apparently in reference to the canses of complaint in the present House (not reported), and hoped that in any new House that might be built membere would be so seated that they might all face the speaker and the greater part of the assembly. A great difficulty, of course, is tbat while larger accommodation for strangers, ladies, and the press is called for, the Honee could not be much enlarged without making it inconvenient and harassing to speakers. Indeed, even as it is, speakere with weak voices or any want of clearness of epeech are beard with difficulty. However, we do not apprehend that a new House of Commons will be construoted jnst at preeent. One member, it may be observed, seemed to think an attack was being made on the architecture of the Houses of Parliament, and defended it as "one of the finest specimens of Gothic architecture in the world," only complaining that the smoking-room was very uncomfortable; a charge which seemed to excite a great deal of sympathy. Lord R. Churchill reminded the House that at the time when the building was erected smoking wae considered as a vice; hut now he anticipated (and no doubt correctly) that any attempt to improve the smoking-room would meet with support on all sides quite independently of party ties. Probably it would; hut surely tbere should be a separate smoking-room for eaoh party in the House? How are two Government membere to unburden their minds over a cigar when two Opposition spiee are seated close to them? One might as well bring membors of the Reform into the St. Stephene', or membors of the Conecrvative into the Devonshire. The widening of Parliament-street wae bronght into the discussion; hut that, ae was pointed out, was a matter to be considered in connexion with the large scheme for concentrated Government officee.

Another eubject which followed elicited a very general consenens of opinion, in whioh we entirely concur, as to the great delay in the completion of the Ordnance Survey. This has been dragging on interminably, and unless it ie completed soon, it will he nearly time to begin another to take in new changes. The work ie, it appears, a matter of contract, and any material hastening of it must be at the cost of increased expenditure, if the work is to be thoroughly done. Of conree this latter conclusion is a *sine quâ non*; a hastily-finished survey would be sure to contain many inaccuracies, and would be neeless because unreliable at any point. But it seems a matter in which some increased expenditure in procuring an expeditious completion would be very wisely incurred, and for a purpose highly advantageous to the public.

It is to be regretted tbat the subjects which were diecneeed on the occasion alluded to do not eeem to interest many of our legielatore, for it appears that matters were in a position for a count-out at one moment of the diecuesion. But it must be admitted that those members who take part in diecussing this olass of subjects show some desire to make up for the pancity of numbers by the decided character of their opinione and expreseions.

* See *Builder*, September 21, 1878.

A STEP TOWARDS OPENING THE BRITISH MUSEUM ON SUNDAYS.

ON Saturday afternoon, July 10th, a deputation from the Sunday Society had an interview with the Trustees of the British Museum at that institution. The deputation was headed by the Earl of Dunraven, and wae so numerous that many were unable to get beyond the entrance to the Council Chamber, where the interview took place. The trustees present were Earl Sydney, the Duke of Somerset, Viscount Sherbrooke, Right Hon. Spencer H. Walpole, M.P., Sir Henry C. Rawlinson, K.C.B., Mr. W. Spottiswoode, Pres. Royal Society, the Rev. F. Hanbury Annesley, Lord O'Hagan, and Mr. F. Winne Knight, M.P. Among the deputation were Lord Dorchester, Thos. Burt, M.P., Sir Arthur Hobhouse, K.C.S.I., Sir Charles Palmer, bart., Sir Edward Sullivan, Major Thos. Gaisford, Major R. R. Noel, Professor W. H. Flower, F.R.S., Professor Corfield, M.D., Professor Plumptre, Mr. George Godwin, F.R.S., Mr. George Romanes, F.R.S., Mr. F. J. Boruwell, M.A., Mr. Arthur Catee, F.R.I.B.A., Mr. Thos. Taylor, J.P. (Oxford), Mr. Lewin, Mr. Hodgson Pratt, Mr. Mark H. Judge, M.R.S.L., Mr. W. Cave Thomas, F.S.S., Mr. James Hopgood, J.P., Rev. J. Panton Ham, Rev. Chas. Voysey, and Mr. Herbert B. M. Praed. Also Miss Jane E. Cobden (daughter of Richard Cobden), Miss Richardson, M.L.S.B., Miss Edith Simcox, M.L.S.B., Miee Anna Swanwick, and Miee E. Orme.

In introducing the deputation, Lord Dunraven eaid:—My lorde and gentlemen, as president of the Sunday Society the duty devolves on me of asking you to receive the deputation, who wieh you to permit them to present a memorial begging you to throw open thie museum on Sundays. The object of thie society ie to allow museums, art-galleries, libraries, and gardens to be opened on Sundays, and we think that if our object could he fully attained it would confer great benefit on society at large, and particularly on those who, on accouut of their ordinary work, are unable to visit places of the kind except on Sunday. We think it would be beneficial to theee people on moral, eocial, and religious grounds, and we think it would he far better they ehould spend their Sunday in that way rather than in absolute idleness. We think it better also on grounds arrived at from experience, becauee, ae you are aware, there are many museums, libraries, &c., open on Sundays, in various towns in the provinces and in the suburbe and neighbourbood of London; and these are visited hy many thousands of people. No complainte have arisen, no scandals have arisen, and the opposition that there was previous to the Sunday opening bas entirely disappeared, owing to the good results which have been seen. In seeking amusement in such places as the British Museum, it is impossible, at the same time, not to derive instruotion, and it seems to me that the present year would he very euitable for a first opening of this museum on Sundays. This year is the centenary of the institution of Sunday Sohools, whicb have been of such great benefit to children, and I think this would he a peculiarly good opportunity of giving the same advantages to grown-up children. We attach particular importance to the Britieh Museum, becanse we think there is a certain amount of hardship in the fact tbat many of ue cannot visit thie building on week-days, and are thue unable to enjoy an institution whioh belongs to the nation. If it could be opened even as an experiment it would be of great value, as it would enable the trustees to judge of the way in wbioh it would work. If it should be a question of estimatee which stood at all in the way, it might be possible to open the Museum for a few consecutive Sundaye, closing it on one day in the week in order to see whether a plan of that kind would succeed. With these few remarke, I will ask you to allow Mr. Judge, the honorary secretary, to read the memorial; and I will ask you, then, to bear a word or two in its support from Sir Arthur Hobhouse, Professor Flower, and Mr. Geo. Godwin.

Mr. Mark H. Judge then read the memorial as follows:—

"*To the Right Honourable and Honourable the Trustees of the British Museum.*

The memorial of the President and other officers of the Sunday Society

Sheweth:—That your memorialists consider that the acknowledged succes which has attended the Sunday opening of various museums, art galleries, libraries, and gardens, both under Imperial and under municipal regulations, and the absence of the slightest agitation to again close them on Sundays, fully justifies your memorialists in asking you to exercise your prerogative in the interest of a large section of society, and open the British Museum on Sundays.

The succes referred to has recently led statesmen to declare it to ha their conviction that before long the object of the Sunday Society will he attained, and your memorialists anticipate that the Legislature will at an early data see its way to open the whole of the national museums and art-galleries on Sundays.

Your memorialists, however, cannot bnt recognise the difficulties which stand in the way of this important matter being properly dealt with during the present brief session, either in Parliament or by the Government; and pending the further action of the Legislature, are of opinion that it would be a graceful act were you to at once open the British Museum on Sundays, and an act that would be highly appreciated hy all classes of the community.

On behalf, therefore, of tna fifth public annual meeting of the Sunday Society, hald at the Freemasons' Hall on the 29th of May, 1880, your memorialists respectfully ask you to open the British Museum on Sundays for the convenience of the public during such hours and under such regulations as you may deem necessary.

DUNRAVEN, President.
W. H. CORFIELD, Chairman of Committee.
FREDERICK LONG, Treasurer.
Mark H. JUDGE, Honorary Secretary.

July 10th, 1880."

Lord Dnnraven, having formally presented tbe memorial to the trustees,

Sir Arthur Hobhouse said,—The matter is not

one that concerns the working-classes alone, but other classes, which, if not very large, are still worthy of consideration. For the sake of these the museums should be opened on Sundays, unless there is some official or substantial reason to prevent it. If there is such a reason it is not known to me, and in any case there should be a way to overcome it. I believe that you will confer a great boon upon a great body of persons by acceding to the request of the memorial.

Professor Flower said,—One of the principal arguments that have been used against us is that if museums were opened it would tend to further what is called the desecration of Sunday. I have no such fear myself, and I value our English Sunday as much as any member of the community. It is one of the objects of this society to preserve the English Sunday by having a portion of it set apart for recreation of this kind. I myself enjoy part of the Sunday afternoon at the Zoological Gardens, and if I have been at church in the morning it is perhaps all the better. I do not see why other people should not be able to do the same thing.

Mr. George Godwin said,—I have a strong impression that no amount of mere speech-making will alter the opinions already formed by the trustees, and will therefore confine myself to a piece of evidence, with the preliminary observation that the trustees will probably attach importance to the fact that this deputation, numbering more than a hundred persons who may be considered to a certain extent representative, has been gathered together in forty-eight hours, showing the strong interest felt in the subject by many. The first thing, then, I will say is this, in answer to some who urge that if the Museum were opened as desired the working men and women of London would not take advantage of it. It happens to me that for many years I have been in communication with large numbers of the working-classes throughout the kingdom, and I can assert from my own personal knowledge that they do greatly desire, especially the younger and rising men, the opportunity of visiting museums and galleries on their leisure day. Further I can say, as a member of the Council of the Royal Albert Hall, that the free Sunday organ recitals there, consisting of music of the highest possible character, have been attended Sunday after Sunday by constantly increasing audiences numbering on each occasion from 4,000 to 5,000 persons, thus giving elevating enjoyment to large numbers of persons. It has afforded those who think with me great satisfaction to learn that the leading officials of this institution are favourable on their own part to it being opened on Sunday, and I do hope you will grant our request, if only by giving one Sunday this season. It will only be ante-dating the matter, because that this advantage will be afforded sooner or later everybody is satisfied.

Earl Sydney, in replying to the deputation on behalf of the trustees, said:—Lord Dunraven, Ladies, and Gentlemen,—The trustees of the Museum do not give any opinion upon the great Sunday question, nor do they bring forward their own individual opinions upon the merits of opening the Museum as requested on Sundays. I have only to say to you on their part that it is impossible to open this Museum without communicating with the Treasury with regard to the expense of it.

Lord Dunraven said,—Perhaps you will, before we retire, allow me to give you a list of the names of those who are present; you will also, I hope, allow me, on the part of the Society, to thank you for receiving the deputation and accepting the memorial. We hope that before long steps will be taken to put an end to the difficulty which you mention as standing in the way of our wishes being acceded to.

The deputation then withdrew.

Among those who wrote expressing their great regret at being unable to accompany the deputation were the Duke of Westminster, Viscount Powerscourt, Lord Truro, Mr. P. A. Taylor, M.P., Hon. J. C. Dundas, M.P., Mr. Alex. Macdonald, M.P., the Dean of Westminster, Canon Shuttleworth, Rev. A. H. Mackonochie, Sir Henry Thompson, Sir Julius Benedict, Professor Williamson, F.R.S., Professor Max Müller, James Heywood, F.R.S., Mr. Moncure D. Conway, M.A., and Professor Huxley, F.R.S.

Scarborough Spa.—The new Spa buildings at Scarborough will be opened on Monday, the 2nd of August.

PARLIAMENTARY JOTTINGS.

The Westminster Clock.—In the House of Commons, on the 8th inst., Mr. Adam (in answer to Mr. Forester) said,—The cost of executing the necessary repairs, painting and regilding the west face of the clock, the ironwork surrounding it, repairing the hands of the clock, the metal framework, and the opal glass, has been about 240*l.* These repairs are of a dangerous nature, and can only be undertaken during the summer months. A special scaffolding had to be designed and completed, and I cannot say that, considering the difficulty of the work, it has taken an unreasonable time to complete.

Cemeteries at Wandsworth.—Sir H. Peek asked the Secretary of State for the Home Department whether he was aware that the proposal of the Battersea Burial Board to purchase nearly 40 acres of land near Wandsworth Common, in the parish of Wandsworth, had caused great consternation among the ratepayers, inasmuch as there were already seven cemeteries in or close to Wandsworth, and one on the borders of that parish for Battersea; that the establishment of another cemetery for a thickly-populated parish would not only be prejudicial to a large amount of rateable property, but also in contravention to the intention of the Burial Acts; whether he had been informed that the matter was strongly opposed by the ratepayers of Battersea on account of the large price to be paid for the land; if it were known that the land in question had a subsoil of clay; and if he would be so good as to cause immediate and full inquiries to be made into the subject.—Sir W. Harcourt replied that, in consequence of the report on the subject which had been made to him, the site for the cemetery in question would not be approved.

The Royal Academy.—On the 9th inst., Mr. Thompson asked the First Lord of the Treasury if the Government would use its influence with the President of the Royal Academy to open its exhibition free of charge on Monday, the 2nd of August, being Bank Holiday. In reply, Mr. Gladstone said it was not usual for the Government to interfere in any manner in the administration of the details of the Royal Academy. At the same time, he had every reason to believe in the disposition of the President and the Council of the Royal Academy to give accommodation to the public and to entertain any reasonable proposal; and without giving an opinion,—which would not be in accordance with his duty,—on this proposal, he would recommend that the gentlemen interested in it should seek an opportunity of meeting, on public grounds, the President of the Council. He had no doubt any representations made would be kindly and respectfully and carefully entertained.

Public Offices.—In the House of Lords, on the same evening, Lord Lamington asked Her Majesty's Government whether during the recess they would consider the report of the House of Commons Select Committee of 1877 on Public Offices, with the view of the improvement of the public offices, inasmuch as the committee were all but unanimous in insisting on the necessity of immediate action, not only on economical considerations, but for the efficiency and comfort of the public departments. The committee reported three years ago, but nothing had yet been done. Their public offices were most inconveniently scattered about the metropolis. Sixty or seventy different houses or apartments in different houses, all separate from each other, constituted the War Department, and the mere hire of such imperfect accommodation cost about 60,000*l.* or 70,000*l.* a year. Such a sum as that would go far towards repaying the outlay of a million and a half which the erection of adequate buildings would entail. Lord Sudely, on behalf of the Government, said the subject was one which would not be lost sight of when the funds of the country would enable the Government to consider the question. In the course of the discussion which followed, Viscount Cranbrook said he thought there was some exaggeration in the statements about the ill-health of the persons employed in the War Office. The condition of that office was not much worse than that of some of the new offices. In the India Office there were places lighted up in the daytime with gas, and papers were read by the aid of a sunlight in the centre of a room on a day in June when the sun was at its height. If offices were to be built on that principle, it would be better to put up with bad offices.—The Earl of Redesdale trusted that the Government would, without delay, acquire the freehold of the land lying between Parliament-street and Great George-street, not necessarily with a view to immediately building upon it, but to obtain possession of it while yet it might be purchased at a moderate price.

The Tay Bridge.—In the House of Commons, on the 8th inst., on the second reading being moved of the Bill of the North British Railway Company for the rebuilding of the Tay Bridge, Mr. Anderson opposed it, and, adverting to the condemnation passed on Sir T. Bouch in Mr. Rothery's report, strongly objected to that gentleman being employed in the reconstruction of the bridge. Mr. Chamberlain, in the course of his reply, said that Sir T. Bouch would have nothing to do with the plans, and explained that he proposed to refer the Bill to a hybrid committee, with instructions which would widen the scope of the ordinary inquiry. After some further conversation, the Bill was read a second time and ordered to be referred to a hybrid committee, with power to inquire into the best position for the bridge, the protection of the navigation, the best mode of securing its permanent safety, &c.——On the 12th inst., Sir A. Gordon asked whether the position and the construction of the piers of the bridge and the width and the height of the spans, as they were altered from the deposited plans approved by Parliament, were such as were prescribed by the Board of Trade, and whether a copy of the document giving its sanction could be laid on the table. Mr. Chamberlain.—The bridge over the River Tay, as originally designed, had spans of 200 ft. of clear water space over that part of it which fell, and 100 ft. headway. As prescribed by the Board of Trade, the spans were still to have been of 200 ft., but the headway was reduced to 88 ft. But, as actually constructed, there were eleven openings of 245 ft. span and two openings of 227 ft. span, with 88 ft. headway. Therefore, the position and construction of the piers of the bridge, and the width of the span for openings between the piers were not such as were prescribed by the Board of Trade according to the provisions of the 6th clause of the Act 33 & 34 Vic., chap. 135, which authorised the construction of the bridge. The company did not inform the Board of Trade of the alteration which they had made, and the Board of Trade were not aware of it until some time after it had been effected. The width of the spans was settled by the Board of Trade merely with regard to the interests of navigation of the river; and as the increase was an improvement, the Board of Trade saw no reason to object to the alteration. The sanction of the Board of Trade to the alteration authorised by the Act was given on the usual printed form, and was accompanied by a signed plan. The plan is of great size and length, and I hardly think it would be worth while printing it, but if the hon. baronet wishes to inspect the documents, I shall be most happy to show them to him at the Board of Trade. Sir G. Campbell asked what course the Government proposed to adopt in consequence of the report of the Wreck Commissioner regarding the fall of the Tay Bridge. Mr. Chamberlain.—As soon as I received the reports of the Courts of Inquiry with regard to the Tay Bridge, I directed a circular letter to be sent to all the railway companies, enclosing a copy of the reports, and calling their attention to the grave responsibilities which they incurred with regard to all structures of a similar nature on their lines of railway. That circular I will lay upon the table of the House. I also desired a copy of the reports to be sent to Major-General Hutchinson, and called upon him for an explanation with regard to the remarks contained therein as to his original inspection of the bridge. General Hutchinson's memorandum I will also lay upon the table. It is also my intention to appoint a committee to consider what rules it may be desirable to make with regard to wind-pressure upon railway structures, as suggested in the report of the court of inquiry.

The Canal Boats Act.—On the 12th inst. Mr. J. Cowen asked the President of the Local Government Board whether it was the intention of the Government to take any steps towards the better enforcement of the Canal Boats Act of 1877, so far as it related to the overcrowding in the cabins and the education of the canal-boat children; and whether the Government intended taking any steps for bringing temporary abodes, such as gipsy tents, vans, shows, and like places, under the influence of the sanitary officers, and the children dwelling in

those places under the power of the Education Acts, in extension of the provisions of the Canal Boats Act of 1877. Mr. Dodson.—The Local Government Board have made regulations for preventing overcrowding on these boats, and it rests with the local authorities to see that these regulations are observed, and also the provisions of the Act with regard to the education of the children. The Board have no power to compel the local authorities to enforce the Act, and as they are not aware that any further compulsory power is required for that purpose, the Government themselves have no intention at present of proposing further legislation on the subject. There is considerable difficulty in dealing with gipsies' tents, &c., but the matter has been brought under the notice of the Board, who will endeavour to deal with it when a suitable opportunity presents itself for that purpose.

The Census Bill.—On the 12th inst. Lord Enfield laid upon the table of the House of Lords a Bill to provide for the decennial Census of 1881. He explained that its provisions were almost identical with those of the Act which provided for the Census of 1871, with the exception that the Local Government Board was constituted the central authority, instead of the Secretary of State for the Home Department. This was necessary in consequence of the passing of the Local Government Board Act in 1871, which, in conformity with the recommendations of the Royal Sanitary Commission, transferred to the Local Government Board such jurisdiction as the Home Office previously possessed over the Registrar-General's Department. The Local Government Board would therefore superintend the taking of the new Census, and approve all the forms and instructions to be issued for that purpose. The work, however, would, as on former occasions, be done in the Registrar-General's Department. The persons employed outside that department would be the various superintendent registrars, the local registrars, and the several enumerators to be appointed by them, and the overseers of parishes, constables, and relieving officers would be bound to act as enumerators. The Census would be taken on the night of Sunday, the 3rd of April, 1881. Clause 4 of the Bill provided for the particulars to be returned by each householder, and they were classed under the following eight heads:—1, name; 2, sex; 3, age; 4, rank, profession, or occupation; 5, condition as to marriage; 6, relation to head of family; 7, where born; 8, whether blind, deaf or dumb, imbecile, idiot, or lunatic. On Monday, the 4th of April, the returns would be collected by the enumerators, and corrected when erroneous. The enumerators would take the account of the occupied and unoccupied houses, and houses then building, and distinguish the boundaries of parishes and boroughs. They would deliver their books, with the householders' schedules, to the registrars, who would verify the same and hand them to the superintendent registrars. These would examine the books and return them to the Registrar-General, who would cause the returns to be abstracted, and a preliminary report would be laid before Parliament before the 1st of June in the following year. The Census in detail would be completed as soon as practicable after wards. ——Earl Fortescue regretted to find that no provision was made for the completion of the Census in less than two years and eleven months. He suggested that a large local staff should be employed, so as to finish the work within something like three months. The cost in the end would not be greater, and it was important to have the information as nearly as possible up to date. The Bill was read a first time.

TWO EXHIBITIONS WORTH SEEING.

A FORTNIGHT ago we briefly chronicled the opening of an "Industrial and Fine Art Exhibition" in the large hall of the Bow and Bromley Institute, over the Bow Station of the North London Railway. The best things among the workmen's exhibits are by those who show specimens of their own handicraft. Among the most notable exhibits in Class II., "Artistic work in terra cotta, stone," &c., are some small figures, a carved panel, and a portion of ceiling decoration, exhibited by W. Allan, carver, Lambeth (No. 106 in catalogue); plaster bas-reliefs (No. 110), modelled by C. Bursill, stone-carver, Westminster Bridge-road; and two vases and two salad-bowls (113), exhibited by Edward Dann, draughtsman and designer to Messrs. Stiff & Sons, of Lambeth;—these four articles are in stoneware, and in general design and treatment resemble the now well-known Doulton ware, though they hardly attain its excellence. Mr. H. Gunthorp, stone-carver, Herne-hill, exhibits (117) specimens of his skill in modelling in the shape of a figure from the antique, and a small medallion. Mr. J. Gwillim, smith, Stamford-street, exhibits (118) a wrought-iron ornamental bracket and a *repoussé* medallion of Garibaldi, in copper. A well-executed silver dish in *repoussé* work (124), exhibited by W. Middleton, embosser, Liverpool-road, Islington, is labelled as purchased by Mr. Hubert Herkomer, A.R.A., one of the judges in the Artistic section. The exhibition contains some good mechanical models and other work by engineers, also several large models of steamships built for the navy and mercantile marine by Messrs. Samuda Brothers and other well-known firms, by whom the models have been lent. There is also some excellent coopers' work, the Coopers' Company having offered a special prize to workmen in this trade. Mr. Wilberforce Bryant lends a collection of Japanese curiosities and manufactures; Messrs. Doulton & Co. send a good representative collection of their artistic Doulton ware and Lambeth faïence; Messrs. Powell, of Whitefriars, have an excellent display of glass; and Messrs. Josiah Wedgwood & Sons are represented by a case of ornamental Wedgwood ware. The exhibition, like all its congeners, contains the usual heterogeneous collection of articles produced, with infinite pains and labour, by people who are evidently quite unaware of their lack of aptitude for the particular work which they impose upon themselves in their leisure hours. To cite only one instance. The exhibit marked No. 135 in the catalogue is described as an open-work vase, cut in Caen stone, and is the work of Mr. A. Tilley, painter, plumber, &c., Rotherhithe. The exhibitor may be an excellent workman in his own particular trade, but in laboriously producing this vase he has shown himself to be quite unable to appreciate the nature of such a material as Caen stone, for in it he has, with an amount of patience and perseverance which could have been far more usefully applied in other directions, produced a perforated vase of delicate fret-work, from his own design,—a design utterly unsuited to the material in which it has been executed. The difficulties which the producer had to contend with are testified to by the numerous joints to be seen in the work where breakages have occurred. The hall in which the exhibition is held is admirably adapted to the purpose, and the general effect is greatly enhanced by the stained-glass windows exhibited by Mr. Thomas Cox, of Southampton-row, Russell-square, who also displays on the staircase a number of cartoons and drawings for stained glass and church decorations generally. In the hall the same exhibitor has a good show of painted tiles and other ceramics. In this brief glance at the exhibition (which will remain open until the end of the present month, and perhaps longer) we have said enough to show that it is well worth a visit.

The Printing, Stationery, Paper-making, and Kindred Trades Exhibition and Market, at the Agricultural Hall, is eminently deserving of a visit from all who take any interest in the production of books and newspapers. Machinery of the most varied character is to be seen in motion, and appliances and materials of all kinds used by printers, bookbinders, lithographers, and engravers, are fully represented. Among the motors now largely used by printers, as well as by other users of power, we noticed, during a hurried survey of the exhibition, the well-tried "Otto" silent gas engine, and Bailey's hot-air engine, some particulars of which we lately published. The catalogue, sold for sixpence, is well arranged, and as it contains well-written articles on "The Origin and Progress of Printing," by John Southward, and on "Paper and Stationery," by W. F. Catcheside,—each containing a fund of information,—it is worth preserving. An interesting set of *fac-similes* reprints is exhibited by Mr. Elliot Stock, as specimens of the reproduction of ancient books by modern appliances. They are to be found among the cases of exhibits sent by Messrs. Field and Tuer. The exhibition, which appears to have been a great success, closes this Saturday, the 17th. All who can manage to visit it in the short interval that remains will find themselves well repaid for their trouble.

AS TO THE SANITARY INSPECTION OF DWELLINGS.

IN the course of the recent Conference at the Society of Arts on the progress of public health, Mr. Cresswell opened a discussion on the following resolution, under the head Sanitary Inspection and Classification of Dwellings:—"That it is expedient that the Metropolitan Board of Works within the metropolis, and the County Board within each county, should be empowered by the Legislature to make provision for the inspection and sanitary classification of dwellings, upon application being made by the owners thereof; and to grant certificates of healthworthiness in different categories, for terms of years, according to the perfection of sanitary equipment and fitness for habitation of such dwellings; and to determine the scale of fees to be paid for such inspection during construction and repair, and also upon delivery to the applicant of the certificate of classification awarded to such dwelling."

After urging the necessity of such a measure, Mr. Cresswell said, in conclusion,—They would see the importance of handing over these duties to such public body or bodies as would command undivided confidence; that there should be no possibility of collusion between builder or contractor, engineer or sanitary expert, employed by the association or public body; that there should be no doubt whatever that the same repute should attach to the certificate issued from this public body as attached to a certificate of Lloyd's; and he could not put the case stronger than that; for, at that moment, the well-known "Lloyd's Register," bound in blue and gold, bearing the certificate of their secretary, was accepted throughout the whole civilised world as an indisputable evidence of the truth of that which it contained. Some of them might live to see,—they, no doubt, all hoped to live to see,—the time when there should be such a book in the hands of every municipal authority throughout England,—in the register or in the archives of every local sanitary authority in the kingdom; and, above all, in the archives or secretariat of the metropolitan authority,—whatever it might be in the future,—which was destined to govern this great City. If that were so, they would have palpable and tangible evidence of the fact, the means of ascertaining whether the houses in which they had to dwell were fit for human habitation. In the case of the metropolis, whatever the metropolitan authority might be, it should be charged with this most important function; and as they all hoped to see within a few months' time the institution of County Boards throughout the kingdom, no better authorities could be found,—as they were above suspicion,—to perform a similar function in the counties. That was, in fact, the substance of the proposition he had now the honour to lay before the Conference. He submitted with confidence that it was at least worthy of the society under whose hospitable roof they were, and worthy of their attentive consideration.

A long discussion followed, and we give the opinions expressed by some of the speakers.

Dr. Wright said, as representing a town peculiar in its character, namely, Cheltenham, to which a great number of particularly timid and nervous people came to take up their abode for the purposes of health, it was astonishing how nervous these people were on this particular question of the condition of house property. He had letters, some even from India, making inquiries about certain places. Of course, as an officer of health, he could not interfere with the rights of private property. He could not say all he knew about houses; but he gave those individuals references to a sanitary engineer, to whom they could apply, and who would make an inspection of the houses. That had been going on for some time, and, of course, sometimes the reports were unfavourable, and there was a threatened action for damages against the man who had spoken the truth. But altogether it appeared to him that what Mr. Cresswell had so well put before the Conference was neither more nor less than the outcome of what had been going on of late years with reference to sanitary progress. They had awakened the attention of the public mind, by trying to teach them the alphabet of sanitary science, and they were now beginning to spell out the words for themselves. Now came home to every one the important question,—Is the house I am about to take healthy or otherwise? But when the inquiry was made, there was great difficulty

arriving at a conclusion. Very often the most intelligent persons had suggested the want of the very resolution which Mr. Cresswell had so ably introduced, and which he should be very glad to propose he adopted by the Conference.

Dr. Tripe pointed out the difference between ships and houses, especially as regards the sanitary condition and fitness for habitation of such dwellings, which were so great that, to certify for a term of years that the house would be fit for occupation was certainly ill-advised. If the words "for a term of years" were omitted, he should have comparatively little objection to it. Those who knew much of sanitary work were aware that the leaden pipes leading from the water-closets got eaten through; holes were made in them, and it could not be told from the quality of the lead how long they would last. They did not know the reason why certain pipes should be eaten away, and others remain whole. It was, therefore, impossible to give a certificate to the effect that the house would be in good condition for a certain number of years. As to a house being put in the first, second, or third classes, and certified accordingly, he could understand that. He had seen a great deal of building, and gave evidence before the House of Commons on bad building. He had analysed a large number of samples of mortar used, and had found mortar, even recently, made with only 10 per cent. of lime, the greater part of the rest being,—he would not say rubbish,—after Mr. Cresswell's definition of the word,—but garden mould, or something no better, and the consequence was the houses fell down. The inspection of these things was entrusted to officials appointed by the Metropolitan Board of Works, and it was now proposed to appoint others. Were they to have one set of men appointed by the same authority to supervise the others? He could not agree to that; you must find some other body. The surveyors appointed by the vestries had to superintend the drains, and the district surveyors appointed by the Metropolitan Board of Works had to do with the walls, the damp-proof course, the foundations, the roof, and other things of that kind. The water-closet arrangements, and all works connected with drainage, are, in the metropolis, under the control of the vestries and district boards. It was said that no vestry or district board had any regulations, but he would hand in some, framed by the Hackney Board, showing that one board, at any rate, had regulations concerning matters of drainage. There was plenty of power, in fact, both as regards district surveyors and surveyors to local boards, to prevent bad work. They could require anything reasonable to be done, as the bye-laws of the Metropolitan Board were extremely full if they were properly carried out. For what reason should there be any addition to these, or why should a person have, perhaps, to pay again the officer who was already paid, to see that things were properly done at first? As he had already said, he had analysed mortar containing only 10 per cent. of lime, which, when put into the crucible, turned red from the quantity of clay it contained. That was not in accordance with the bye-laws of the Metropolitan Board. He had ascertained the quantity of organic matter in it, and, when mortar was made containing organic matter, it gave off a smell sometimes for six months. That caused a gradual crumbling; so that, although apparently good and setting well, it would by keeping, even in a dry room, in the course of time become perfectly rotten. This kind of mortar is used to a considerable extent by "Jerry" builders. He quite agreed it was most important that persons wanting good dwellings should be able to know where to get them; but here was the difficulty, that persons must be engaged *ab initio*, or they could not tell what was underneath the house, and whether the drains were put in in concrete or not. In Hackney, every drain going under a house within 3 ft. of the floor was to be in concrete, and every drain was supposed to be examined, two men being appointed for the purpose; but, of course, he did not know that they did so, as they were not under his control. He believed that every house, so far as the drainage was concerned, was examined; but he could not say what was done with the walls and foundations, and everything of that kind. These you could see afterwards, but as for the drainage, and what was buried under the ground, you could not see without considerable cost and trouble. Therefore, in order to carry out this proposal, there might be something done by calling the attention of Vestries and Boards to the fact that they had full power to make bye-laws,—which very few had done,—and to insist that they were carried out; that no drain should be covered over without the surveyor or his representative seeing every portion of them, and that every drain under a house was laid in concrete.

Lord Alfred Churchill said the condition of people's dwellings really lay at the root of the question of public health. He should be glad himself, as soon as such a thing became law, to have his house inspected, and to get a certificate upon it. Four or five years ago he had the drains put in order, and should have been glad then to have got a certificate that they were so. Whilst the work was in progress he casually met the inspector of the district, who told him he had watched the laying of the drains, and he said he was very glad they made such a rule that the drains were not to be closed in until they had been inspected. The inspector said, although they did in this case, they were not in the habit of doing it to everybody. Now, he thought it was absolutely necessary that it should be done in the case of every house. He thought the health-worthiness of a house depended almost entirely on the system of drainage, and the certificate should be that the house was examined at such a date, the drains were laid according to the most scientific methods known at the date, and calculated to last such a time; not giving any certificate of health-worthiness, because that was the natural result of good drainage. He would suggest that the certificate should be in the form that the drains themselves were constructed in a proper manner, and were calculated to last so many years. He thought there should be attached to each certificate a complete drawing of the way in which the drains were constructed, in the same way as an outline of the property was generally shown on the deed of conveyance.

Mr. Collins asked if the army of inspectors necessary to carry out this suggested work of inspection had been considered. He had for many years taken a great interest in these questions, and was on many committees in the parish of Paddington, which is a very large and wealthy portion of the metropolis. As had before been mentioned, he considered the Metropolis Local Management Act gave all the power necessary to enable vestries to see all that Mr. Cresswell wished carried into effect; but, whenever you brought such matters forward a storm was at once raised as to the large amount of money it would cost, and the incubus it would be on the ratepayers in order to get such a system carried out. If it were self-supporting,—if the public were so alive to the question as was hinted,—there was nothing at all to prevent them obtaining, without the aid of the Society of Arts, without the assistance of Government, or any similar means, such certificates as were referred to. There were many gentlemen, eminent in their profession, quite capable of giving such a certificate. The truth was that, like most permissive legislation, it would be simply a dead letter if it were passed. There were very few people who, like Earl Spencer, could afford to go to the large expense which such a system demanded. He could only say, from his own experience as a sanitary architect and engineer, that he had always found that when mischief was discovered,—as during the prevalence of fever,—everybody was anxious to do all that was requisite with regard to sanitary improvement; but the moment the epidemic passed away, there was great apathy, and very little was carried out. This question was by no means new. At the meeting of the Social Science Association held at Brighton (to the Health Department of which he had the honour of being secretary) this subject was fully discussed, and the result of it was, a large number of circulars were sent round to the different seaports and towns, for the purpose of ascertaining how the authorities would fall in with views very similar to these. He believed 400 or 500 circulars were sent, and about twenty or thirty replies only were received, showing how great was the anxiety on the part of the public to carry out such a suggestion. In Edinburgh, Manchester, and Glasgow companies had been formed for the purpose of giving such certificates, but he did not think they had been in existence more than one or two years, and therefore it would be difficult to say practically how far they had succeeded; but he should like to know what dividends they were paying, and how far the sanitary rules laid down in this resolution were found beneficial. He thought it would have very little effect indeed. If a man really wanted his house put in proper order and condition, there was no difficulty in obtaining such a certificate; and if the Conference wanted to throw the onus on local authorities, he was perfectly certain they would not carry it out, even if it were paid for. He should like to say a word in defence of his own profession, as a district surveyor for an important part of the City of London. The Act of Parliament gave no option to the district surveyor (until very recently) to attend to sanitary regulations as connected with the building operations in the metropolis. His duties were to ascertain that the walls were built of sufficient thickness, and that certain precautions were taken with regard to accident by fire. Recently, and after an enormous amount of opposition, the Act having been passed two years, certain bye-laws had come into operation which were very simple indeed, and which, by and by, people would be astonished to find had taken so lengthened a period to adopt; but these simply provided that there should be damp-proof courses and proper foundations to the houses; and therein all the sanitary bye-laws of the Board of Works began and ended. A great many more were prepared, but there were so many objections raised, and selfish interests alarmed, that the whole thing threatened to collapse, and they only succeeded in carrying what he had referred to. They did get, it was true, a definition of mortar, but it still only remained a definition, as far as his experience went. There was the greatest possible difficulty in obtaining these "Jerry" builders to perform their work properly. Even if this duty of giving certificates were placed in the hands of inspectors of health, or vestries, or local boards, from his knowledge of the subject, he thought there would always be a certain amount of suspicion attaching to them. The only way of carrying these views into practical effect was to get the public mind sufficiently educated to the necessity of seeing that their houses were fit to live in, and not to die in; and then they would take proper means of availing themselves of such professional assistance as was open to them, in order to insure that their houses possessed those healthy conditions which they desired.

Mr. Wakefield was entirely in favour of this proposition. It had been in his mind many years, and there was no way of getting the public to adopt sanitary measures, except by making it a question of self-interest. You could not do it in any other way but by a system of certificate; but the question appeared to be surrounded by some difficulty. It would be almost too onerous a duty to impose upon local functionaries. The task would be so invidious if called upon to withhold a certificate, the withholding of which would be to inflict a serious injury on the proprietor, that there would be such an amount of pressure brought to bear on the officers as would be hardly fair to subject them to. He could not see his way out of it, except by having a special officer appointed by the Local Government Board in London, and even an officer of that kind ought to be bound down by the most stringent rules. It was not only the drains, but the walls that were of importance. It was impossible to have a good house if you had lath and plaster in it at all, and all the walls should be able to bear a certain amount of surface-pressure without yielding. If a system of that kind could be carried out, the value to the public in general would be incalculable. Take a case for instance; he knew a first-class school where the children of noblemen were being educated where typhoid fever broke out again and again. Nothing wrong could be discovered in the sewers; but on examining the walls it was found that forty papers had been pasted one upon the top of another, and, in fact, two large wagon-loads of old paper were taken away. Lodging-houses and hotels, again, of superior character, would be very glad to use this system as a means of attracting visitors.

Mr. Lovegrove thought it expedient, if practicable, to have certificates such as were referred to in this resolution, but the question was surrounded with difficulties. He had no faith whatever in any certificate, whether it had blue or red ribbon upon it, whether a gilt edge or not. What was wanted was more thorough supervision during the progress of the works, for there were miles of drains which appeared on the face of them perfectly sound, but which

possessed qualities of unsoundness which might prove, after ordinary inspection, a great injury to the inhabitants. They wanted, if they could, to get hold of the hand from which they could obtain sound workmanship, for we depend more on the hand that works than upon occasional overlooking. They wanted drains laid by educated workmen. In the Hackney district, the Local Board executed the work outside, from the sewer to the area, under contract, but from that point underneath the houses throughout to the back, the work was executed usually by the builders. Sometimes there were as many as five or six different workmen engaged on that section of the drain, and the time over which the work extended would be from one month to seven or eight. There we have one of the most serious difficulties in superintending the construction. In order to ensure perfect construction of the drain, the whole of the work, from the sewer to every inlet, should be executed by one, and a properly-constituted authority, and not left to the builders. He had on former occasions referred to the question of certified workmen, and he thought if they could have a class of workmen educated to do this particular work, it would be a step in the right direction. In the absence of that, he should suggest that the whole of the work should be executed by the local authorities at the cost of the owner, but he should object to the Metropolitan Board of Works being entrusted with the power of surveying the work done under the local authorities.

Captain Galton thought it would be very undesirable to pass any resolution which would not be of a practical nature. Although he entirely sympathised with Mr. Cresswell as to the desirability of adopting some means for securing that houses should be constructed in a manner which should insure their healthiness, he had very grave doubt as to how far this mode of effecting that object was practicable. It went to the extent not merely of the drains, but of the whole sanitary character of the houses; it included the nature of the materials, the walls, the ventilation, and the mode of construction of the basement, the means of saying that the house was not being built upon a foundation which was in itself injurious to health, as the foundations of so many houses in London were. All these were points which, if you were to have a certificate of healthiness of the dwelling, must be examined into by the authority which was to deal with it. It seemed to him it would be far wiser to pass a resolution similar to what, no doubt, had been passed before, that all plans of drains, and the sanitary appliances of all dwellings, as well as all alterations in such matters, should be registered at the office of the district surveyor or vestry, and that any person wishing to take a house should be able to examine this plan. The fact was that the arguments which had been adduced on this subject pointed really to the necessity of an improved education of the whole nation in sanitary matters; it was that only which would insure a healthy construction of houses.

Mr. Rogers Field entirely concurred with Captain Galton. He though the resolution, as it stood, could not possibly work. It referred to certificates for old houses as well as new houses; but he was quite certain that certificates could not be given for old houses. The amount of investigation which would be required, if the certificate was to be worth anything, would be enormous, because, in an old house, you must examine everything, open everything, and search everything; if you did not, you would be certain to miss something which was very faulty. With new houses it was different, but then they came to what Dr. Richardson had said: you wanted, first of all, a standard to work by; and, at the present moment, they had not got that in the metropolis. You might go with a scheme of sanitary arrangements for a house, proposing what every man who had studied the subject would agree was the right system, but the vestry would very likely think differently. The question of cutting off the house from the sewer by a ventilated trap, or manhole, was most important from a sanitary point of view; but, when he proposed to do that, one of the West-end London vestries said "No," and raised all sorts of difficulties. Until this state of things was remedied with the vestries, it was impossible to go any further. If proper bye-laws for house drainage were introduced, you might have a certificate saying that the bye-laws were complied with; but, unless it were done in that way, you would get into difficulties.

The Chairman said he had made some verbal alterations in the resolution, which he thought would improve it, and it would now read as follows:—"That it is expedient that the local authorities should be empowered by the Legislature to make provision for the inspection of dwellings on a defined system, upon application being made by the owners thereof; and to grant certificates, according to the perfection of sanitary equipment and fitness for habitation of such dwellings, accompanied by plans of drains, closets, and gullies, &c.; and to determine the scale of fees to be paid for such inspection during construction and repair or otherwise, and also upon delivery to the applicant of the certificate awarded to such dwelling."

Mr. Smallpeice, C.E., said nothing had been observed as to the men who were to be appointed inspectors, and what qualifications they should possess for their office. The Public Health Act gave power to urban and rural sanitary authorities to make bye-laws containing every provision required in this proposition. It empowered them to appoint inspectors or surveyors to see that those laws and bye-laws were carried out, but there was no qualification required for those surveyors. He had a letter some time ago from Sir John Lambert, stating that there was no qualification required by the Local Government Board for a country surveyor, any more than the guardians might require. In London, every district surveyor had to undergo a special examination, and show that he was fitted, before he could obtain the office, but in the country any person who could get a majority of the guardians was appointed. Now, it was evident that a certificate would be valueless unless the surveyor had undergone some examination as to his qualification to perform his duties.

Mr. Pearce thought this resolution was not calculated to remedy the evils complained of, yet it was likely to be operative to a considerable extent in deterring builders from putting such bad workmanship and materials into houses as they had been in the habit of doing; therefore, apart from the benefit which would accrue to those who might be fortunate to live in a house certified to be healthy, its indirect influence would be very great in removing many of the evils from which they had at present suffered. Some houses which were condemned as being absolutely unhealthy had been constructed under inspection, both as to materials and workmanship employed; it should be made more of reality. He spoke on behalf of house-occupiers and owners, and thought it would be lamentable to have to leave this question until the public generally were educated in sanitary science. As a rule house-occupiers could not give much attention to this matter. Houses were largely built by speculative builders, who were merely anxious to get them up, certified to be habitable, and sell them, and the public looked to the authorities to protect them against these evils.

The Chairman said he was sometimes told by his friends that he had something of the judicial element in him, that he did not go to extremes; but, upon this subject, he went further than the resolution. He supported the resolution, because he agreed with Dr. Bond that it was a good tentative educational way of going to work. It pointed out the functions and duties of local sanitary authorities, and the obligation they had undertaken with regard to the ratepayers of the district who support them, and whose actions they, in some respects, controlled in the building of the houses. The local sanitary authority made bye-laws, and the duty imposed upon it,—as it assumed to itself the right of laying down rules as to the materials of which houses should be built, the method of construction, and so on,—placed it before the ratepayers as a body which existed, amongst other things, for the purpose of securing healthy dwellings, at any rate, in future. That was the duty imposed upon it, and the duty which it had taken upon itself to carry it out. Now, taking the question of draining, the local authority constructed a sewer, and told the house-owner to drain into it, and they had already arrived at the view that every local authority ought to have at least as much power as the Commissioners of Sewers had in the City of London, because if the local authority constructed the sewer, and told the owner to drain into it, it was on the ground that it had a right to compel the owner to dispose of the excreta of his house, and send them down the drain to be carried away, so as not to be a nuisance either to those in the house or in the neighbourhood. On the other hand, their obligation was not to send back sewer-gas into the house; but the local authority could not fulfil that implied contract unless it had control, first of all, over the junction of the drain with the sewer just outside the house; and, secondly, it could not fully fulfil that contract unless it had some knowledge and supervision over the drains and similar arrangements of the house. The same remarks applied to the supply of water and gas. In many towns these were supplied by local authorities, and where they were not, they were supplied by companies by virtue of law, but it was surely part of the duty of the local authority, or it should be, to see that water and gas were supplied under conditions which were consistent with the health of the population. Practically speaking, what a condition of utter helplessness were people in when taking a house! It was a matter of notoriety that a man might go and buy, or take for a long term of years, a house, and he had no guarantee that there was any connexion between the drain and the sewer at all; and, in many cases, even after the experience of illness and death in the house, he had at great expense to have the floor and basement of the house taken up, and then to have the road taken up to the sewer in the middle, and find there was positively no connexion at all between the house-drain and the sewer itself. That was too dangerous a state of things to be permitted, and it was part of the duty of the authority to prevent the possibility of such a fraud. If you had introduced in the house drains or water supply, or anything of the kind, as covered work, you were at the mercy of your tradesmen; you had no plans—you did not know anything about drains, the pipes all over the house were left out of view,—there were no means of knowing where they were, so that the householder, whatever his general education and intelligence, was helpless in the hands of the tradespeople who lived by this kind of work.

The resolution, as amended, was then put, and carried unanimously.

BRICK AND TILE MAKING AT PLUCKLEY.*

My object in the present paper is to describe more particularly the processes of manufacture as carried out by the Kent Brick, Tile, and Pottery Company upon their works at Pluckley Station. The clayfields now worked by this company were originally taken from Sir Edward C. Dering, bart., by Mr. William Tongue, builder and contractor, of Plumstead, who opened the works and put down a considerable portion of the present extensive plant. But no sooner had the qualities of this clay for the manufacture of superior bricks and tiles and pottery goods generally been properly tested and fully established, than the lessee applied for and obtained powers to form a limited liability company, to whom the lease of fifty years was eventually transferred. By this company the works have since been carried on under a board of directors, with Mr. Edwin Hughes, of Green's End, Woolwich, as chairman, and Mr. Talfourd Hughes as secretary. Machinery of the most modern and improved kind has been introduced; and the results have been in the highest degree satisfactory to the proprietor of the estate, the lessees of the works, and the shareholders of the company generally.

The machinery employed is driven by a steam-engine of 35 nominal horse-power, having a 3-ft. length of stroke, and a fly-wheel 14 ft. in diameter. The kilns at present in use consist of a "Hoffman," elliptical in form, and 200 ft. long by 100 ft. broad, having in all fourteen chambers, and capable of holding 400,000 bricks; the main shaft is 150 ft. high, 14 ft. in diameter at the base, and 7 ft. at the summit. This kiln is burnt entirely round in periods varying from four to five weeks, according to circumstances. There are also four Scotch kilns, taking 60,000 bricks each, which can be set, burnt, and emptied once in a fortnight; and four Staffordshire kilns for burning blue goods, which hold 30,000 each, and take rather a longer time to burn. The produce of these kilns is the celebrated "blue pavior" which is now being sent from Pluckley Station to all parts of the country.

The machine-house is fitted up with Murray's complete plant for permanent works, with a slight deviation in the mode of drawing the wagons of clay out of the pit, these coming up

* From a paper by Mr. Alfred J. Burrows in the *Journal of Forestry and Estates Management*.

full and returning empty in a continuous stream. Besides the winding gear for drawing up the clay in tip-wagons, this machine comprises ribbed and plain crushing-rollers, a mixing-pan, pug-mill, and compression rollers, which send out a continuous stream of clay on to the side delivery-table, which cuts ten bricks at one stroke, and is capable of turning out 25,000 per day. These are placed upon the back-harrows, and run off at once to the back-ground, which is fitted up according to Kemsley's patent, with corrugated iron roof and canvas curtains.

By the use of the patent continuous-delivery machines, fitted up with the lubricating solid die and patent cutting-table, a non-intermittent stream of clay can be worked, and an important saving both of power and manual labour be effected. These machines are so easily fitted up that they can be removed so as to follow the position of the clay, and they may also be obtained with an automatic cutting-table.

By means of an improved brick-cutting table, the clay issuing from the die of the machine is received on the left hand of the table, and when a sufficient length for from eight to twelve bricks has passed out, this is cut off, as it travels, by a single wire, and passed by hand behind the fixed cutting-wires. The lever on the right hand is next thrown over, and advances the thrust-plate, which places the block of clay parallel with the cutting wires, carrying it up to and through them on to a movable board, with which they are at once transferred to the barrow without being handled. The chief advantages thus obtained are that from 2,000 to 3,000 more bricks can be turned out in the day by this avoidance of stoppages and waste, and the bricks are very superior in quality, and mathematically accurate in shape, and the finish of the cut is perfectly clean, without the slightest tear or raggedness, so that the value of the bricks for finished work is thereby considerably enhanced.

All tiles are moulded plain, and in the case of hips, valley, and ridge tiles, the bend is given afterwards by placing them upon a horse of the proper shape. The corrugations of pantiles are imparted in a similar way. It is now customary to give each plain tile a couple of nibs for fixing it instead of perforating it and fixing with pegs as formerly. The nibs are put on by a separate operation in the press, but by the use of the patent pipe and tile machine of Mr. Murray, manufactured by Messrs. Thomas Middleton & Co., of Southwark, any kind of fancy tile can be completed in one operation. The smaller, or 2 in. drain-pipes can be turned out by it at the rate of 8,000 per day; and if fitted with the patent lubricating solid die, it will put out 10,000 bricks per day. It also makes the ordinary corrugated tile as well as the improved Bridgewater and Spanish tiles. One great advantage of the tile-making machine is the production of the continuous nib-tile by the use of a die. By the use of the lubricating solid die a perfect stream of clay with sharp arris is obtained both from mild and strong clays. This die can be adapted to brick-making machines of all kinds, either with or without the cutting-table.

The bricks and tiles intended for blue goods are manufactured from the upper and second beds of the clay, which are of a light fawn or yellowish colour. This is dug, watered, and weathered somewhat in the usual mode adopted in the manufacture of plastic clays, being wheeled into heaps and turned once or twice. From this is also made the wire-cut bricks and tiles of various kinds. Some of the layers contain a considerable amount of oxide of iron.

The pressing of chequered and other paving bricks, tiles, &c., and the manufacture of pottery-ware, is carried on in a spacious enclosed drying-shed, 168 ft. long by 104 ft. wide, the roof being boarded and tiled and properly ventilated, and supported by brick pillars. This shed is heated by underground flues, which convey through it the escape steam from the engine. In this shed is also to be seen a potter busily employed in turning out common flower-pots, chimney and sea-kale pots, jars, ornamental vases, and a variety of other goods for which the Pluckley clay is eminently adapted, but for the proper burning of which the company has at present no special kiln.

In the moulding of tiles of various kinds, the finest sifted coal-dust is used. The "stable paviors" are at present pressed by hand in Dutton's lever press, which can also be used for tiles by simply changing the die. The tiles thus produced have, of course, to be horsed singly, an operation which is performed after they have lain two or three hours upon the hot floor. The shrinkage of this plastic clay is considerably more than that worked upon the semi-dry process, to be afterwards described.

One of the principal features of these brick-works is the semi-dry process, by which the lower layers of clay are brought direct from the pit and tilted at once into the hopper which feeds Bradley & Craven's clay-grinding mill, with revolving pan and perforated bottom. To insure the continuance of this process, even in the wettest weather, a supply of dry clay is generally kept in the spacious room over the machine-house, which is 60 ft. long by 40 ft. wide. As soon as the clay is sufficiently ground, it passes through the bottom of the pan into a receiver, from which it is thrown out by automatic scrapers into another receiver, from which it is carried to the floor above by cups working upon an endless rubber-band, similar to those employed to elevate the thrashed corn in a thrashing-machine. The ground clay next falls upon the floor above, from which it is conveyed through canvas shoots to the pressing-machines working below. These machines, manufactured by Parker Brothers, are three in number, and each one is capable of turning out 50,000 bricks per week. Each machine produces very superior bricks, and delivers from one mould-box a much larger quantity in a given time than has yet been made by any other machine at present before the public. The superiority of quality lies in the fact that the brick itself undergoes a similar process to pugging within the mould-box in which it is pressed, and thus saves an intermediate process, which, as most brick-makers are well aware, is indispensable in all cases wherein the object mainly sought is a good ringing quality of brick, in place of the easily disintegrated blocks, usually produced under the semi-dry system. If Chamberlain's patent appliance is worked in conjunction with the press designed by the patentee for the purpose of re-pressing the bricks as they are made by the machine, bricks are produced that cannot be distinguished from those made from plastic clay and re-pressed; these are facing-bricks of the very best quality. The machines under notice are simple, powerful, and not likely to get out of order; the bricks turned out are true in form, and sufficiently hard to go direct to the kiln. The quantity produced varies with different clays, but the limits lie between fourteen and twenty-three bricks per minute, and the power required for such a production is very small. Under the most favourable circumstances of grinding and delivery, the clay is not more than from ten to fifteen minutes out of the pit before it is moulded, pressed, and stacked in the kiln.

As it leaves the canvas shoot the ground and finely-granulated clay passes into a measuring-box, 9½ in. by 8 in. by 5 in. in its internal dimensions. Each forward movement of this box deposits the contents in the die of the machine, where it receives a pressure of 30 tons, and is by the next movement pushed forward upon the plate. Its size is now 9½ in. by 4⅛ in. by 3½ in. A woman places it upon the press, where it is subjected to a second pressure of about the same force as the former, and comes out measuring 9½ in. by 4⅛ in. by 2⅞ in. A second woman removes it from the press to the back-barrow, and it is at once delivered into the kiln, where its shrinkage in burning reduces it to 9 in. by 4⅜ in. by 2⅝ in.

The principal kiln in use here is built in accordance with the invention of M. Hoffmann, of Berlin, and patented in England by Mr. H. Chamberlain, a pottery engineer, who supplies the designs. It is elliptical in shape, having outside doors to each of the fourteen chambers, through which the bricks are wheeled in and out. The fuel, which consists of finely-sifted coal, is let in through apertures in the crown of the arch, and these are kept covered up with close-fitting iron caps. The smoke-chamber surrounds the central chimney, and flues leading from the bed of the furnace communicate with this. The bricks are so packed that the fuel passes freely amongst them, firing as it descends. Between every two chambers is a large intercepting damper. When in full work, any of the two chambers may have their doors open at one time, the one being emptied and the other filled.

By the use of the Hoffman kiln all the gaseous substances set free by combustion are carried on by the current of air to dry out and prepare for burning the bricks in the further chambers.

The quantity of land at present leased by the Kent Brick and Tile Company is twenty-three acres, and they have power to add to this from time to time, as may be found necessary.

THE NEW TOWN HALL, BOOTLE.

STORETON STONE.

THE foundation-stone of the new Town-hall of Bootle-cum-Linacre was laid by the Mayor (Mr. J. P. M'Arthur), on the 8th inst. The site of the new Town-hall is at the junction of Trinity-road and Oriel-road. It is intended that the entrance to the public offices in Trinity-road shall have an effective appearance. Immediately on entering there will be a large hall and corridor giving access to the town-clerk's offices. The School Board office adjoins the entrance. The large hall will have an area of upwards of 3,500 superficial feet, with platform at one end, and retiring-rooms for the performers. In the Council Chamber, which will be on the ground-floor, there will be a gallery for the reporters, approached from the staircase. The whole of the building is planned so that if necessary additional offices could be placed on either frontage without interfering with the working arrangements. The building is designed in the style of the period of Francis I. The fronts will be executed in Yorkshire parpoints; with Storeton stone dressings, and, in order that the structure may be better seen, it will be set back three yards from the Trinity-road and eight yards from the Oriel-road frontages. The builder is Mr. Samuel Webster, of Bootle, and the architect is Mr. John Johnson, of London.

We note that, at a recent meeting of the Bootle Town Council, Mr. Alderman Newell moved the following resolution:—

"That the memorandum on the General Purposes Committee's proceedings of April 7th, 1880, page 236, relative to yellow Storeton stone, be rescinded, and that white Storeton stone be used."

Alderman Newell said he brought the motion forward because he considered that the architect in the matter had not worked in the business way that an architect to the building (the Town-hall) should do. The speaker then went on with the view of showing the superiority of the white over the yellow Storeton stone. Bebington Church, he said, was composed of the former, and was 700 years old. On the other hand, the yellow Storeton stone was being used for the St. Helen's Town-hall, and when the building was half up, for some reason or other, the stone changed from yellow to white.

Mr. Leslie.—That is wrong; it is not true.

Alderman Newell, continuing, said he knew that Mr. Leslie was the contractor for the building, and his information went to show that it was worked with yellow stone for a certain period, and with the white afterwards.

Mr. Leslie explained that the stone which had been used in the erection of the Philharmonic Hall and the Rev. Hugh Stowell Brown's chapel, viz., the white stone, could not be got at present. He had used more Storeton stone for the past fifteen years, he would venture to say, than any other contractor either in Liverpool or Bootle, and he said there was no practical difference between them. He hoped the motion would be met by a decided negative.

The Mayor put the motion to the meeting, when Alderman Newell voted for, and all the other members of the Council against, it. The motion was therefore lost.

A New Mission Home, Kilburn.—Mr. R. Bilke, of Victoria-road, Kilburn, under whose management this work has been conducted nearly the whole time of the existence of the mission, having secured a suitable piece of land in Kilburn-lane for the purpose of erecting a new building to be called the Queen's Park Hall, a contract has been entered into with Messrs. Hook & Oldrey, of Kensal-road, who have arranged to complete the whole of the buildings by Michaelmas Day. The plans have been prepared by Mr. Edward Heffer, architect, of Victoria-road. Besides the large hall, which will have an open timbered roof, boarded and varnished, there will be a room for inquiries, retiring-rooms, and kitchen, fitted up with the requisite conveniences for tea meetings, &c. The exterior of the building, although simple in its proportions, will be pleasing in character. The foundations are now commenced.

GREEK PAINTED VASES.

PROFESSOR NEWTON'S ninth lecture* (a supplementary one) to students of University and King's Colleges was given on the 7th inst. and concluded the course on ancient Greek art. It treated of the designs on Greek painted vases. These vases formed a distinct branch of fictile or ceramic art; the designs with which they are decorated might, therefore, he called specimens of Ceramography. The earliest examples of such designs carried us back to the earliest period of Hellenic, and, perhaps, of pre-Hellenic civilisation. In the rudest of these specimens, found at Athens, Mycenæ, and Rhodes, the human figure rarely occurred, or, if represented, was drawn as a child might draw it. A large class of this early pottery was ornamented either with geometrical or floral patterns. Next came the style now called Asiatic, because believed to come from a Babylonian or Assyrian source. In this style zones of animals, with occasionally winged monsters, encircle the vase, and in the blank spaces between these animals are flowers and symbols. As drawing improves in this style, the human figure is introduced, with something like dramatic action, and the subject represented is explained by names written over the figures. The lecturer illustrated this phase of ceramography by a design on a Rhodian vase on which was represented a scene from the Trojan war, in which Hector and Menelaus are fighting over the body of Euphorbos. In the next stage of the art the figures were painted in black on a red ground, the details of anatomy and other inner markings being rendered by incised lines and conventional colours. The drawing in this style is generally harsh and full of archaic mannerism. A further change was introduced by making the ground of the picture black, the figures being red with inner markings drawn in faint lines of a deeper tint of red. Small details and accessories were picked out with other colours; but, as the predominant colour was red, these designs might he called monochrome. This style probably began as early as the time of Polygnotus or earlier, and continued till the time of Alexander the Great. At Athens and in Sicily and in a few other places we meet with another contemporary style of vase-painting, in which the figures were painted in several colours on a white ground. A very beautiful specimen of this style was to be seen in the British Museum,—a Rhodian cup, inside which is painted Aphrodite riding on a swan. This vase is probably of the time of Phidias. Both in the monochrome style, with red figures, and in the contemporary polychrome style, there was no attempt at chiaroscuro, and yet the painters who decorated these vases were the contemporaries of Apollodoros, Zeuxis, Parrhasios, Pausias, by whom, as we know from Pliny, chiaroscuro was gradually developed by a series of steps. The reason why this improvement in the art of painting so little affected ceramography was mainly that the convex or concave surface of the vase was better adapted to a design kept very flat than to one which by chiaroscuro suggested the idea of relief, and because in the great age of art the composition of the vase-picture was determined in most cases by the form of the vase itself, which was regarded, like the triangular space of a pediment, as an architectonic necessity. The absence of chiaroscuro, again, led the vase-painter in the best period to avoid complicated foreshortening and groupings; the face is generally seen in profile, and the figures are kept in one plane. In the contemporary polychrome style the colours are harmoniously combined, but not modified by light. About the time of Alexander the Great, when the eye of the Greeks was dazzled by the splendid colouring of Apelles, and when increased private wealth led to a more sumptuous style of decoration, several innovations were made in vase-painting. In the designs with red figures we find gilding introduced, and here and there a figure in white. Other colours were used in the accessory details. One of the finest examples in this style is a vase from Camirus, in Rhodes, representing Thetis carried off by Peleus, in which the wings of Eros are painted blue, and the mantle of Thetis sea-green. The drawing of this vase is most masterly. In this and the subsequent Hellenistic period we find vases of immense size, on which are painted designs in several planes; from the absence of aërial perspective the more distant figures appear to be higher up in the picture than the nearer ones; rising ground is indicated by irregular lines of dots, but there is no attempt to represent landscape, except by conventional adjuncts, such as a single tree to represent a forest. In the later specimens of this style, the drawing, though showing great facility and dexterity, is often careless and faulty, and the types are effeminate. With regard to the subjects of vase-pictures, we find in the earlier style a preference for scenes of war and the chase, and recognise many subjects from the Homeric and Cyclic poems; in the finest period of art these subjects still recur, together with many other myths not previously familiar to us, because not celebrated in extant classical literature. Agonistic scenes were also abundant in this period. In the later style of the Hellenistic period there is a preference for more effeminate subjects taken from Dionysiac or Erotic myths. Scenes where mourners bring offerings to a tomb were also common in this style. The lecturer then explained a number of drawings of vase-pictures illustrating the different periods.

* See pp. 24, 55, *ante*.

DISPOSAL OF TOWN REFUSE: LIVERPOOL.

MR. J. A. FORREST, the chairman of the Scavenging Sub-committee of the Liverpool Town Council, has drawn up a report as to the annual inspection of wharfs, depôts, stables, &c., owned by the Corporation. The most interesting portion of the report relates to the disposal of town refuse, and from this portion we extract the following particulars:—

Since the commencement of the current year the experimental knowledge of the Health Committee has been advanced one step further, with regard to the best and most economical means to be adopted for the final disposal of those products of scavenging operations which possess no value to the farmer. In 1879 the Council sanctioned the purchase of a steam-hopper barge to be used for the purpose of conveying to sea a large quantity of unsaleable refuse collected from the South-end of the city, similar in character to that which had been previously got rid of by being utilised for raising the levels of proposed new streets, or had been sent at considerable cost to fill up marsh-lands abutting upon Bromborough Pool and the Lancashire Canal. The tender of Messrs. Simons & Co., of Renfrew (2,400*l*.), for building the barge in accordance with plans prepared by the then borough engineer (Mr. G. F. Deacon), was accepted in February, 1879, and the barge was delivered in December. So soon as arrangements for the registration and equipment of the vessel (which has been named *Alpha*) had been completed, the trial-trip was made, and she has since been regularly employed, except for a few days, when, through stress of weather, it was not safe for her to proceed to sea. The results of the working of the *Alpha* for three months are detailed below, together with a statement of the cost incurred on the disposal of South-end refuse by canal during the corresponding period of 1879:—Disposal of refuse from the South-end by ordinary barges, to land on the Lancashire Canal, from February 1st, 1879, to April 30th, 1879, 2,425 tons at a cost of 2s. 7¼d. per ton; disposal of refuse from the South-end by steam-hopper barge *Alpha*, about 4 miles beyond the North-West Lightship, and in not less than 16 fathoms, from February 1st, 1880, to April 30th, 1880, 9,650 tons at a cost of 1s. 6⅞d. per ton. The total cost per ton in each case comprises all charges except rent for dock accommodation, and includes the cost of loading, which has chiefly been by manual labour. Arrangements are now pending with the Mersey Docks and Harbour Board, by which a berth-space having sufficient and convenient quay accommodation will be assigned for the use of the barge, and thus admit of steam or hydraulic power being employed for loading. This, when accomplished, will probably be the means of a further saving being effected. It must be observed that the saving in cost, as indicated by the comparative statement, is to be regarded as relative rather than absolute; because, owing to failure of available places of deposit in the city, the quantity of refuse so disposed of at a trifling cost near the South-end was only 3,316 loads for the three months of 1880, against 9,732 for the same period of 1879. In a short time all the refuse from this division will have to be disposed of by the barge. It is to be expected that the cost per ton for the disposal of refuse by the *Alpha* will be further reduced as the necessity arises for a larger quantity to be got rid of at sea; because, with the exception of two cargoes that had to be sent up the canal during the time the steam-hopper barge was prevented by weather from making her regular trips, she has carried all the refuse sent to the south wharfs, so that her capability of making a greater number of trips has not yet been thoroughly tested. The sub-committee have had under consideration the subject of destroying unsaleable refuse by fire; and, from investigations as to the cost of working the system in Leeds, they are of opinion that its adoption in Liverpool would not be advantageous.

INDEX SOCIETY.

THE second annual meeting of this Society was held on Friday, the 9th inst., in the rooms of the Society of Arts, when the chair was taken by his Excellency the American Minister, Mr. James Russell Lowell. The report contained an account of the work already accomplished, and of that which is in hand, or can be put in hand as soon as the list of subscriptions is enlarged. Among the indexes issued through the Society are many referring to literature and history, but science is not overlooked. A "Hand-book of the Literature of Botany," by Mr. Daydon Jackson, the secretary of the Linnean Society, is just ready for the press, and a companion volume for meteorology is proposed. Indexes of logic and anthropology also find a place in the list of schemes. The further business of the meeting consisted in the election of the new council and in the passing of resolutions for the appointment of committees to consider the best means for carrying out the following objects:—1. The indexing of biographical collections, especially those contained in the *Annual Register* and the *Gentleman's Magazine*. 2. The indexing of Roman remains in Great Britain. 3. The desirability of opening an office to contain the printed and MS. indexes and other papers of the Society.

The Chairman, in his opening remarks, said that it was a gratification to him to have been asked to preside on the occasion, more particularly as it was a sort of recognition of the cosmopolitanism of the Republic of Letters, and gave him an opportunity of expressing that good feeling between the two countries which he always liked to cherish. The objects of the Society were also of much interest to him, and he should do his best to bring them before his fellow-countrymen in the United States, and endeavour to secure their co-operation and assistance in promoting the work which the Society had in view.

THE METROPOLITAN RAILWAY COMPANY'S EXTENSION TO HARROW AND RICKMANSWORTH.

THE Metropolitan Railway, which, within the last twelve months, has been extended in a north-westerly direction from the Swiss Cottage to Willesden-green, will be still further extended in that direction at the commencement of the ensuing month, by the opening of the new line between Willesden-green and Harrow, adding to the Metropolitan's company's system an increase of five miles and a half in length. The line, which has for some time past been in progress of construction and is now completed, contains a considerable amount of engineering and general structural work, taking into account its short length. There are no fewer than twelve bridges between the commencement of the line at Willesden-green and its terminus at Harrow, several of them being massive and costly structures. The station buildings are constructed on iron girders immediately over the line, and on a level with the highway, the railway platforms beneath being reached by staircases from the booking offices. The station at Harrow is a spacious structure, having, in addition to the booking-offices, both general and ladies' waiting-rooms. The station buildings are in red brick, with terra-cotta for dressings and ornament, and have a high-pitched roof covered with red tiles. The upper portions of the windows of the booking-office are ornamented with stained glass. The line has been constructed by Mr. Joseph Firbank, the contractor, under the superintendence of Mr. C. Liddell, C.E., the company's engineer-in-chief, and Mr. Tomlinson, the resident engineer.

It may be added that there is every probability of the line being shortly still further extended to Rickmansworth, the Bill for such extension having just been passed by the Committee of the House of Commons, notwithstanding that it was strongly opposed by the London and North-Western Company.

OUR CHURCH MONUMENTS.*

THE destruction of sepulchral monuments which is being rapidly accomplished, year by year, during the process of modern church restoration, demands the serious consideration and united action, not only of archæologists, but of all who are interested in the preservation of their ancestral memorials.

One example in the county of Essex, which, if not of quite recent occurrence, is of quite recent public disclosure, may be cited; not that it is by any means an isolated illustration, but that it exhibits one of more than ordinary wanton desecration. Not less than seven tombs have been despoiled of their brasses, which have passed into different private hands; but the altar tomb of Sir Anthony Brown, chief justice of Common Pleas, and the munificent founder of the richly-endowed grammar school which exists in the parish of South Weald, has been demolished, and other sepulchral memorials have been ejected from the church. Such is, in brief, the published narrative of a resident gentleman, and it has a very important bearing in connexion with the "Report of the Sepulchral Monuments Committee of the Society of Antiquaries," presented to Parliament in 1872.

In February, 1869, the First Commissioner of her Majesty's Works requested the council of the Society of Antiquaries to furnish him with a list of such regal and historical tombs or monuments existing as, in their opinion, it would be desirable to place under the protection or supervision of the Government, with a view to their proper custody and preservation. Acting upon this a committee was formed, who, in drawing up their resolution, say,—"We had regard, not to the value of the monuments as mere works of art, but to the importance of the persons commemorated as actors in the great drama of our national history, and that in any scheme for the protection of these monuments the object in view would be rather the conservation of existing memorials of our illustrious countrymen than the mere gratification of artistic taste or antiquarian curiosity; and that in this respect the simple monument of John Locke was more worthy of record than the more sumptuous monument erected to a person who had left no trace behind him in the history of his country." While admitting the abstract truth of this proposition, the obvious reply is,—"This ought ye to have done, and not to have left the other undone"; and, besides, a large number of historical monuments *are* excluded from the catalogue. It is true that the committee say elsewhere, with just appreciation of the importance of the subject,—"A church, which to-day seems liable to no molestation, may, to-morrow, at the suggestion of an ambitious architect, an ignorant committee, or a speculator in glazed tiles, be turned inside out; chantry chapels destroyed, and tombs needlessly removed from the honoured graves which they once marked; the model slabs which recorded the burial of persons of historical importance allowed to be broken and carried away; or even, as in cases frequently reported to the Society of Antiquaries, the whole floor of a country church, with all the inscribed flag-stones, may be permanently concealed by a new encaustic-tile pavement. These things being so, it would seem that any measure of protection must apply to the whole list of monuments deemed worthy of preservation; and whatever the immediate probability of their careful preservation by the local authorities, or of their liability to injury, whether from carelessness, ignorance, or malice."

This report, presented to Parliament and published eight years ago, was favourably reviewed by the press, and received by the public with approval; but no legislation has ensued upon it, and it is practically nugatory. The desecrations which the Society of Antiquaries deplore continue rife throughout the country, and the depredations during the last eight years have probably not been less than in those which have preceded; indeed, one of the twenty tombs in the county of Essex which fell within the limited scope of the inquiry, as that of a chief justice, has been destroyed in the very face of it; nor need we doubt that had the tomb of John Locke stood in South Weald church, instead of at High Laver, the same fate would have befallen it. The same arbitrary will which disregards alike objects of art and antiquity, and the feelings of those who may possess ancestral monuments, would probably treat with the same reckless indifference the tomb of the great English philosopher.

The elaborate report is practically consigned to oblivion, or remains upon our shelves merely as a convenient index to a certain class of monuments. What is the remedy to put a stop to this continuous spoliation? Naturally we should look to the Society of Antiquaries to press upon the Government the urgent necessity of immediate legislation. Firstly, by procuring a complete registration of all sepulchral monuments, and then holding the incumbents and churchwardens responsible for their preservation. But this obvious step has never been taken. It is the duty of all societies, and, far more, of society at large. Until the monuments are fully registered, and the clergy made responsible for them, removal, concealment, and destruction will go on quietly as heretofore.

* By Mr. Charles Roach Smith. This will form part of the next volume of his "Collectanea Antiqua."

TWO ART CRITICS.

AMONG the studios we find
Critics are of varied kind;
Some being useful, others not.
Now suppose that you have got
Your picture into such a state
As makes your misery very great,
And much and long you cogitate
Whether it should be so, or so.

Now comes the first. He does not throw
Himself the least into the spirit
You are labouring to give it,
But only thinks of his own thought,
Reckoning your idea as nought,
And counsels you to change it quite
To suit his own idea of right;
And bores you with a tedious lecture
How *he himself* would paint the picture.

At last he goes: the which you find
A mercy: when, of different kind,
Another calls, of juster mind:
For what he sets himself to do
Is to grasp the meaning *you*
Wish to represent. That done,
Then his mind's at once addrest
So to counsel, how the best,
Your cherish'd object may be won,
And most thoroughly exprest,
This point enhanced, and that suppressed
With advantage to the rest;
But all in accord with the scheme
Of your picture, and its theme.

Now, not like the first who came,
This one puts in better frame
Your spirits, which were somewhat low;
And when he takes his hat to go,
You are most grateful he has been;
For 'tis clearly to be seen,
That, thanks to his appreciation,
And remarks on this occasion,
Your picture's prospects are much brighter,
And your labour's render'd lighter.

This is the critic, do you see?
That I should wish to call on me.

B.

LARGE SALES OF CORPORATION GROUND RENTS.

THE Corporation have just realised the large sum of 37,131*l.* from the sale, by tender, of a number of City ground-rents, arising out of the property purchased by the corporation under the Holborn Valley and Clerkenwell Improvement Acts. These ground-rents include one of 53*l.* 5*s.* on a house at the north side of Charterhouse-street, let on lease to Mr. Henry Beyfus and Mr. Albert Boss, for eighty years from December, 1874. It realised 13,551*l.*, the purchasers being the Governors of Queen Anne's Bounty. A ground-rent of 35*l.*, arising from a house situate on the west side of Farringdon-street, and on the north-east side of St. Bride-street, and let on lease to the British Mutual Investment Company for eighty years from June, 1872, was purchased by the Prudential Assurance Company for 8,775*l.* Another ground-rent, amounting to 25*l.*, on a warehouse in St. Bride-street, let on lease to Mr. Hugh Birley, M.P., and others (Charles Mackintosh & Co.) for eighty years from December, 1872, was sold for 6,650*l.*, Mr. Henry Grose Smith being the purchaser. Mr. Smith was also the purchaser of a ground-rent amounting to 157*l.* 7*s.* on a warehouse on the west side of Farringdon-road, leased to Mr. Henry William-son for eighty years from March, 1877. The purchase-money was 4,150*l.* Another ground-rent of 153*l.* 17*s.* on a warehouse on the west side of Farringdon-road, let on lease to Mr. G. S. Mamford for eighty years from June, 1875, was purchased by Mr. F. G. Eiloart for 4,005*l.*

FURTHER SALES OF BUILDING ESTATES.

THE sales of extensive plots of building land in several districts around the metropolis continue to follow upon each other in rapid succession. On Monday evening Messrs. Protheroe & Morris offered for sale, at the Castle Tavern, High-street, Tooting, 133 plots on the Carrington estate, in Upper Tooting, formerly known as Messrs. Rolleson's Nursery, which has now been laid out for building upon. The estate was described as having important frontages to the High-street, and also to new roads now in course of formation, all to be constructed and sewered in accordance with plans approved by the Metropolitan Board of Works. With the exception of the intended shops fronting the high road, which contain a larger area, the several plots have a frontage of 15 ft., with a depth ranging from 40 ft. to about 90 ft. After some introductory remarks from the auctioneer, the sale commenced with the plots set apart for shops, of 16 ft. frontage and 60 ft. to 80 ft. in depth, which realised from 200*l.* to 210*l.* each. The other plots of 15 ft. frontage by 40 ft. to 80 ft. and 90 ft. in depth, were sold at prices ranging from 37*l.* to 75*l.* each. At the close of the sale the auctioneer announced that all the lots (excepting a block of land in the rear, containing an area of upwards of an acre, which was withdrawn at 2,975*l.*) were sold, realising a total sum of about 8,500*l.*

Last week Messrs. Protheroe & Morris also offered for sale the second portion of the Clements Estate at Ilford, consisting of ninety-three lots. Although the sale was not so largely attended as on the first occasion, there was an eager competition for the various plots. The front plots in High-street realised from 175*l.* to 210*l.* each; and those in the other roads from 50*l.* to 90*l.* each. With about a dozen exceptions, all the plots were sold.

On Monday evening, Mr. Alfred Baker, of the firm of Messrs. Baker & Sons, offered for sale, at the Windsor Castle Hotel, Hammersmith, the Walham Lodge Estate, near Walham-green, which is being laid out for building upon. The estate has been divided into ninety-six building plots, and the first portion, advertised for sale on Monday last, consisted of forty-eight plots, but the demand was so great that the whole of the lots, at the request of the company who are laying out the estate, were included in the sale, and the whole of the lots were sold. The plots fronting the Fulham-road, which are intended for shops, some of them having a frontage of 16 ft., and others 20 ft., with an average depth of 50 ft., realised from 205*l.* to 265*l.* each, whilst the other plots of 16 ft. frontage, and about 40 ft. in depth, fetched an average of 90*l.* each. The prices were considered good. The total proceeds of the sale amounted to 10,227*l.*

THE WESLEYAN CHAPEL YARD, TOTTENHAM.

I WISH to call attention again to the disgraceful condition of the above-named yard. Its state is most deplorable for a (so-called) Christian burial-ground. The faithful should at once subscribe for an iron railing as a protection against the reckless and destructive propensities and illicit practices of unruly boys.

CYCLOPS.

BUILDERS' TENDERS.

SIR,—I am astonished almost every day, on receiving bills of quantities, to find continued the objectional words, "I hereby agree," in the form of tender. I think there cannot be two opinions as to the absurdity and danger of such words, which really form a contract, when in nine cases out of ten the conditions have not been considered. Of course the builder is frequently told the conditions are ready for his perusal, but, I take it, a builder who is constantly tendering has quite enough to do without studying voluminous contracts, neither can he think of going to the necessary expense of submitting the same to his solicitor before the result of the tenders is known.

LONDON BUILDER.

EXCURSION OF THE ARCHITECTURAL ASSOCIATION.

ON the present occasion the committee have decided to visit the neighbourhood of Norwich, and Mr. James Fowler, of Louth, has consented to generally conduct the visits.

The following is the sketch programme. Head quarters, Norwich:—

Monday, August 16.—The Cathedral and adjoining buildings. Churches of St. Peter Mancroft and St. Stephen.

Tuesday.—Rail to Aylsham. Carriages thence to Cawston, Sall, and Blickling (Church and Hall).

Wednesday.—Rail to North Walsham. Carriages thence to Trunch, Knapton, Edingthorpe, Bromholm Priory, and Worstead.

Thursday.—Rail to East Dereham and Fakenham. Carriages to East Barsham Hall.

Friday.—Rail to Wymondham. Carriages thence to Attleborough, Great Ellingham, Hingham, and Deopham.

Saturday.—St. Andrew's and Stranger's Halls, St. George's and St. Giles's Churches, &c., Norwich.

CONGRESS OF THE BRITISH ARCHÆOLOGICAL ASSOCIATION.

THE annual meeting will, this year, be held at Devizes, from Monday, August 16th, to Saturday, the 21st, inclusive. An interesting programme has been issued, but it is too long for us to print. At the opening meeting, on Monday, the members will be received by the Mayor and Corporation, and the Right Hon. the Earl Nelson, president of the Congress, will deliver an inaugural address. Local antiquities will be inspected, and the churches of St. John and St. Mary visited and examined. A public dinner at the Bear Hotel will be held at 7 p.m. Abury and Silbury will be examined on Wednesday, with various papers on these antiquities.

Friday will be an interesting day. Members and visitors will drive by Enford and Netheravon to Amesbury. After visiting the church, the party will proceed to Vespasian's Camp, where luncheon will be partaken of, in conjunction with the members of the Newbury District Field Club, under the gnidance of Mr. Walter Money, F.S.A., and at two o'clock all will leave for Stonehenge, which will be described and commented on by Mr. William Long, F.S.A., the Rev. A. C. Smith, Mr. Thomas Morgan, F.S.A., and others.

In the programme for Saturday, a visit will be paid to Bowood (by the kindness of the Marquis of Lansdowne, V.P.), with its gallery of historical pictnres, &c., and luncheon will be partaken of in the park; afterwards proceeding to Laycock Abbey, the party will be received by its owner, Mr. C. H. Talbot. Papers will be read each evening, and two extra days will be enjoyed in the following week by those who will remain.

EMPLOYERS' LIABILITY FOR ACCIDENTS.

SIR,—As I observe you take interest in this very important Bill, I venture to send you a small contribution to the facts, which I think is rather in your way. I am not an employer of labonr myself, at least I am not so now, and my sympathies lie very strongly with the working-classes. But what will you make of the following case? Right opposite my house, at this moment, a church is being erected, and the method of elevating the stones to the scaffolding is by means of a derrick-crane with a pole about 50 ft. or 60 ft. in length, or rather, let me say in height. Well, this very morning I observed a stone being slowly raised which might have weighed probably half a ton, and right underneath it stood a mason hewing away at a piece of ashlar with the utmost composure. I shouted to him as hard as I was able, and held up my walking-stick; but he did not seem to understand me, and so I had to endnre about five minntes of considerahle anxiety. Had the least thing happened to the chains, or the winding gear, or the clippers, or in the cohesion of the block of freestone, he wonld have been killed on the spot. And I ask you, sir, or any man acquainted with the building trades, whether snch incidents are not of frequent occurrence? I ask you, moreover, had such an accident occnrred, who would have been responsible for this poor mason's death?

A SURVEYOR.

A New Library and other additions have just heen completed at River Meade, Sunbury-on-Thames, for Mr. L. Knight Bruce, from the designs of Messrs. Pugin, of Westminster. Mr. John Dalglish, of Sunbury, was the contractor.

THE SHARES IN LONDON WATER COMPANIES AND THE PARLIAMENTARY COMMITTEE.

THE proceedings of the Select Committee of the House of Commons, which is now taking evidence on the several London Water Companies, excite much public interest in the metropolis, and the announcement of a sale last week, at the Auction Mart, of a number of shares in two of the principal metropolitan companies, brought together a very numerous attendance. The auctioneers were Messrs. Fox & Bousfield. The property offered consisted of one-tenth of a share in the King's Moiety of the New River Company; five 100*l.* new shares in the same company; and forty 50*l.* shares in the Grand Junction Company. The shares in the New River Company were first offered, the tenth part of the King's moiety being divided into ten lots, each lot consisting of the hundredth part of a share. Mr. Bousfield, who conducted the sale, in his introductory remarks said that the New River Company never gave rise to speculation, and while other companies fluctuated, it remained firm in the position it had gained. The increase in the income had steadily advanced during the last sixteen years, amounting to 206,825*l.* in 1863, and 424,097*l.* in 1879. Adverting to the evidence given by Mr. E. J. Smith before the Select Committee of the Houso, he said he considered that the New River Company was likely to be taken by the Government, in which case they would have to pay a high compensation, which would increase the value of the shares; but it would be better still if the company was left alone, since the amonnt of increase in the value of their property in the next few years it would be difficult to imagine. All the ten lots forming the King's Moiety were sold for 920*l.* and 925*l.* each, or at the rate of 92,000*l.* for a full share; the 100*l.* new shares being next sold, and realising 380*l.* and 385*l.* per share, or nearly 300 per cent. premium. These were followed by the sale of the forty 50*l.* shares in the Grand Junction Company, all of which were purchased at 110*l.* 10s. and 110*l.* 15s. per share.

RECOVERY OF FEES PAID UNDER PROTEST.

IN the Birmingham County Court, before Mr. J. Motteram, Q.C., Judge, Mr. Brooke Robinson, solicitor, Dudley, brought an action against Mr. Julius A. Chatwin, architect, Temple-street, Birmingham, to recover 41*l.* 7s., "for the return of fees overcharged by the defendant as architect appointed to report to the arbitrator, in the case of Holland *v.* Robinson, and which fees were paid by the plaintiff to the defendant under protest." The judge was assisted in his investigation by an assessor, in the person of Mr. W. Millican, F.R.I.B.A., of Leicester.

The present case arose out of an action tried last year, in which the present plaintiff was sued by Messrs. Holland & Son, builders, Dudley, in respect of certain alterations and repairs done to Barford House, Warwick. The action by Messrs. Holland & Son was originally brought brought into one of the courts, but was referred to Mr. Dowdeswell, who, in the course of the arbitration, instructed Mr. Chatwin to go through certain vouchers and make a report of the value of the work done by Messrs. Holland & Son, and the materials supplied by them. Mr. Chatwin made his report, and for his services charged 63*l.* 10s., this sum also including the expenses of a journey to London, Barford, and Dudley. Mr. Robinson considered the charge excessive, and declined at first to pay it; but ultimately he paid the money under protest, and took up the arbitrator's award. It was now contended that Mr. Chatwin should be amply paid if he received 23*l.*, and the action was brought to recover 41*l.* 7s., the amount in excess, after allowing for certain travelling-expenses. Mr. Chatwin was examined at great length as to the time occupied by him in investigating the accounts and measuring up the work. He estimated that he and his clerk were occupied fifteen days in the work, but declined to pledge himself as to the specific days on which they were engaged. Pressed by the Judge, Mr. Chatwin said he would have charged twenty guineas for the work if his labours had not been greatly increased by the interference of the plaintiff. He was questioned with a view of showing that the examination of the vouchers could have been done by a junior clerk instead of doing the work himself, and charging 3*l.* 3s. for his services: but he denied that a junior could have performed the work, and said it was necessary that the person examining the vouchers should have a knowledge of building.—Mr. Newey, defendant's clerk, estimated that he was engaged sixteen or seventeen days on the work; but upon being cross-examined as to the dates upon which he was employed he could not specify more than six days. His Honour, after consulting with the assessor, said they desired to be as liberal towards the defendant as they possibly could. They felt that even the time occupied for which remuneration was about to be given had not been supported by anything like evidence such as was necessary to support defendant's views. They had, therefore, disregarded that; but having been occupied over five hours, and having heard everything that could be said,—some of it not very regular,—and given every opportunity for both sides to be heard, the figures which the learned assessor put down, and which he concurred in, were 28*l.* 18s., which, deducted from 65*l.* 10s., gave the plaintiff a verdict for 36*l.*

COMPENSATION CASES.

IN the case of *The Rector and Churchwardens of St. Mary Orgar* v. *The London and Blackwall Railway Company*, the arbitrator, Sir Henry A. Hunt, C.B., has made his award. The claim was for certain property in John-street, Minories, having an area of 10,455 superficial feet, with access from and cellars under Gough-square. The value put on the property by Mr. P'Anson, the claimants' surveyor, was 44,852*l.* Mr. George Barnes Williams, surveyor to the Mercers' Company, estimated it to be worth 42,716*l.*, and Mr. T. Horsey (Fuller, Horsey, & Son) put the value at 42,982*l.* On behalf of the railway company, Mr. Farmer (Debenham, Tewson, Farmer, & Bridgewater), valued it at 28,356*l.* Mr. Robert Ritchie's estimate was 28,688*l.*; and Mr. C. F. Adams put in a valuation at 28,693*l.* The property was required for the extension of Fenchurch-street Railway Station. The arbitrator has awarded 33,930*l.*

In the case of *The Weavers' Company* v. *The Metropolitan Board of Works*, heard on March 5th, before the same arbitrator (Sir H. A. Hunt), the award has also been made. The claim was for the premises, 1, High Holborn, at the corner of Gray's-inn-road, having an area of 4,498 ft., and a vault 250 ft. On behalf of the claimants, Mr. J. Jennings valued the property at 11,605*l.*; Mr. Edwin Fox (Fox & Bousfield) estimated it to be worth 9,240*l.*; and Mr. Virgoe Buckland, Mr. L. H. Isaacs, and Mr. R. C. Driver each put it at 8,167*l.* The witnesses for the Metropolitan Board of Works were Mr. E. N. Clifton, whose valuation was 6,517*l.*; Mr. F. W. Porter, who estimated it at 6,682*l.*; and Mr. Robert Vigers, whose figures were the same as Mr. Clifton's. The property was taken by the Metropolitan Board of Works for the widening of Gray's-inn-road. Sir Henry Hunt has awarded 7,177*l.*

NATIONAL COURTESIES.

H.M.S. *Resolute*, which formed part of the late Admiral Sir Edward Belcher's expedition sent in search of Sir John Franklin, was abandoned on May 15th, 1854. She was discovered and extricated in September, 1855, by Captain Buddington, of the United States whaler, *George Henry*, and was taken to New York; the British Government waiving all claim to her. It appears that the sum of 40,000 dollars was voted by Congress to acquire her from the whalers, and she was then purchased, fitted out, and sent to England at the expense of the American Government, and presented to her Majesty Queen Victoria, at Southampton, on the 16th of December, 1856.

The ship having recently been broken up, a small portion of her timber, oak and teak, has been used to make a writing-table for presentation by her Majesty the Queen to the President of the United States. This has been executed by Messrs. Morant, Boyd, & Blandford, of Bond-street. Without being pretentious, it is a thoroughly good, sound, and handsome piece of work. In the first instance, as we mentioned at the time, it was proposed to execute a much larger piece of furniture for the purpose, and six firms sent designs in competition, from which that of the firm who have now executed the writing-table was selected.

"ESSAY ON THE HISTORY OF ENGLISH CHURCH ARCHITECTURE."

SIR,—As I have learned that Mr. Edward Pococke has been soliciting, from architects and others, subscriptions to the above-named work, will you kindly allow me to state that he has no authority to do so, and that subscriptions can only be paid to Mr. David Bain, at the publisher's, Southampton-street, Strand?

G. GILBERT SCOTT.

Paint.—Certainly the ornamental railings on the Thames Embankment are in a remarkable state of preservation considering that the paint supplied by the Indestructible Paint Company was applied at their erection, now more than eight years ago. Though one portion of these railings has been exposed the length of time named to the action of the sulphurous acid given off by the locomotives of the Metropolitan Railway at a ventilating shaft close to Waterloo Bridge, it has not been affected in the least. The railings are quite intact, and show no sign of rust.

THE YORKSHIRE FINE ART AND INDUSTRIAL INSTITUTION.

THE opening of the Summer Exhibition of Pictures and other worke of art in connexion with the Yorkshire Fine Art and Indnstrial Inetitntion took place on Thursday last. The collection in the Grand Saloon consists of oil paintings hy eminent artists, as doee also that in Callery C Sonth. Messrs. W. Q. Orchardson, R.A., J. C. Horsley, R.A., Herman Tenkatt, Brookes, Bayes, Walton, Burr, Wyke Bayliss, and othere, are amongst the paintere of works exhibited. Galleries D and E South are occupied hy water-colour drawinge. The contribntion from South Kensington comprises photographs and other objecte of interest, including a series of forty-five historical drawinge, and Marke's noted pictures of May-Day; a choice collection of illuminations on parchment, of the fourteenth, fifteenth, and eixteenth centuries; a large number of photographs of ecclesiastical architecture, &c. The miscellaneoue articles comprise eix cases; the first containe a variety of objects in gold and silversmiths' work, and the eecond contains porcelain, including Sèvres, Dresden, and Flemish. The third caeo is interesting, as containing, amongst other articles, a vaee and a cup and saucer, a portion of a platean contributed to South Kensington hy her Majesty the Queen. In the fonrth is to he eeen Italian majolica ware, chiefly of the eixteenth century. The next case containe wood carvinge and carved musical inetrnments. The fifth ie a case of Indian textiles, and the last ie a case of electrotype reproductione from varione collections, including a pair of fire dogs from the Royal collection in Windsor Castle; alec vaees from Lord Delawarr'e collection. The site of what was the machinery annexe at the recent industrial exhibition in York has been laid out as a garden.

PREMIUMS FROM THE INSTITUTION OF CIVIL ENGINEERS.

THE Council of this profeesional body have awarded the following premiums for some of the original communications presented dnring the past session on accennt of the science, talent, or industry ehown in the consideration of the varions enbjects dealt with:—

FOR PAPERS READ AT THE ORDINARY MEETINGS.

1. A Telford Medal and a Telford Preminm to E. A. Bernays, C.E., for his paper en "Portland Cement Concrete, and some of its Applications."

2. A Telford Medal and a Telford Premium, to H. E. Jones, C.E., for his paper on "The Pnrification of Gas."

3. A Telford Medal and a Telford Premium, to J. J. Webster, C.E., for hie paper on "Iron and Steel at Low Temperaturee."

4. A Telford Premium, to Frederick Angustus Abel,* C.B., for hie paper on "Explosive Agents applied to Industrial Purposee."

5. A Telford Preminm, to John Grant,* C.E., for hie paper on "Portland Cement: its Nature, Tests, and Uses."

6. A Telford Preminm, to Maj.-General Scott, C.B., and a Telford Premium to G. R. Redgrave, C.E., for their paper on the "Manufacture and Testing of Portland Cement."

7. A Telford Premium, to C. J. Wood, C.E., for his paper on "Tunnel Outlets from Storage Reservoirs."

8. A Telford Preminm, to W. H. Delano, C.E., for his paper on "The Uso of Asphalt and Mineral Bitumen in Engineering."

9. The Manby Premium, to G. Chatterton, M.A., C.E., for his paper on "The Main Drainage of Torqnay."

FOR PAPERS PRINTED IN THE PROCEEDINGS WITHOUT BEING DISCUSSED.

1. A Telford Medal and a Telford Preminm, to B. Baker, C.E., for hie papers on "The River Nile," "Cleopatra's Needle," and "The Practical Strength of Beams."

2. A Telford Medal and a Telford Premium, to J. Lucas, for his paper on "The Hydrogeology of the Lower Greensande of Surrey and Hampshire."

3. A Telford Preminm, to Harco T. H Siccama, C.E., for his paper on "The Delta of the Rhine and the Mense in the Netherlands."

4. A Telford Premium, to J. Miller Wilson, C.E., for hie "Description of a Bridge over the Monongahela River, at Port Ferry, Pennsylvania."

5. A Telford Preminm, to F. Eliot Duckham, C.E., for his paper on "The Thames Steam Ferry between Wapping and Rotherhithe."

6. A Telford Premium, to George Moyle, for his paper on "The Platelaying of the Jacobabad or broad-gauge section of the Candahar Railway."

* Have previously received Telford medals.

THE GAS EXPLOSION.

AT a meeting of the St. Pancras Committee of Worke, on Monday evening laet, a report was received from the sub-committee appointed last week, stating that they had instructed Mr. W. B. Scott, the chief eurveyor, and Mr. Gibb, the vestry clerk, to pnt themselvee in communication with the secretary of the Chartered Gas Company. In reply to a letter addressed to the gas company, the following answer had been received:—

"On the subject of your letter of the 7th inst. I am directed to say in reply that, while the company do not, under existing circumstances, admit their liability for the damage occasioned by the late explosions, yet with a view of carrying out without delay the works and repairs necessary to be done to the houses, streets, and sewers in your parish injured by the explosion, Messrs. Aird & Sons, the contractors, have received instructions forthwith to place themselves in communication with Mr. Scott, your surveyor, to arrange with him as to what is required to be done by them to carry out the works on behalf of the company."

The chief sarveyor had accordingly put himself in communication with the contractors, and a clerk of the works had been appointed to enpervise the proper execution of the necessary worke. The report was approved and ordered to be forwarded to the Vestry.

The coroner's jury have found the following verdict:—

"That the deaths of Burr and Bearis were caused by explosion, that explosion being caused by a light ignorantly placed to the pipe on the main by Hawks, the gas having been introduced into the new main by some defect in the valve in Howland-street. The jury are further of opinion that additional care should be taken by the Gas Light and Coke Company in the testing of new mains."

The Coroner remarked that the valve might have been opened hy misadventure, and, if so, the verdict wonld not cover that.

The jury replied that the opening of the valve would be a defect. They had thoroughly considered all the points, and they wonld not alter the terms of their verdict.

Similar explosione, strange to eay, occurred in Wolverhampton on Tuesday last. Happily no lives were lost.

SIZE AND PROPORTION.

SIR,—I quite agree with yonr correspondent "B." that you are right in allowing questions such as that mooted by "Toreuticos" to find a place in your journal. The colnmns of the *Builder* have, indeed, always been open to those who have felt etrongly upon art or any other topic. But the advantage to the public has inhered in that yon have also permitted any new notion to be "holted to the hran" hy discussion.

In my several letters I have enggested means for teeting the trnth of the hypothesie put forward hy yonr correspondent, hut I nsually reeerve the full etrength of an opposing argument for the *coup de grace*. Now, eir, it may be gathered from the internal evidence of the letters of "Toreuticos" that he ie a great stickler for proportions, for proportion *à l'outrance*,—for proportion to the millionth of a minim. Were these exact proportions, may I ask, determined hy the Greeke ae proportions of fitneee in the human fignre? or were they worked ont from the Grecian "moral consciousness," as the German ie said to have worked ont his camel? Clearly the former. But what doee yonr correepondent, the stickler for proportion to a minim, do? Nothing more nor less than knock down what he would build np by contending for the introduction of some variable quantity to he substituted at the taete of the artiet, instead of the exact proportions, to minims, worked ont by the scientific Greeke. A ecience of the proportions of the human fignre would, nnder ench complex conditions, he impoeeible. All such fanciful expediente for avoiding correctness are, to my mind, of the same order, though, perhaps, somewhat different in degree to that adopted by the Egyptian artiste who represented the Life Guarde of Heliopolis, with both lege on the pictured eide of their horses, to counteract the effect of one being obscured in nature to the spectator'e view. We might as well increase the diameters of the tops of columns to counteract the effects of perspective.

And, finally, I may add there is an entire absence of any enfficient reason for increasing one section of the body, the head, and no other. Why not the foot? Every section of a reduced copy of any statne, in the abeence of any special and sufficient reason to the contrary, would have an equal claim to the enlargement, and thne by a parity of reason we ehould come to the conclusion that the just proportions of the original should be maintained in their integrity in the reduced copy. METER.

THE BRITISH MUSEUM.

SIR,—With reference to the remarks npon thie enbject in the *Builder* of the 10th July inst., it merits notice that it has been necessary to remove some useful hooke from the ehelves in the Reading-room,—several shelvee of Bohn's volumes, for instance,—in conscquence of some of them having heen purloined hy dishonest readers. The shelves were vacant for some months, but now they are filled with dry books relative to Parliamentary proceedings. For some monthe, Murray'e Guide Booke were removed from their ehelf, but they are now restored. Since Mr. Bond's appointment as the chief librarian, beneficial rnlee have been introduced, and the electric light is a hoon, decidedly. There ie, I think, room for improvement even now, although, upon the whole, the Reading-room s convenient and well conducted, and the additional reference-hooks are valuable.

I think that all pnblications should be bound so ae to be ready for nse within six months from their pnhlication; as to periodicale, within six months from their completion. I think, also, that puhlishers should not be allowed to have a discretionary power as to what works they eend to the Museum nnder the Copyright Act. It is a fact that some publishers evade thie Act habitnally, as ie etated in Mr. Cowtan's "Memoirs of the British Mnseum." Now, if some of these gentlemen were summoned hy the solicitors to the Museum for evading the Act, and fined, there would he more alacrity by the trade and less disappointment would he experienced by the readers, especially with reference to the periodicals. The printed catalogues of hooke now in course of publication are a decided improvement, and I hope they may he continued. Some yeare since, in the *Builder*, I referred to the Ordnance maps in the Museum (see *Builder*, No. I,466, vol. xxix.). The red folio catalogues contain a list of many of these, hut they are incomplete. Consequently, a reader may suppose that maps are not in the Mnsenm which, in fact, are there. A complete catalogue is necesaary for reference. There is a valuable collection of newspaper literature in the library, which, as to certain journals, at least, should be kept up regnlarly. The catalogues of them, so far as this centnry is concerned, are loose and incomplete, and a printed list of nineteenth-century journals also would be useful and worthy of the national repository. C. C.

OPENING-UP WESTMINSTER.

SIR,—Any one who knows Westminster, or lives in Pimlico, must have felt the urgent necessity there ie for hetter and easier communication between theee places. At present one is chliged to go from one to the other through a most ohjectionahle locality hy a tortuons ronte, very difficult to ordinary strangers to find, and disagreeable to ladies and old people to have to nse hahitnally. Going home late at night hy hansom, the favourite route of the cab fraternity seems to be ont of Victoria-street hy Artillery-row, dashing round a sharp and dangerone corner through a narrow way, styled Old Rochester-row, into Rochester-row itself. Dnring the session of Parliament there is a great traffic of cabs all through the night, more or lees. It ie just this point of the ronte which reqnires diversion and making more direct, and a short new street continuing Artillery-row ie all that is reqnired to remedy the evil. Thie new street, in another point of view, would be a desirable improvement, opening-up a vieta to one of the most picturesque architectural groups in the locality, viz., St. Stephen's Church and Schoole, hnilt and endowed by the munificence of the Baronese Burdett Coutts. Thie alteration would require merely the diversion and part destruction of a narrow street of small dwelling-houses, which would certainly pay to remove to make room for something better.

A considerahle traffic has been set going hy

the Army and Navy Co-operative Stores, which have done so much for the enlivenment of Victoria-street,—until lately one of the most dreary and forbidding streets in the metropolis to the unhappy pedestrian, especially after dark. A. S. E.

ROYAL LONDON PANORAMA.

SIR,—Referring to a report of an action by Mr. E. L. Paraire, for the winding up of the Alcazar Company, which appeared in the last issue of the *Builder*, and from which it might appear that the building now in course of construction, on the site in Leicester-square, formerly occupied by Saville House, is for the Alcazar Company, permit me to state that the building now erecting is for the Royal London Panorama, of 14, Avenue de l'Opéra, Paris, and is being carried out from the designs of M. L. Dumoulin, architect, of Paris, under my superintendence.

ALFRED BOVILL.

SIR,—A sentence in your report of the above matter reads somewhat prejudicially to my position as architect to the company. It is stated that the directors of the Alcazar have entered into negotiations with another architect. This is not correct. The facts are as follows:—The directors of the Alcazar, departing from the object of the original prospectus,—which comprised a theatre, a *café*, and a *restaurant*,—let the site to a French company, who at once assigned their agreement to another French company, who made over their interest to somebody else. None of these companies are registered in England, nor have they any known office or representative. This peculiar French combination employed their own architect, Monsieur Dumoulin, to design and superintend the building of a panorama and bazaar. This is the building now in course of erection, and which it is probable will be completed by October next.

The directors of the Alcazar have nothing to do with the merits of the scheme. They are to receive 3,000*l.* per annum ground-rent. Beyond this the shareholders need anticipate no further profit. EDWARD L. PARAIRE.

PEOPLE'S ENTERTAINMENT SOCIETY.

AN evening concert was given in the Grosvenor Gallery (by kind permission of Sir Coutts Lindsay, bart.), in aid of the funds of this society, on Thursday, July 15th, in presence of a distinguished audience. The performers were all amateurs, and included Viscountess Folkestone, Mrs. Ronalds, Miss Wakefield, Miss Brough, Mr. L. d'Egville, Mr. Charles Wade, and Mr. C. Bethune. The objects of this society, which is scarcely so well known as might be desired, is to provide good amusement for the poorer classes in London during the winter, in the hope of withdrawing them from lower places of resort. Its first entertainment took place on January 2nd, 1879. At some places the admission is free, while at others a small charge is made. The entertainments have been attended with a very encouraging amount of success, the audiences varying in number from 200 to 600, and the halls and rooms being as a rule well filled. At the termination of a series of weekly entertainments given at Battersea, where the audience was composed of working men exclusively, an address was presented to the members of the society, signed by 200 men, testifying to their appreciation of the efforts made by the society on their behalf. On the 2nd of last January the first of a new series was commenced at Lambeth, in a large room placed at the disposal of the society by the Messrs. Doulton, when about 700 persons were present. At Westminster a local society has been started. Three new series of entertainments are now being organised in other thickly-populated districts, with an entrance charge of twopence, so that shortly the society will have six or seven different entertainments every week. Subscriptions are needed, and may be sent to 180, Brompton-road. In no better way can our less fortunate brethren be aided than by affording them high-class amusement. This is a sort of kindness which has no tendency to destroy the independence and self-respect of the recipients. The society was originated by Mr. C. C. Bethune, who has devoted himself to it for two winters, attending sometimes three or four entertainments every week. The committee list includes many distinguished and well-known names.

The Builders' Benevolent Institution.—It has been felt for some time past that this institution would be doing much more good if the annuity paid to the pensioners was increased, so as to place them in a comparatively comfortable position. To carry out this excellent purpose, and to maintain an equal number of pensioners as are now on the funds of the institution, additional subscriptions or donations would have to be obtained; and at the annual general meeting, which is to take place at Willis's Rooms, on the 29th of July, it is proposed to consider the desirability of endeavouring to effect this change. We trust the promoters of it will be successful.

CHURCH-BUILDING NEWS.

Fulham.—On the 10th inst. the corner stone of the new parish church of Fulham was laid by the Archbishop of Canterbury. The old building now being pulled down has neither age nor beauty to recommend it, and is, in fact, less interesting than the churchyard, which, in spite of the growth of London, still keeps its rural character. Several Bishops of London have been buried here:—Dr. King, in 1621; Dr. Compton, in 1713; Dr. Robinson, in 1723; Dr. Gibson, in 1743; Dr. Sherlock, in 1761; Dr. Lowth, in 1787; and Dr. Blomfield, in 1857. Here, too, under the lime trees, is the grave of Theodore Hook, "of infinite jest, of most excellent fancy." The new church will be built in the Perpendicular style, from the designs of Mr. A. W. Blomfield, M.A., who will give the east window in memory of his father, the late Bishop; but the old tower, with its pleasant peal of bells, will remain untouched. A view of this tower, as restored under the direction of the conductor of this journal, will be found in our volume for 1846. The dimensions of the nave are as follow:—Height, 48 ft.; length, 71 ft. 3 in.; width, aisles included, 56 ft. There are also north and south transepts to chancel, divided by arcades. There is also a vestry on the north side, and organ-chamber on the south side. The dimensions of the chancel are,—Height, 39 ft.; length, 35 ft.; width, transepts included, 63 ft. The new floor of the nave will be 2 ft. 9 in. above the old one, on account of the old church having been inundated with water upon several occasions, owing to the floor having been so much lower than the ground line. The walls throughout are composed of Kentish Rag facing outside; stock-brick faced inside, and to be plastered in rough stucco; the middles of the walls are filled in with Portland cement concrete. The dressings are of Bath stone, both inside and out. The roofs are open-timbered, and constructed of pitch-pine, boarded on backs of rafters, and covered with green Eureka slates. The style of the building is Perpendicular. The total cost will be 8,000*l.*, exclusive of Grundy's heating apparatus. Messrs. Goddard & Sons, of Farnham and Dorking, are the contractors, the work being under the superintendence of Mr. J. Vaughan, clerk of works.

Exeter.—A meeting of the parishioners of the united parishes of St. Petrock and St. Kerrian have adopted plans for certain alterations at St. Petrock's Church. According to the rector, the church was first built in the reign of the Conqueror. At that time the church consisted of a chancel, nave, north aisle, and tower. What became of the north aisle no one knew. In 1413 the south aisle was added, and about a century afterwards it was further extended in the direction of the Cathedral Close. This it was that gave the church its present unique and unparalleled shape. He had never before seen any church in which two-thirds at least of the worshippers were unable to see the Communion-table, or hear anything that was said there, and where the people sat looking five or six ways at once. Nothing was done from 1413 until 1828, when in that year several changes were made. A new chancel-arch was added, the church was entirely re-seated, and the pulpit, reading-desk, and wainscoting were altered and repaired. It is now proposed to reseat the church, and to carry out other works for the comfort of the congregation.

Four Elms.—On the 24th ult. the foundation-stone of a new church, at Four Elms, Kent, was laid by Mr. S. Williams, of Shirley. The external facing will be of Limpsfield stone, while the quoins, window and other dressings, and the internal facings, will be of Bath stone. Messrs. Punnett, of Tunbridge, are the contractors; and the architect is Mr. Edwin T. Hall, of London.

Gatley-in-Etchells.—The foundation-stone of the new Church of St. James, Gatley-in-Etchells, was laid on the 10th inst. by Mr. W. Cunliffe Brooks, M.P. The church will stand in a conspicuous position at the easterly end of Gatley Green, on a site adjoining the National Schools, its westerly front facing the main approach from Handforth and Wilmslow. The design comprises a nave, 31 ft. wide, the western end of it being narrowed so as to form a kind of narther, and in the middle of this narther, and projecting some 5 ft. westwards, is an octagonal-shaped baptistery, its walls rising some 33 ft. from the ground, and being covered with a semicircular roof. The tower, which will be gabled to the west and east, is "saddle-backed." The total height to the top of the tower will be about 70 ft. The chancel will be about 18 ft. wide and 25 ft. long, and will terminate apsidally, the angles of the apse being those of a hexagon. To the south of the chancel will be the organ-chamber, vestry, and the boiler-house. The total length of the building externally will be about 90 ft. Accommodation will be provided for about 250 worshippers, and provision is made in the design for enlargement by means of a future south aisle. The walls externally and internally will be faced with bricks of a greyish colour, with dressings of stone and stock bricks. Moulded bricks will be used in the arches and in the label-monlds and strings. In the inside of the church there will be a few white bricks in the arches, bands, &c. The roofs will be slated. The church is being built in sections, the present contract for the nave, organ-chamber, and vestry, including the bottom stage of the tower, having been let to Mr. Thomas Darnborough, of Rusholme. The architects are Messrs. Medland & Henry Taylor, of Manchester.

Clerkenwell.—At a public meeting of the inhabitants, held recently, it was resolved that it was not advisable to enlarge and finish the Martyrs' Memorial Church, St. John-street-road, according to the original design, as it would entail a cost of at least 2,500*l.*; but that the design submitted by Mr. Jesse C. Hukins be adopted instead, involving a cost of only 1,600*l.*; and that an immediate attempt should be made to collect that sum, and to build the organ-chamber, south transept, aisle, and door upon the portion of the ground given for that purpose by the Marquis of Northampton. The church was built from designs by Mr. E. L. Blackburne, architect.

Bideford.—A temporary iron church has been erected and opened at East-the-Water, as an adjunct to the Bideford parish church. The plans were prepared and the building erected by Mr. J. C. Hawes, London. The building is of corrugated galvanised iron on a brick foundation, and is 55 ft. long by 26 ft. wide and 28 ft. high in the nave, and 17 ft. by 15 ft. in the chancel.

Miscellanea.

A Photographic Phenomenon.—An interesting phenomenon in photography has been announced by M. Janssen, in a note to the Académie des Sciences. While obtaining solar images at Meudon, he has observed that when the exposure is prolonged beyond a certain period, in which a good negative image is got, this image loses its distinctness, and the plate passes into a neutral state,—*i.e.*, no appreciable image appears on use of a developer. But if the exposure be continued still further, the negative image gives place to a positive, in which the distribution of light and shade is exactly the opposite, and this image, if the luminous action be well regulated, presents all the details and fineness of the one it has supplanted. With further exposure a second neutral state is reached, opposite to the first, inasmuch as if the latter showed the image uniformly dark, the former shows it uniformly light. For solar negatives taken at Meudon, the time of exposure has rarely exceeded 1-1,000th of a second, if the photospheric granulations were to be obtained; and with plates prepared by the gelatino-bromide process, the time may be reduced to 1-20,000th of a second, or less. Now, if one of these dry plates be exposed half a second, or a second, a distinct positive image is produced, the body of the sun appearing white, and the spots black, as they do to the eye. M. Janssen has similarly obtained positive images of landscapes, appearing transparently as the scene is viewed naturally; also a view of the park at Meudon, showing a white solar disc on the dark background of the sky, and counter-types, which are of the same sign as the original type,—*i.e.*, positive if the type be positive, and negative if it be negative. In these photographs it is the same spectral rays that have first given the negative image, and then effected its transformation into a positive.

Sedgley.—Board schools to accommodate 450 children have been opened at Red Hall. The schools and playground extend over 4,000 square yards. There are three departments, each capable of accommodating 150 children. The buildings have been erected by Mr. Horton, of Brierley Hill, from the plans of Mr. A. P. Brevitt, architect, Darlaston, at a cost of 3,800*l.*

Floods in London.—At the meeting of the Metropolitan Board of Works, on the 9th inst., four deputations attended in reference to the floodings which have occurred in the northern districts of the metropolis. The first two deputations were from the Vestry of Islington and inhabitants of Holloway, to present memorials praying the Board to expedite the intended works for the storm and relief line of sewer for Holloway and Kentish-town, so as to prevent as far as possible further repetitions of the overflows of sewage matter and water into the houses in the parish of Islington and Holloway. The deputations were introduced by Mr. Elt. Mr. Brodfield, in support of the memorials, said that when the main drainage works for the northern part of the metropolis were constructed, the inhabited houses in Islington numbered 20,000, but the number assessed at the present time was 37,000; and the districts of Upper Holloway, Lower Holloway, and Highbury comprised as many houses as constituted the whole parish of Islington twenty years ago. In 1878 these districts were seriously affected by the overflow from the sewers, and particularly on the 23rd of June in that year, when one-third of a mile of the Holloway-road was flooded with sewage water, which flowed into the shops, houses, and premises. In the present year there had been several repetitions of the floods of 1878, and the inhabitants of the houses had suffered seriously from damage to their goods and properties, while the sewage matter was most dangerous to health. They prayed, therefore, that the Board would at once proceed with the contemplated measures for their relief. Two other deputations were introduced by Mr. Furniss and Mr. Watkins from the Vestry of St. Pancras, and inhabitants of the northern part of the parish of St. Pancras, to present similar memorials. The memorials were referred to the Works and General Purposes Committee.

A Large Building Society.—At the twenty-ninth annual meeting of the Birkbeck Building Society, held Thursday, July 8th, in the theatre of the Birkbeck Literary Institution, the report presented to the meeting stated that the receipts for the year ending the 31st March last were 5,709,932*l.*, and the total from the commencement of the Society 49,794,824*l.* The deposits reached the large sum of 5,132,924. The gross profits earned by the Society amounted to 102,802*l.*, of which 86,586*l.* have been appropriated to the payment of interest on shares and deposits, discount and expenses of management, leaving a net profit of 16,216*l.* The surplus funds amount at the present time to 1,966,296*l.*, of which 300,458*l.* is invested in Consols, New Three per Cents., and Exchequer and Treasury Bills; 219,275*l.* in Metropolitan Board of Works and India Stocks; 542,757*l.* in Colonial Bonds; 76,693*l.* in Railway Debentures; 125,145*l.* in French Treasury Bills, Foreign Railway Obligations, Bonds, &c.; 306,109*l.* in gas, water, and miscellaneous securities; 214,914*l.* in freehold ground-rents; while 180,943*l.* is in cash. It is worthy of note that no portion of the funds appear to be invested in promissory notes, bills of exchange, or personal securities of any kind. The total liabilities of the Society are 2,465,819*l.*, while the assets are 2,583,331*l.*, showing a net surplus of 117,512*l.* Of this sum 50,000*l.* is invested in Consols as a permanent guarantee fund, leaving 67,512*l.* to be carried forward to await the next declaration of a bonus.

The Obelisk.—At the meeting of the Metropolitan Board of Works, on the 9th inst., a report was presented from the Works and General Purposes Committee stating that, in pursuance of the resolution of the Board of the 13th of June, 1879, a model of one of the sphinxes to be placed on the pedestals at the sides of the Egyptian obelisk on the Victoria Embankment, and models of the proposed additions to the obelisk, had been placed in position, and recommending that the models be approved, and that it be referred back to the committee to take all necessary steps for having the sphinxes and additions cast in bronze. Mr. E. Dresser Rogers, in moving the adoption of the report, said it was intended to cover the obelisk with the silicate paint of the Indestructible Paint Company for preservation, and also to apply lightning-conductors. The report was adopted.

Fire.—On the night of the 7th inst. the steam sawing and moulding mills of Mr. Davis, adjoining the Lawrence Hill station, Bristol, together with the expensive machinery, stock, &c., were entirely destroyed by fire.

The Site of Horsemonger-lane Gaol will not, according to present appearances, be obtained by the denizens of Southwark as an open space. A report submitted by the Works and General Purposes Committee to the Metropolitan Board of Works, on the 9th inst., stated that on the 28th of May last the Board referred it to the committee to open further negotiations with the justices of Surrey, with a view of ascertaining what price they would accept for the site of Horsemonger-lane Gaol. The committee had since been in communication with the Clerk of the Peace, and had now to report that they had received a letter from him stating that the justices would be willing to accept 18,000*l.* for that portion of the site of the gaol which was offered for sale on the 19th of May, subject to the conditions of sale used on that occasion. The sum named by the justices was, however, the committee regretted to say, beyond that which they would feel justified in advising the Board to pay, and they recommended, therefore, that the offer be declined. Mr. Dresser-Rogers, in proposing the adoption of the report, said he regretted exceedingly that the price asked, 18,000*l.*, for something less than an acre and a half of land, was not a price which the Board would be prepared to give. The committee had viewed the spot, and they were sorry to find that the justices thought of taking a large portion of the area now uncovered for their own purposes, and the space left would be so small, and the price asked so very high, that the Board could not think of proceeding further in the matter. The recommendation of the committee was adopted.

Social Science Congress.—Lord Reay has accepted the office of President of the Social Science Congress at its approaching meeting in Edinburgh. The Congress, as at present arranged, is to meet on the 6th of October, the closing meeting being held on the 13th of that month. The Arrangements Committee has nominated the following gentlemen to be the secretaries of the different departments, viz., I. Jurisprudence,—(1) International and Municipal Law section,—Mr. J. A. Reid, advocate, and Mr. J. Barker Duncan, Writer to the Signet; (2) Repression of Crime section,—Mr. Chas. Scott and Mr. J. M. G. Ivison, advocates. II. Education,—Dr. Pryde and Dr. Robertson. III. Health,—Dr. Littlejohn and Dr. Stevenson Macadam. IV. Economy and Trade,—Ex-Treasurer Wilson and Mr. John Harrison; and V. Art,—Mr. J. M. Barclay, R.S.A., Mr. Arch. Constable, and Mr. Alexander Ballantine. In connexion with the Congress, arrangements are being made by the Royal Scottish Academy for opening an exhibition illustrative of Scottish art. While living painters of standing will be invited to contribute, it is expected that nearly 200 pictures by deceased artists will be obtained on loan.

The Proposed Art Gallery for Birmingham.—The Art Gallery movement in Birmingham has received an additional stimulus by the encouraging announcement of the purchase, expressly for presentation to the town, of Mr. John Bragg's noted collection of Wedgwood ware, valued at 2,000*l.* The gift (says the *Birmingham Gazette*) has a special value, as unsuccessful efforts have previously been made to secure to the town by means of a subscription the unique collection which it will now obtain through the wise and thoughtful generosity of a private individual. The name of the donor will not be made known for the present, but this will not be the first of his benefactions. To the art-workers of Birmingham the donation will be an inestimable treasure. Another addition to the Art Gallery is the picture, "George Dawson and his Friends," which was painted by the late Mr. Ernest Thompson, of Birmingham, and purchased by public subscription. The picture has just been presented to the Free Libraries Committee for exhibition in the Art Gallery.

Driffield.—A new Wesleyan Chapel was opened at Driffield on the 7th inst. The cost has been over 5,000*l.*, and the contractors were:—Stonework, Mr. Sweeting, Hull; woodwork, Mr. Barnes, Beverley; brickwork, Mr. Gage, Driffield; and Mr. J. F. Shepherdson, of Driffield, has acted as clerk of works for the architect, Mr. H. J. Paull, of London and Manchester.

Messrs. Doulton & Co. have obtained at the Sydney International Exhibition four first-class awards for their sanitary ware, vitrified stoneware drain-pipes, crucibles, melting-pots, &c., and art ware, besides awards for other manufactures.

In the "Whitehall Review," for the future, the portraits of ladies, which have long formed an important feature of the paper, will be drawn from the life by the Chevalier Desanges, the painter of "A Royal Garden Party at Chiswick." Lady Poltimore's will be the first portrait given.

New Parochial Offices, Westminster.—In this competition, Mr. Charles Barry has consented to act as professional adviser to the committee. The desire that the Press should abstain from giving any notice of the designs submitted is still expressed.

Cast Steel Bells.—We have been asked more than once for information as to cast-steel bells. A trade-book just now issued by Messrs. Vickers, Sons, and Co., of Sheffield, gives all the particulars that can be desired.

TENDERS

For new warehouses, Queen's-road, Bayswater, for Mr. W. Whiteley. Mr. J. E. Saunders, architect. Quantities by Messrs. Osborn & Russell:—

Cubitt & Co.	£99,824 0 0
Holland & Hannen	99,210 0 0
Adamson	98,415 0 0
Ashby & Horner	92,890 0 0
Hall, Beddall, & Co.	92,760 0 0
Brass	88,615 0 0

For the sewers, making up, and kerbing, &c., of Spencer-road, Bolton-road, Hartington-road, and Devonshire-gardens, Grove-park, for the Chiswick Improvement Commissioners. Mr. H. O. Smith, surveyor:—

Mears	£3,162 0 0
Aldred	3,135 10 0
Nowell & Robson	2,800 0 0
Burford & Ball	2,783 0 0
Marshall	2,782 10 0
Acock	2,685 18 6
Isles	2,639 0 0
Huggett & Wilson	2,573 14 9
Ward & Torkington	2,462 0 0
Neal (accepted)	2,401 6 11

For a residence at Woburn Sands, Bucks. Mr. Fredk. Gotto, architect:—

Young	£430 0 0
E. Smith & Son	417 0 0
Whiting (accepted)	380 0 0

For pair of semi-detached houses in Wimbledon-park, for Mr. W. Everett. Mr. J. G. Gibbins, architect:—

Falkner	£3,975 0 0
Fisher	3,574 0 0
Wood	3,224 0 0
Deacon (accepted)	3,032 0 0

For Infectious Hospital, Hillingdon, for the Uxbridge Local Board:—

Holland, Poplar	£2,090 0 0
Crowe, Hereford	1,995 0 0
Scott, Ealing	1,951 0 0
W. Reaves, Windsor	1,940 0 0
G. Reaves, Windsor	1,926 0 0
Hardy, Cowley	1,839 0 0
Taylor, Uxbridge	1,698 0 0
Harold, Finsbury	1,622 0 0
Kearley, Uxbridge	1,552 0 0
Bull, Cooper, & Co., Chelsea	1,539 0 0
Bagley, Beaconsfield	1,497 0 0
Haynes, Harrow	1,437 0 0
Pratt, Hillingdon	1,421 0 0
Rebington, Uxbridge (accepted)	1,399 0 0
Garrett, Uxbridge	1,333 0 0

For four sale shops and houses, Derby-road, Nottingham. Messrs. S. Dutton Walker & Howitt, architects:—

Marriott & Wartnaby	£3,460 0 0
Bell & Son	3,320 0 0
McCulloch	3,140 0 0
Fish	3,067 0 0
Hind	3,025 0 0
Vickers	2,999 0 0
Jelley	2,980 0 0
Wheatley & Maule	2,971 0 0
Wooll, Bros.	2,920 0 0
Clarke	2,914 0 0
Fox	2,904 0 0
Bailey	2,880 0 0
Henshaw	2,853 17 0
Lynam	2,851 0 0
Hodson & Facon	2,839 0 0
Messom (accepted), Talbot-street, Nottingham	2,815 0

For the erection of stables and coach-houses on the Bolingbroke-grove estate, Wandsworth-common, for Mr. E. Appleby. Mr. E. R. Robson, architect. Quantities not supplied.

W. Johnson (accepted)	£747 10 0

For the erection of a house on the Earlsfield estate, Wandsworth-common, for Mr. Archibald Little. Mr. J. T. Lynes, architect. Quantities supplied by Mr. W. E. Stoner:—

Parsons	£1,770 0 0
Gibbs	1,734 0 0
Pain	1,723 0 0
Robinson	1,600 0 0
Turtle & Appleton	1,585 0 0
Lorden	1,575 0 0
Williams	1,560 0 0
Johnson (accepted)	1,510 19 6½

For sundry alterations and repairs at The Elms, Trinity-road, Wandsworth-common, for Mr. C. W. Wheatley:—

Johnson (accepted)	£210 2 0

For the erection of boundary-wall and entrance-gates, &c., in Nightingale-lane, Clapham-common, for Mr. Brookes. Mr. J. Weir, architect. Quantities not supplied:—

Ansell	£451 0 0
Lathey, Bros.	339 0 0
Johnson (accepted, with revision)	311 7 0

For the erection of a detached villa on the St. James-road, Wandsworth-common, for Mr. H. Privett:—
Johnson (accepted) £836 0 0

For the Bells, Drury-lane. Mr. W. H. Scrymgeour, architect:—
Martin, Wells, & Co. £5,500 0 0
Dunford & Langham 5,495 0 0
Martin 5,450 0 0
Watson 5,429 0 0

For restoration of main part of mansion, Watlington-park, Oxon, for Mr. J. T. Symons-Jeune. Mr. Arthur Vernon, architect:—
Silver £1,874 0 0
Holland 1,749 0 0
Cooper 1,745 10 0
Woodbridge (accepted) 1,673 0 0

For rebuilding premises in the Poultry. Messrs. Ford & Hesketh, architects:—
Scrivener & Co. £3,274 0 0
Dove, Bros. 3,155 0 0
Mowlem & Co. 3,123 0 0
Mark 3,000 0 0
Brass 2,950 0 0
Macey & Sons 2,933 0 0
Lawrence 2,722 0 0
Sabey & Son 2,717 0 0
Conder 2,605 0 0

For the erection of an entrance lodge, for Mr. W. B. Gater, Belvoir House, Fareham. Mr. J. Burman Rosevear, architect:—
Gamblin £234 7 0
Fullford 230 0 0
Plummer (accepted) 223 0 0

For a house and shop at Reigate. Mr. T. R. Hooper, architect. Quantities supplied:—
Braid & Co. ..... £1,600 0 0 !
Bagaley 1,600 0 0
Parsons 1,400 0 0
Cook & Thornton 1,340 0 0
Winkworth & Worsell 1,240 0 0
Holmwood 1,168 0 0
Apted 1,057 0 0
Waycot (accepted) ..... 890 0 0!

For two detached villas, Shepherd's-hill, Crouch-end. Mr. E. J. Paine, architect:—

	No. 1.	No. 2.
Goodman	£1,646 0 0	£1,875 0 0
Holmes & Son ...	1,540 0 0	1,737 0 0
Conder	1,699 0 0	1,713 0 0
Roberts	1,461 0 0	1,698 0 0
Harper	1,448 0 0	1,617 0 0
King	1,360 0 0	1,560 0 0
Mattock, Bros...	1,334 0 0	1,426 0 0

For re-building No. 232, Westminster Bridge-road, for Mr. D. Davis. H. W. Sexton, architect. Quantities supplied:—
Heard & Co. £1,767 12 0
Chaffen 1,550 0 0
Crisp & Tomlin 1,473 0 0
Elliott 1,460 0 0
Vaughan 1,459 0 0
Nichols 1,430 0 0
Julian & Co. 1,425 0 0
Beale 1,387 10 0
J. & H. Cocks 1,370 0 0
Garrard 1,367 0 0
Nightingale 1,352 0 0
Batley 1,340 0 0
Priestly 1,340 0 0
Linfield 1,333 0 0
Russell & Cowley 1,329 0 0
Whittaker 1,298 10 0
Judd (accepted) 1,279 0 0
Hobern (too late) 1,275 0 0

For villa residence at Fitzjohn's-avenue, Hampstead, for Mr. Pettie, R.A. Mr. Wm. Wallace, architect. Quantities by Mr. F. Thomson:—
Richardson, Bros £7,995 0 0
Hunt 7,645 0 0
Brass 7,587 0 0
Manley 7,531 0 0
Scrivener & Co. 7,490 0 0
White 7,429 0 0
Woodward 7,380 0 0
Toms 7,359 0 0
Cox 7,274 0 0
Taverner & Son 7,130 0 0
Dowsing & Sons (accepted) 6,497 0 0

For dwelling-house, Sunninghill, Berks, for Mr. T. Ashby. Mr. Saunders, architect:—
Knight £2,920 0 0
Simpson 2,768 0 0
Messom 2,745 0 0
Pither 2,722 0 0
Watson 2,716 0 0
Higgs 2,459 0 0

For Baptist Chapel, New Shoreham, Sussex. Mr. Arthur Loader, architect:—
Burstow £1,278 0 0
Stow 1,250 0 0
Newnham 1,230 0 0
Burchell 1,210 0 0
Curd 1,210 0 0
Bruton (accepted) 1,200 0 0

For alterations to No. 177, and new shop 178, Western-road, Brighton. Mr. Arthur Loader, architect:—
Lockyer £834 0 0
Newnham 777 0 0
Bruton 760 0 0
Dourner 735 0 0

For alterations and repairs to Nos. 4, 5, 6, and 7, Frederick-street, Hampstead-road, for Messrs. Saul. No quantities. First contract:—
Purkiss £1,99 17 0
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The Builder.

VOL. XXXIX. No. 1955. SATURDAY, JULY 24, 1880.

ILLUSTRATIONS.

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More Gas Explosions.

WORKMEN'S EDUCATION.

BY one of those coincidences which so frequently occur, as if in mockery of the calculus of probabilities, the same daily journals that reported the verdict of the coroner's jury as to the death of the two men who were killed on the 5th current by the explosion in Tottenham-court-road, contained also an account of two explosions which took place on the 13th current at Bilston, near Wolverhampton, as briefly noticed in our last number. The importance of the warning, which we gave in the same number, of the danger arising from the effect of street traffic on the unprotected joints of the gas-pipes, has thus received an emphatic confirmation.

Although unaccompanied by any loss of life or personal damage, the Bilston explosion points to a graver source of possible danger than did the London catastrophe. It is graver in this respect,—it is one which cannot be said to be unlikely to recur elsewhere. The laying of a large main, not as an altogether new work, but as replacing former communication, is, as we pointed out, a matter of rare occurrence. It is one as to which the terrible warning of the 5th of July is calculated to suggest due precaution for the future. But the same thing cannot be predicated of the escape of gas into a sewer. All the elements of danger occur in such a case, with the sole exception that the introduction of a light is unlikely. But undetected leakage, slow accumulation of unsuspected gas, formation of explosive mixture,—all these things may occur, and probably do occur, far oftener than we have any notion, in sewers. In any such case we are at the mercy of a chance spark, and how far a chain of explosions thus originated may extend no one is able to say.

In the Bilston case, as in that in London, the flame travelled down the conduit which contained the explosive mixture, firing the same in successive places. A second explosion took place at three in the afternoon, five hours after the first. But we apprehend that there can be little doubt that the second was so far independent of the first, that it must have arisen from a fresh lighting of the gas from some external source. The great lesson to be learned, in each case, is that danger is not to be avoided by closing our eyes. A leak is not stopped by being buried in the ground. A sewer is not made safe by being left unventilated. On the contrary, a new reason for the ventilation and inspection of sewers is afforded by the revelation of a source of danger not hitherto unknown, but too little thought of. In the case of a sewer which, in addition to that sewer gas which is the carrier of typhoid fever, contains any serious amount of carburetted hydrogen gas,—the very means taken to effect ventilation, unless perfect, might cause wholesale destruction.

The more essential is it that gas-mains should be so laid as to be undisturbed by traffic, and to be easy of inspection from time to time. The great advantage, as a matter of safety, which coal-gas possesses in its odious and permeating smell, is neutralised by the burial of the pipes beneath the road. It may be doubted whether that saturation of the earth with gas of which some witnesses speak is not somewhat fanciful. But there can be no doubt as to the danger of the existence of any conduits, caves, cellars, or other hollow spaces into which it is possible for leaking gas to make its way, without either suspicion or supervision.

Another lesson may be drawn from the verdict of the jury, in the London case. We referred before to the very straightforward evidence of Hawkes. The jury say that the explosion was caused by a light being ignorantly placed to a pipe by this witness. As we understand the verdict, it means that Hawkes was totally unaware of the danger caused by so doing. No doubt this was the case. But what are we to say of the technical education of the working man, when we find that a foreman of gasfitters was utterly unacquainted with the rudimentary fact that a mixture of hydrogen and of oxygen is explosive? Do not let us be deceived by the use of the word "technical." It does not mean, rightly understood, an education above the wants of the people. It means a sound practical education, giving proper instruction as to the rudimentary facts of the business in which the workman is to be engaged. In this, we greatly fear, our workmen, as a rule, are very deficient.

We take it that the ignorance of the workman arises, to a very great extent, from the fact of the changes which are so constantly occurring in the social relations amongst us, owing chiefly to the growth of population. In old times each craft was also a mystery. The master of the craft hesitated to commit to writing the secrets of the trade, even if he could write or read. In the most ancient and venerable of brotherhoods, such record was distinctly forbidden. As far back as we can trace the organisation of society, this idea of mystery has been present. The sole means of entrance to a craft was by apprenticeship. Three or four hundred years ago, if one of those popular handbooks, which now profess to teach almost every science and any art which can be pursued by man, could have been written it would have been burned by the common hangman, and its author would have been lucky if he escaped a like fate. Oral teaching, and practical tuition, were the means of initiating the young into the business of life. We are not about either to justify or to deplore the change which the last century has witnessed in this respect. It has been a change which, if attended with some good, has none the less been attended with some evil. The freedom of occupation,—freedom, that is, for any man to work at any craft which he chooses, whether he enters its precincts by the old-fashioned doorway, or whether he climbs over the wall,—is now regarded as one of the inalienable rights of the workman. There is some reason to doubt whether the craft, the workman, or the public, are the better for the change. One thing may be safely asserted, and that is that the committal of almost any kind of work to the hands of a man who has not been, in one way or another, specially instructed in the primary rudiments of the craft to which it belongs, is a cause of public danger, and of national loss.

Danger and loss, from this cause, will be likely rapidly to increase. It would not be easy to pick out a more instructive example than that of a gasfitting foreman, who did not know that gas and air, when mixed, were explosive. How much light does such a remark throw on many a coal-mine explosion? When these have been so often attributed to rash and self-willed hardihood, may it not often have been the case that the real cause was the utter, profound, total ignorance of the workman? Call him ignorant, indeed, and he on the one hand, and the Committee of Council on Education on the other, stand up and revile you! He can read even the small print of *Lloyd's Weekly Newspaper*. He can work the first four rules of arithmetic. Nay, he may have had lessons in geography or in music; or, in other modes, may have had a primary, transformed into a secondary, education.

But when you ask, How have the bases of his education been laid with reference to his future calling in life? there is an ugly silence. To fit every man for every thing is the great object of many advocates of theoretic education. The result, in nine cases out of ten, we take it to be, that no single pupil is thoroughly trained or fitted for any single occupation. Surely if the education of a man who was to deal in gas was to have any practical value, the first thing that it should teach him would be under what circumstances gas is dangerous to human life. Now it seems to result from the evidence before the Coroner that the gas-pipes and mains of London are entrusted to the practical tendance of a body of men who are utterly unconscious of the dangerous character of the subtle fluid in the distribution of which they are the agents.

We believe that there is hardly one great physical catastrophe that occurs,—from the fall of an iron bridge in a high wind, to the rupture of a gas-main,—which is not more or less directly to be traced to the substitution of the hastily-instructed or the wholly uninstructed workman,—grading from the highest to the lowest,—for

the pupil of adequate experience. That this has been the case in new countries and colonies has long been known. In fact, the very want of traditional training is one of the conditions which have fostered the inventive genius of the United States. But while in a new community such want of training has a certain compensation in the readiness of invention which it encourages, in an old community it is hardly conceivable that anything but mischief can result from it. We are told that a trade must cease to be a mystery. But the danger is that, such being effected, it will soon cease to be a craft. When any great industry can be carried on in a factory, under selected masters and foremen, it will be likely to succeed,—as a means of making money. What becomes of the craft itself, and of those who were once small but independent members of it, is a question less easy to answer.

One thing, we think, ought to call for immediate attention as regards the protection of society from the ignorance of the workmen. In each craft,—speaking more especially now of those which are of public exercise, such as that to which we have been here chiefly referring,—there should be an accepted primer or text-book, with which every man allowed to practise the trade should be made acquainted. This primer should state the rudiments of the craft, more especially with regard to those elements that affect the safety of human life. It should be confined to the craft itself, yet should be so written that a collection of these primers would be at once mutually consistent and exhaustive of the field of technical education, using the word, as we before explained, as synonymous with practical education.

Thus, before a man should be put in a position in which his ignorance might allow him to be the agent of converting a populous thoroughfare into a heap of ruins, he ought to have some information conveyed to him, and drilled into him, as to the reasons for taking care. "You must not smoke on your work." A good rule. But the intelligent workmen will say, "Why? It comforts me to smoke; I do my work better with a pipe in my mouth. Don't be tyrannical." What is the reply to this? Is it a collier or a gasfitter of whom we are speaking? He must be taught what it is with which he has to deal. "You have heard of the terrible fire-jack. You have been accustomed to gaslight from your childhood. You see that that stinking air burns when it is allowed to escape gently into the air; but in that terrible explosion the other day, the fire-damp was simply coal-gas mixed with air. This fire-jack can be produced by neglect wherever there is coal-gas." We are not giving this as a sketch of the primer, but as an instance of the way in which the attention of the lad is to be excited. For those who have to deal with coal, or the products of coal, there should be a special primer, drawn up by a man of thorough acquaintance with the subject, which should give a practical explanation of combustion, distillation, and explosion, and the study of which should be so enforced that no town should be placed at the mercy of a labourer who attempts to discover whether gas,—or, if you like better, gunpowder,—is safe, by the simple test of the application of a lucifer match. That is what is now the practice.

The above had been written before the intelligence of the fatal explosion at the Risca colliery arrived, to add a tenfold emphasis to our words. It is, of course, possible that it may prove that this terrible explosion was due to the one main cause of colliery explosions—the want of a luminous safety-lamp, which shall give more light when it is closed than the open flame would yield. But as far as intelligence has yet reached us, it points rather to what is usually spoken of by juries as "the act of God" than to any human error or neglect. The seam of highly bituminous coal lying at a depth of 840 ft. from the surface was known to be fiery. The ventilation of the mine was ample. The precautions taken were unusual. The men engaged were not solitary miners, but gangs of carpenters, masons, and other workmen, who had gone down expressly for the repairs of the roadway. Every thing points to care. The case, however, of the striking of a spark from a steel tool is one as to which no thought seems to have been taken. It might fully account for the catastrophe.

There is no doubt that the atmosphere has for some time been highly charged with electricity. The hypothesis of anything like spontaneous combustion is one not lightly to be adopted. But it may be asked whether, in the Bilston case, the formation of phosphuretted hydrogen in the sewer is impossible? This gas, as is well known, ignites spontaneously on coming in contact with the atmosphere; and a puff of this fluid, which forms the Jack-o'-lantern or Will-o'-the-wisp of our fens and marshes, would be enough to explode a mixture of hydrogen and oxygen. We suppose that phosphuretted hydrogen is not likely to have been secreted by the black vein. But even as to this an inquiry can do no harm. It will be well to have the chemistry of the spontaneous ignition of coal, which sometimes occurs in the bunkers of a steamer, made thoroughly clear to the practical man, as bearing on this point. The idea has also been suggested that the lightning of the storm which accompanied the Risca explosion may have fired the gas ascending from the upcast shaft. At all events, even without supposing any direct inflammatory action apart from human agency, the atmosphere has for some days been in a highly electric state. We do not know enough of the subject to form an opinion how far the inflammatory or explosive qualities of any mixture of gas may be augmented by a high temperature. But it is quite possible that this may be the case to a notable extent.

As bearing on the possibility of the ignition of the gas within the mine from fire without, whether by the electric spark or any other source, it will be found highly instructive to study the account of the outburst of fire-damp in a colliery at Frameries, in Belgium, on the 17th of April last, which is given in the *Annales des Mines* (7th series, vol. xv., p. 575), and of which an abstract is given in Part II. of the "Abstracts of Papers in Foreign Transactions and Periodicals" of vol. lx. of the "Excerpt Minutes of Proceedings of the Institution of Civil Engineers."

At 7h. 45m. a.m. of the 17th of April, a violent current of air issued from the downcast pit, accompanied with dust, and small fragments of coal. A few seconds afterwards the gas ignited at a surface fire, and immediately the whole interior of the building covering the pit was filled with flame, which extended to a height of over 160 ft. The ventilator having been stopped, ineffectual efforts were made to extinguish the fire. Gradually the flames issuing from the pit lowered, till at 9·15 a.m. it only rose to 6 ft. above the orifice of the shaft. After flickering for a moment, an explosion took place in the shaft. For twenty-five minutes after this, everything was quiet. Then another explosion occurred, followed by four others at intervals of ten minutes apart. It is believed, on the evidence of survivors, that all these explosions took place in the shaft itself, which was 656 yards deep. But an hour after the last of these, a violent explosion took place, extending through the whole mine, and attended with fatal and disastrous results. It was estimated that during little more than two hours preceding the first explosion not less than twelve million cubic feet of gas issued from the workings. So fiery is the coal that fire-damp issues from the face at times with a pressure of sixteen atmospheres, measured in the bore-holes with which it is customary to tap the workings in order to drain the coal of gas. The efflux is at times so full as to extinguish the Mueseler lamps, which are used in the mines. Should a sudden outburst of gas, remarks a French engineer, take place near the down-cast shaft, part of the gas, proportioned to the ventilating current, will course through the mine. The surplus, which may be considerable, may lodge in the downcast pit, and by its levity may ascend so as to retard or even to reverse the current. At the surface, or in passing lights at higher insets into the pit, the gas may become ignited, drawing together more gas and surrounding air. The latter soon attains the proportions for a violent explosion; but the flame at the pit's mouth is unextinguished until the quantity of air attains such a proportion that a final explosion takes place in the pit or in the mine itself.

It is observed in the Belgian mines that the advance borings generally give out but little gas for some days before an outburst. In some cases a cavity, more or less extensive, is found, but the disproportion between any such cavities and the enormous quantities of gas liberated is so great as to lead some engineers to the opinion that the gas exists in a liquid state, which is suddenly changed into a gaseous state by a rise in temperature.

The result of the first inquiry at Risca is that the explosion took place near the bottom of the downcast shaft; but we are told that it seemed to the explorers that the fire did not go towards the shaft, but took the other direction. The hitcher, Thomas Bowden, was not burnt at all, but killed by being blown against the sides of the mine. It is said that naked lights were used by the repairers, as far as 30 yards from the downcast shaft, and that the ventilation in this part was almost strong enough to blow a man off his legs. Further research has rendered the hypothesis of external firing less probable. The lamp of one of the miners was found with a large hole in the wire gauze, evidently caused by a blow from a pick. The lamp was broken and the gauze bent.

A FOREIGNER ON HOME DECORATION.

In a country like England, that for centuries has been famous for its comfortable homes, it cannot be said that we have ever been indifferent to what we now call, and hear so much about as, "Household Decoration." It may be said that since the first great exhibition in Hyde Park it is easy to trace in a large body of society, which till that time had remained comparatively indifferent to such matters, an eager desire to see their homes and houses artistically furnished and decorated. Volume after volume on "Household Taste" has been published, translated, and re-edited on both sides of the Atlantic, for our American cousins have taken up the question with perhaps even more warmth than ourselves, and the interest still shows no sign of abatement, while the encouraging results obtained justify even further efforts on the part of those who seek to lead the way in this path.

In these columns our readers have had it placed within their power to observe the successive development of the question as argued from the various modern points of view of which it admits. It is not often that we are able to compare with those of our own English professors the views of foreign authorities. On the Continent, where among a very large number of persons the matter of household decoration is one to which consideration was given long before its importance was even suspected in England and where also domestic decoration may be said to be a science, among the greater mass the existence of any artistic views on the matter is unknown or unsuspected; it would be, indeed, difficult to purchase abroad any work similar to those of which so many are to be found in every bookseller's shop or store in England, Australia, or America. Household taste on the Continent partakes more of oral and ocular tradition than of written law, and, out of certain artistic and refined circles, the views on the subject have long been settled with an exactitude that allows of scarcely an exception; indeed, they coincide with such amusing rigidity that the inventory of any respectable Parisian bourgeois household (a representative example of the foreign home) would serve as a perfect type of that of ninety-nine families out of every hundred, commencing from the regulation, cumbersome, but sacredly necessary, "*armoire à glace*," and the inevitable "*bois de lit*," down to the "*reps*" curtains, and the chimney-shelf "*garniture*."

From time to time, however, a voice is feebly raised to break the monotony and indifference of this existence, but the foreigner generally (outside, it is true, a comparatively large class of art-lovers) cares little for his home; his wife is occupied with the household cares, her spare time is devoted to the all-important consideration of her dress or that of her children, and generation after generation the same ideas regarding household decoration are handed down immaculately. The voice raised is drowned in general indifference,—on one side from the people of taste who are opposed to dictation; on the other, of those unmindful of their blissful ignorance;—and hence it is that nowhere more than on the Continent is the observant stranger struck with the extremes to be met with in the houses he may visit.

Notwithstanding the admirable teaching of the French, and the many lessons and suggestions that are to be obtained in Paris on matters relating to household decoration, we are certainly disposed to think that the world, not only of London, but the great world everywhere, has been too long content to allow Paris to lead them in the pure questions of decorative art. The time has now come when not only the

wealthy, who have always been lavish in the decoration of their houses, but the comparatively needy, may find, in London,—in Oxford-street, in Wigmore-street, in Bond-street, and elsewhere; in New York,—in Broadway and in Fourteenth-street, professional household beautifiers with knowledge and means sufficient to satisfy even the correct taste which now in so many instances exists in England and America.

It may not be uninteresting, however, to lay before our readers the views expressed on this subject of household taste by a highly-respected foreign authority,—M. Guichard,—the founder of that excellent institution, the Union Centrale des Beaux-Arts appliqués à l'Industrie, to which reference has more than once been made in these pages. M. Guichard has expressed some of his views on "The Furnishing and Decoration of our Apartments" in a lecture delivered some while since, but only very recently printed. By the aid of the elegant and inexpensive little volume published by Rouveyre, let us examine M. Guichard's views.

The interest connected with the subject of household taste needs scarcely to be drawn attention to; few questions rouse more profitable controversy, few more directly appeal to us, for is it not in the very midst of all that constitutes the decoration of our homes that we pass the greater part of our lives? It is a time-honoured saying, the inaccuracy of which Brillat Savarin was, we believe, the first to point out, that in the matter of taste and colours every one has a right to his own unfettered opinion; in reality such matters are regulated by laws almost as fixed as those which Newton laid down. Their application alone affords scope for the exercise of diversity of taste.

M. Guichard takes us in imagination with him into a modern French house, the features of which he proceeds to criticise; a passing and ironical allusion to the dingy corridor leads us, like that useful feature which replaces, in Paris, our "hall" or "hall-way," to the dining-room, —"the dining-room of the nineteenth century," —or rather to the two dining-rooms, one for daily use, the other for state occasions. In the former the seats and curtains are in woollen rep, the walls covered with flock-paper. Little *étagères* are crowded with various childish knick-knacks. At this point M. Guichard regrets the beautiful decorative plates of the old days, and deplores that the work of our modern potters cannot take their place. The chandelier receives from M. Guichard a rude shock, fortunately only delivered on paper; he begs that the chandelier be made smaller, or at least the height of the room adapted in proportion, a somewhat more difficult task. It is impossible not to agree with our author in his abuse of the rep chair-covers and hangings, and flock-paper, for their peculiar property of absorbing in the dining-room the odour of previous meals. The room set aside for gala days is of the same serious tone; here, again, we meet with sombre, severe hangings; the tables, seats, and walls, the side-boards, are all in black wood, a funereal feature which suggests to M. Guichard a somewhat amusing allusion to an Egyptian custom which, it will be remembered, Mr. Long has treated happily in a well-known picture. The use of black wood for the dining-room is certainly to be questioned,—its proper place is the library or the study; for the dining-room, the furniture by its aspect and very air should be inviting and gay; or, as the author has it, "it never should exceed the tint of old oak, which recalls so successfully the appetising colour of the joint roasted to a turn." Consideration, again, as to the comfort of the guests should not be neglected in the design of the chairs, as is so often the case in modern houses. The "surtout" or épergne, which still reigns in glory in many French houses, only receives from M. Guichard its proper due when he roundly advises its displacement, provising that, if tradition or fashion demand its presence, it should be a subject of great artistic consideration as the principal feature in the composition of the table; above all, our author urges, as we urged for years, that it should never intercept the view or the voices of one's opposite neighbours.

The meal over, the guests retire to the *salon*, "to which penetrates at the same time the odour of the dinner." "Why should there not be," asks the author, "an intermediary room, a species of *lazaretto*, in which could be purified these 'aromas,—perfumes while the appetite exists, miasmas when it is satisfied'?" He has here in mind, of course, the French flat, with dining-room and *salon* on the same floor, rather than the English house.

Introduced with M. Guichard into the *salon*, its gorgeous and invariable white and gold is the subject of the criticisms of the author. In every direction white and gold,—"the eternal absence of beauty dissimulated by wealth." The decorators know the ease of its management; for white, as M. Guichard explains, being the negation of all colour, there is no need to seek contrasts or harmonies of tone. It is sad, adds the author, but less so, nevertheless, than the use of colours which offend the eye.

Appealing to his readers, M. Guichard asks them if their memories will not serve them in recollecting how nearly all the homes of their wealthier friends are decorated in this style. Nature is the sole corrector for this discordance in harmony. Consult Nature; "refer to the great book which she opens for all, and there you will find all your examples. All that is necessary is that they should be seen, analysed, and applied." Taking the instance of the decorative effect of a garden, M. Guichard explains how it will be found that while in the foreground every flower can be distinguished and named, as it recedes from the eye it becomes more and more indistinct. Such is the perspective of colour during the day. At night the effect is exactly the opposite; the foreground is in half-tint and indistinct; further on it grows darker, and beyond the dark, shadow. Here, observes M. Guichard, are two examples furnished by nature. They will be found as valuable guides to follow in the decoration of our rooms. Thus if you wish to decorate your room with light tones, and increase in appearance the size of the apartment, follow the first example above cited. Let your carpet be bright, the brilliant tones toward the centre; let these diminish in intensity, and grow lighter at the extremities, that is, at the feet of the walls. Let your seats, those at least ranged round the room, relieve light on the stuff which covers the seat. Lower the tone a little for the back; then, for the panelling, if it is sunk, paint the projecting portions in tones even lighter than those of the backs of your chairs, and of different colours if you like. Finally, the deepest portions of your panelling will receive the most vaporous tints of your palette. By this means you will produce an optical effect which will apparently increase the size of your room, and you will at the same time obtain a general harmony which will be pleasing to the eye. The advice regarding the use of subdued colours is worthy of attention. "When the exigencies of the room you have to decorate require the use of low or sombre tones, you must take advantage of what I may term 'night perspective,'—that is, you will do the contrary of what has been advised above in the management of 'day perspective.' The carpet must be light in the centre, and the further you leave the centre the more subdued the tones must become. The colour of the seats must be calculated according to the number of distances of which you will have been able to dispose in your panelling. The stuff which covers your seats must be darker than the centre of your carpet, and the stuff at the back must be a tone or two above that again. Finally, the shades must grow more and more subdued on the walls of the room as they approach the farthest distance."

In answer to the surprise that may be expressed at reference to different "distances" in speaking of panelling, M. Guichard explains very clearly his views. In ordinary panelling there are several distances, and by the difference of half an inch several additional distances can be easily obtained, and the management of these, by the skilful aid of the palette, will produce, so M. Guichard assures his readers, quite unexpected results.

As to the stuff of the chairs, the difference of tones between the seat and the back will, as the author hastens to state, certainly appear unsatisfactory, unless the transition between the two is carefully considered. It is not with ordinary stuff bought by the yard that such effects can be got up, but the manufacturers (in France, particularly the Aubusson looms) now produce, and usually to order, any patterns required. "I am far from exacting from the decorator the impossible," continues M. Guichard, "when I require him to produce an illusion which will be completely satisfactory, if he knows how to make use of his palette and of the natural objects which aid him in his interior perspective; if, taking the position of the leader of an orchestra, he boldly makes use of each instrument, lowering the tone of one, augmenting with discretion the tone of another, managing with skill the soloists, he will arrive by delicate transitions at an effective whole."

Colour allied to architecture, as very truly remarks M. Guichard, completes its pleasurable effect on the eye and mind; distributed with taste and discernment, varied with skill, vivified by the clever management of light, colour singularly enhances the architectural features of a design.

M. Guichard at this point takes the opportunity of briefly explaining the theory of colour such as Chevreul has laid it down; and which, whatever doubt there may be on the exact correctness of its explanation, it is impossible not to feel is substantially correct in its application. M. Guichard has made, and is at the present moment making, a profound study, with practical experiments, of the applications and results of the theory of complementary colours such as it was explained in these columns not long since.* The value of a knowledge of the effects produced by the contrast, juxtaposition, and management of colours is warmly advocated by M. Guichard, who is, if we mistake not, shortly to publish a work copiously illustrated, showing the industrial application, for the decorator, of the theory of Chevreul, which, as the author boldly asserts, is a science which, like every other science, can be studied, analysed, and "the profound and complete knowledge of which is of the utmost necessity for all those who are engaged in the decorative arts." They should, further urges the learned founder and director of the Union Centrale, know also the laws of optics and many other matters besides, which our *fa presto* of the present day find it rather long and difficult to learn, and the absence of which leads to so many being actively employed utterly wanting in the necessary education,—not least among these, private individuals who foolishly boast of having themselves directed the choice of their hangings, their furniture, their bronzes, and the whole decorative effect.

From this digression we are recalled to the *salon*, where the uncomfortable nature of the chairs is warmly descanted upon. Why, asks M. Guichard pointedly, is the seat convex when it ought to be concave or at least level? Graceful it may be, but it is ill-suited, as M. Guichard very well puts it, to the construction of the human body. His opinion here, however, is open to discussion by the surgeons. With seats such as we use, the knees are lower than the trunk of the body, be continues, and it is the very opposite that is necessary for repose. The Orientals, who pass the greater part of their lives in contemplation, cross their legs (the knees in this position are higher than the centre of gravity), and in this way they can remain for hours in the same pose, while as M. Guichard very truly points out, with the existing construction of our seats, ten minutes suffice to transform them into a veritable instrument of torture. The form of the chair remains to be studied, and it is certainly difficult not to agree with the author when he foresees from this study the creation of very graceful forms, additionally comfortable as moulded, so to speak, on the human body.

M. Guichard is severe on the fireplace of the present day, the so-called family hearth, which the paterfamilias, in his traditional attitude, is able to entirely shut out. It is a little startling to be advised to demolish the whole structure and replace it by a stove in the centre of the room on the ground that "You will in this manner gain the space occupied by the chimney-piece and the fire-place, which is good for nothing"; admitting, however, the utility of the mantel-shelf (the mantel-shelf, no longer the real mantel-shelf of the past) as the natural place for the customary clock and candelabra, M. Guichard urges that "something yet remains to be done; let the architects endeavour to think of the matter." The fireplace and chimney-piece undoubtedly occupy, flanked as they are by their two cabinets, a large share of room; M. Guichard would propose to substitute a fire-place which, "instead of increasing in height should extend in length and offer a generous warmth to as many of the guests as possible assembled around it." This is to be done by the aid of a fireplace the interior of which could be "regulated by a series of little iron shutters closing and opening at will"; the heating power is to be gas. The writer devotes some para-

* See *Builder*, vol. xxxviii., pp. 392, 421, 484, 583 617, 675.

graphs to the important question of ventilation, or rather its want in our small rooms of the present day,—a grave inconvenience which, on reception nights, leads to an accumulated condensation of vapours on the windows and even the walls, and a common remedy for which is recklessly creating draughts by opening doors and windows. How is it, asks M. Guichard, that we make up our minds to suffer such an evil? The architect may here become a true hygienic doctor at the same time that he can create by taste a series of charming decorative motives. Let him place his panelling (panelling and high dados, let it be remembered, are more universally used in France than in England) at an inch or two from the wall, and a ventilation will be created behind the woodwork which will cure all the ill. The upper (open) portion would be connected from distance to distance with the cornice by garlands or by any other decoration that taste would suggest. The air would thus be continually renewed and never agitated; it would preserve a hygrometric state which would be equable, it would always remain healthy and agreeable. Art and hygiene would in this simple combination both be satisfied.

To the bedroom M. Guichard devotes more than one just criticism. Here, as he truly remarks (and the remark applies almost as forcibly to the English bedroom), are to be found the "largest masses of woollen stuffs, cotton, or silk. Chairs, carpet, *portières*, bed and window curtains, are all of one of these materials. Reject from this place of repose, this warehouse of stuffs, which absorb and keep the miasma of night. No woollen carpet, no heavy curtains to the windows, still less to the bed (it is much more universally the custom in France to have bed-curtains than it is in England); have you not enough in your woollen mattress, your blanket, your eider down, which serve as so many greedy aspirators? Replace your velvet and your silk by flexible matting; let paint decorate your walls; let an intelligent system of ventilation be established, and your bedroom will be what it should be,—healthy and agreeable." To those unable to dispense, from long habit, with bed-curtains, he advises wooden panelling cut, as modern machinery is alone able to do, very thin. Wood under this new form is susceptible of taking the most splendid tones of the palette, which will fully rival the most marvellous silks and velvets, but, unlike them, will not absorb any emanation or infection.

M. Guichard, it will be seen, is not one of those critics whose sole power consists in criticising; he suggests improvements and substitutes, the results of a long and practical career as an architect. This is a quality rarely found, and which cannot be too highly appreciated.

To the æsthetic consideration of the subject he has treated, M. Guichard does not neglect to devote some share of attention. He very properly prays that good taste may become more widely spread,—a result alone to be obtained by forming and purifying the taste already implanted in the masses. M. Guillaume, a former director of the École des Beaux Arts, remarked not long since on this very subject that it was by "the level of ideas, and not by the efforts of amateurs, that should be established the kind of superiority which suits the more cultured classes of society. Public opinion would be more authoritative if the men of the world, enlightened by study, and placed above all considerations of interest, could direct it; while at present we see them submitting to the caprices of fashion, or even inspiring them, and, indeed, in their knowledge both of the theory and practice of art, liable to the far inferior to an intelligent artisan." Much remains unquestionably to be done in this direction in our system of education, the closer union of art and letters in the educational system forming a first step in this direction. "We would wish," continued M. Guillaume, "that this union should commence from the earliest classes, and that art, after having been presented as one of the most living expressions of religious sentiment, as one of the sources of history, and the indispensable auxiliary of literary intelligence, should be connected in its critical bearing with the principles which regulate every well-reflected production; and with regard to its origin, with the constitutive ideas of the human mind." It is impossible not to feel that when this warmly-expressed desire of the director of the École des Beaux Arts is carried out, a great stride will have been made in the spread of a cultivated taste among those who at present are so contentedly ignorant of its advantages and the pleasures it bestows. But a further aid must come from the artists and the manufacturers themselves. This point M. Guichard insists upon, and in support of its importance quotes a valuable passage from a report of the commission of being re-quoted: "The period of uncontrolled competition under which industry at present is carried on, does not raise the workman to a proper understanding of the work he creates, but subdivides it, to lower it to the capacity of those who accomplish it. There exist in the present day few, if any, strong or able enough to take the raw material and fashion it, model it, chisel it, enamel it, gild it, give it, in fact, a form and a colour which are the production of reflection and the expression of the human heart. On the other hand, art itself, floating uncertain amidst brilliant individualities without schools, seeks its inspiration from all epochs and at the centre of all the extinct arts; from creator, from inventor that it once was, it has become learned, and taking too often memory for talent, it pretends to serve our needs, our tastes, our modern aspirations, with ready-made solutions and second-hand forms."

Let the details be carefully studied, but let the general effect be not forgotten. The great centuries of the history of art are far from us. Times and manners have changed, and with them our fortunes. Let the artists and creators study their condition in the present day to satisfy their needs. Let our art be made to suit these needs: in this action it will lose no dignity. In the enormous change it has seen since its rise, its progress through the East, through Greece, in Italy, and in the West during the last 500 years,—can art be said to have abdicated in all these transformations either its unity or its beauty? Whether it has triumphed through its simplicity or its grandeur, through its force or its majesty, or through its grace, we ever find its glorious trace at a supreme degree above the lowest water-mark of the civilisations of the past.

ANOTHER WORD ON THE SMOKE QUESTION.

CERTAIN people who have the welfare of society very much at heart, and who have already notably contributed to it in various ways, are proposing, we believe, to enter on a systematic effort to promote a further campaign, ultimately in a legal form, against the production of smoke in London; to apply, in fact, to habitations in general some such compulsory legislation as is already in force in regard to the processes of combustion in manufactories. From what we hear of it, the matter seems as yet to be in too early a stage to be referred to except in these general terms; but as it seems likely that public attention may be again specially directed to the subject, it may be useful to recall to those who are interested in it some of the main facts and principles to be borne in mind in attempting any systematic treatment of the smoke-plague.

Probably a good deal of indignation on the subject has been evoked by the peculiar violence of the fogs of the past winter. We say indignation, for that appears to be the kind of feeling which a thorough visitation of London fog evokes from those who have to endure it,—a feeling that they are utterly ill-used persons, and that somebody ought to be hanged. This is to some extent, we believe, a rather recently-evolved feeling. Formerly the London fog was mostly regarded as a visitation of Providence, to be accepted with the same resignation with which a heavy thunderstorm would be received: it was nobody's fault, although very inconvenient, and even in some respects dangerous; and many clergymen would probably have thought it not out of place to have added a prayer against fogs to the other meteorological petitions in the Prayer-book. The reason for the change of feeling, the modern lack of pious resignation to the fog, is not to be traced entirely to the progress of that kind of materialism which led a parish clerk to reply to his rector, when the latter proposed to read the prayer for fair weather,—"Bless you! sir, its no use till this wind changes." A good many people have seized hold of the idea that the London fog is preventible, and that it consists of the London smoke blown back or kept in suspension, under certain atmospheric, and perhaps electrical, conditions, over the doomed city. The fact that other cities were not visited with such fogs led to the conclusion, logical enough, that there must be a cause for them special to London,—

"For this effect, defective, comes by cause,"

and the smoke seemed the only scapegoat. In respect of this idea there are two discriminations to be made. In the case of some of the thickest fogs we have had it has been observed that the "inspissation" (as Dr. Johnson would have called it) is as great far out into the surrounding country as it is over the town, and that on all sides, independent of the quarter of the wind. We had occasion ourselves to notice this in regard to one of the very worst fogs of this last winter, which was thicker some miles out of London than in it, though it changed its colour, being yellow in the town and white in the country. The colour in town gave every reason for the belief that smoke formed a considerable factor in it; the colour in the country showed plainly enough that it could be just as thick without the smoke to help. As to what may be the real main cause of the London fog we do not here say again, as our business at present is with the smoke; we only wish to point out that those who think they will get rid of the London fog by getting rid (if that be possible) of all the smoke will probably find themselves disappointed. They will get rid of its colour and of its peculiarly dismal and depressing effect, but that is all. Other facts combine to indicate the same conclusion. Manchester, in the matter of "blacks" in the air, is a great deal worse than London, as London visitors at the last Social Science Congress must have observed. When eleven years ago there was a discussion at Newcastle-on-Tyne as to the repression of smoke there, London was cited as an example of what could be done, and it was said that with proper attention Newcastle might be made as free from smoke as London. This perhaps implied an innocent illusion on the part of the Newcastle folk; but what may at any rate be deduced is that both Manchester and Newcastle are (unless the desired improvements in the latter town have been effected) more smoky than London, but they have not the same fogs.

It is even a question whether, granting the presence of a great quantity of smoke in the air of London and in the fogs of London, that is in itself deleterious, whether even a fog is not less injurious to some when mixed with particles of carbon than when pure, if one may apply that adjective to a fog. We have heard decided opinions from medical men to the effect that what is popularly called "soot" is, to a certain extent, when diffused in the air, rather conducive to the health of a town than otherwise; that it is a great disinfectant; that if it were possible to fill the air with it for half an hour and then disperse it, many deleterious influences would be absorbed and removed with it. That is, as to the visible part of smoke. As far as the question of health is concerned it is not the visible soot, say some, but the invisible gases, which are injurious in rendering the air unhealthy to breathe. That a smoke-laden atmosphere is hurtful to delicate lungs, however, we believe there can be no doubt.

This brings us to one of the considerations much lost sight of in connexion with what is erroneously called "consuming" smoke. A fire in which the fresh fuel is introduced from below, in what are called by the trade smoke-consuming grates, unquestionably makes less smoke, after the first lighting, than one in which the fresh coal is added at the top, but it does so because the carbon-vapour forms new combinations in passing through the already heated coal at the top; it takes away everything into the air which would otherwise escape, in a form less visible, but which robs the fire of a greater portion of its heat, or its heat-producing faculty. It renders the smoke less palpable, but is as far as ever from promoting the real object to be aimed at, the prevention of the formation of smoke.

For it cannot be too often repeated to the general public, that the only object that can be rationally aimed at, and which can be accomplished, is the prevention of the formation of smoke. The "consuming" of smoke, once given out, is not possible, although almost all people, except experts in the subject, still use the phrase, and apparently believe in the operation. Smoke cannot be consumed; but, on the other hand, smoke is by no means a necessary product of combustion; it is only a product of imperfect combustion. Perfect combustion requires a large supply of oxygen, larger than is supplied

hy the mass of air ordinarily in contact with the fire. With an artificially increased draught conveying sufficient oxygen to the hurning coal, the carbon all unites with the oxygen, passing off as carhonic acid gas. Failing the requisite supply of oxygen, part of the carhon goes off as carburetted hydrogen, *Anglicè*, smoke. The question is as to the best practical means of feeding the flame with sufficient oxygen.

All the smoke-preventing furnaces which have fulfilled their purpose successfully combine to show that the effective means of doing this consists in supplying pure air to the flame at its point of production in such a manner as to mix it as thoroughly as possible with the flame at all points. There is one other way of preventing smoke which has not been put to the same practical test, hut which has reason in it; that is, the principle suggested in an article in these pages in the early part of last year, under the heading "A Smokeless London," and which consists in treating the fuel beforehand so as to remove some of the gas from it, and leave only sufficient to combine with the oxygen supplied by the air under ordinary circumstances.

There are only these two ways of doing it that are founded on scientific reason or are likely to he successful. Either remove some of the gas so as to render the fuel incapable of producing smoke under fair treatment, and with the average supply of air, or give it an extra supply of air where air is wanted. This latter plan has been adopted with perfect success in large furnaces; without any pretext of consuming smoke, without any elaborate apparatus, smoke has been entirely prevented hy introducing air so as to have every opportunity of mixing with every part of the flame at its points of production. The same principle can, of course, he applied to a house-grate, hut it has not been so applied as yet. A new form of grate would he required, introducing pure air in separate jets rather than in a mass into the midst of the incandescence, and we have not seen a grate as yet which supplies this desideratum. The other principle of partially extracting the gas from the coal, not reducing it absolutely to coke, hut leaving it with only so much gas as will readily combine thoroughly with the ordinary supply of oxygen from the air, we helieve would he found to answer; and if it became a question of applying compulsory legislation, it would, of course, be infinitely easier to hring the law to hear upon a limited number of dealers in fuel than on the whole population who hurn it in their houses. Added to which, this system would, as pointed out in the article before referred to, in which it was first advocated in these columns, he capable of great economical advantages on a large scale.

THE WATER SUPPLY INQUIRY.

THE period of the Session, and the information elicited from the first witness examined hy the Select Committee on the Water Supply of the Metropolis, render it expedient to inquire what course can he now most usefully taken to further the wisest settlement of this important question. Nothing is more worthy of remark, in all that relates to the position of the water companies and to the present and future water-service of London, than the fulness and multiplicity of detail accessible on certain features of the case, at the same time that an almost total ignorance prevails as to other and no less important elements. The truth is that, as far as returns have been prescribed hy Parliament, the information accessible is almost exhaustive. On the other hand, as far as those scientific data which will hereafter prove to be controlling conditions of the case are concerned, they have as yet almost wholly to he collected, or, at the least, to be co-ordinated. Of statistical information there is a plethora. Of amateur or speculative recommendations there are more than enough. But a general view of the whole case, to the outcome of which all these details are subservient, has yet to he taken.

It cannot he denied that the acceptance of the terms which, as we may ascertain from the evidence of Mr. E. J. Smith, were provisionally agreed upon hetween that gentleman, acting for the late Government, and the water companies, was urged under the influence of a sort of panic. The clauses of the Bill were referred to like the leaves of the Syhilline hooks. "You may take them or leave them," was the argument, "hut if you refuse them to-day, you will not have the chance of accepting them to-morrow." And this view, which was urged with great plainness of speech, and with somewhat of the triumph of a man who thinks that he has just done something unusually clever, in the columns of the *Times*, has been put into a concrete form in the course of the evidence. The income of the water companies, the committee was informed, was increasing at the rate of 100*l*. per day. That, the same witness alleged, was equal to an increase in capital value at the rate of 3,000*l*. per day. Certainly, if a property which *must* he purchased is steadily increasing in earning value at the rate of more than a million per annum, despatch in concluding the bargain would he a wise economy.

Men of business, however, are pretty well aware of the danger of leaping at a hait on the pretext of "now or never." That heing the case, it was wonderful how the panic spread. Grave hodies, like the Commissioners of Sewers, came hot-foot to the Government to implore the immediate introduction of measures to prevent the companies from exerting their statutory powers. "We held that competition was out of the question," said Mr. Smith. With this helpless view taken by the Government arhitrator on the one hand, and with the vague fears of the extortionate action of the companies on the other, there would probably,—hut for certain interfering circumstances,—have heen a rapid legalisation of the agreements.

That a Select Committee should look into the matter, before such a leap in the dark was taken, was a proposal of practical good sense. That the Committee should go further, and inquire into the sources of future supply, into the purity, or otherwise, of the water, and into all the vast mass of details which constitute the physical part of the case, is another matter. Not that such an inquiry should not he made. Quite the contrary. But it is one that cannot he made in a hurry, and one which will require a more prolonged, and probably a more systematic, investigation than is competent to a Committee of the House of Commons.

To the first part of the question,—the inquiry whether the provisional agreements made hy Mr. Smith ought to he sanctioned hy Parliament,—the first ten days of the sitting of the Committee have been enough to furnish the reply. It is obvious to all those who can read hetween the lines of a report that even the first day's evidence was conclusive. The great weapon of the purchaser, freedom of market, was not only not employed hy Mr. Smith, hut was admittedly laid aside. "Competition was out of the question!" That heing so, the whole transaction degenerated into a haggle. Even as to that haggle, however, one effective argument on the part of the purchaser appears to have been entirely overlooked.

It is obvious to any person accustomed to ascertain the value of property, that the property of the London water companies possesses a rising value. If we glance over the Board of Trade returns for the past five years, we see that there has been a steady increase in gross receipts at the rate of 4¼ per cent. per annum. But the increase in net receipts, which is the true test of value, has been more rapid. The working expenditure has not increased as fast as the gross income. Against 4¼ per cent. in the latter there has been only an increase of 3½ per cent. in the former. These rates of increase, which some time since we calculated from the returns of the companies, are considerably less than those which have accrued since the whole period from 1872, as shown in the Dilke return. The increase of income has been 5·04 per cent. per annum for eight years, hut only 4¼ for the last five of them. But the increase of capital has been nearly in the same proportion for the whole time. This yearly increment of value is, therefore, something fairly to he expected to occur in the future. And this has been the main fact that underlies all questions as to future "increments" and deferred payments.

This is all very well, as far as it goes. But there is something more. Two facts have been left out of sight. One may he regarded as only matter of account. The other is cardinal, and commands the whole question.

The income of the water companies owes its expectation of increase to the increase in the size and population of London. That increase may he taken at 2½ per cent. per annum; the metropolis doubling its size in forty years. Looking hack to the past five years, the average increase in the capital of the water companies has gone on step hy step with the increase of the metropolis. The annual increase has been 2½ per cent. For the past eight years it has been 2·6 per cent. Thus to earn the net increase above indicated, a corresponding increase of capital outlay must be made. This has not been brought into the account; and the whole calculation of future profits is thus entirely in the air.

So much for finance. But that is not all. The capital of a company is not a matter that can grow of itself. It is an artificial provision, which has to he sanctioned hy Parliament. In the accounts of each of the companies is to he found the account of the unexhausted powers which they each possess as to the raising of capital. All together do not amount to 1,200,000*l*., or to 10 per cent. on the present expended capital. In four years, therefore,—taking the case all round,—the growth of the companies will have stopped. Their "increment" will he hide-hound. Only Parliament can enable them to go on,—to supply the wants of the future, to earn more than four years' increase out of the twelve years' increase for which Mr. Smith proposed to pay them, according to the First Schedule of the Metropolis Water-works Purchase Bill, the sum of 9,280,000*l*. Taking this valuation without comment, the companies, if let alone, could not earn more than one-third of this sum without fresh Parliamentary powers. We have not room to add more to this very important consideration than the fact that items provided for in clauses 9, 13, 20, and part ii. of the First Schedule of the Bill, amount altogether to 4,408,000*l*., which the public would have to pay, and which has not yet been brought honestly forward on the face of the account, the total of which thus stands at the round figure of 35,750,000*l*.

Mr. Richardson, the chairman of the Parliamentary Committee of the Metropolitan Board of Works, is the first witness who has taken the hull hy the horns, and stated in round numbers what would be the cost to the ratepayers of the hargain struck hy Mr. Smith. The Metropolitan Board, said Mr. Richardson, are in favour of the acquisition of the water companies; hut they consider the terms excessive. Taking the purchase as effected in a stock which he rates at 114, Mr. Richardson brings the amount up to 35,920,000*l*., and 3,250,000*l*. for debentures. There is in this, however, no abatement for deferred payment. The total cost arrived at hy Mr. Richardson is 40,500,000*l*. Our own estimate (*Builder*, March 13, 1880, p. 302) was "upwards of 38,000,000*l*." The difference between us is due to the fact that we only allowed an extra value of 5 per cent. for 3½ per cent. stock as compared to 3 per cent. at 90, and Mr. Richardson takes the price of 114 for the 3½ stock. Again we spoke of present price, and Mr. Richardson speaks of permanent cost. We are thus in very close accordance, and we, certainly, cannot object to the substitution of Mr. Richardson's figures for our own.

No serious evidence has been elicited hy the committee which is anything hut condemnatory of that extravagance of the agreements which we were long the only persons to point out. Mr. Stoneham, one of the Assistant Secretaries of the Board of Trade, and an auditor of water companies' accounts under the Act of 1871, reluctantly described the effect of Mr. Smith's agreements as converting every 20*s*. of present income into 30*s*. of future income. Sir Henry Thring, cited hy Mr. Smith as an authority on whom he had relied as to certain allowances for hack dividends, wrote to the chairman of the committee to say that he had given no opinion on the subject at all. The evidence of Colonel Bolton, the Water Examiner under the Act of 1871, was even more damaging. He had, he said, "over and over again urged on Mr. Smith that the services of an independent professional engineer should he secured, as the general information he could furnish was not of a nature to enable an engineer to arrive at even an approximate value of the works." This is the comment on Mr. Smith's statement, "I had the story of the improvements going on, and the exact amount of those executed up to the time I was considering the matter, and I had the hest evidence as to the expectations of the future from Colonel Bolton and others."

It is melancholy work to contrast the statements of Mr. Smith with the facts. We referred in a former article to the excess of the totals in the returns made hy that gentleman over those of the companies as to the income of 1879. Schedule C of that gentleman's report of the 26th March is to us simply unintelligible. But he begins with "increment of income in

1880-81, increasing 780*l.* annually." In 1879 there is, according to the companies' statement, an increment of 35,500*l.* of the *gross* income over that of 1878. But there was an increase in the items of maintenance and management of more than 10,000*l.* at the same time, and there was an increase of more than 2,000*l.* on interest paid. Thus the net improvement of the year 1879 over 1878 is little over 23,000*l.* And on that naked fact is based the payment to the companies of 9,240,000*l.* of deferred stock. In fact, the mean increment of net profit from 1878 to 1879 is less than the mean increment from 1871 to 1879. The importance of this fact it is hardly necessary to point out.

In a word, taking 33 years' purchase to represent a perpetuity,—which we take to be fair at the present value of money,—the equivalent of a perpetual enjoyment of the present income of the Water Companies is 28,314,000*l.* As to future increment, first, we have to remember that, within a few years, none such can be acquired without further Parliamentary powers being obtained; and, secondly, the sum of such increments for five years, taking that of the last year as normal, is only 345,000*l.* The sum of 30,000,000*l.*, which is equal to 242*l.* for every 100*l.* of the companies' capital (including the loan capital), would therefore, in our opinion, be a very ample consideration for the transfer of the property, if such transfer be based on a mere appreciation of the present and expected income, under existing statutory powers, and without raising the question of the condition and sufficiency of the works.

Once again,—for the figures are large, and the misuse of them is incredible,—taking last year as normal, the increase of capital, according to the Dilke return, was 315,314*l.* The increase of net profit, after paying additional interest on loans, we have seen, was 23,000*l.* Taking this at thirty-three years' purchase, gives a figure of 759,000*l.*, from which the deduction of the actual capital raised and paid, as above stated, gives us an increase of value of 444,000*l.* in a year. This, no doubt, is not a figure with which to trifle. But it is something widely different from the panic estimates of Mr. Smith.

On the tenth meeting of the committee, on the 16th current, Mr. Philbrick, Q.C., who represented the Metropolitan Board of Works, said that he had abstained from calling evidence on the subject of an independent supply of water in deference to what he understood to be the view of the committee. The Chairman said he had given no instructions to exclude any evidence. Sir Edmund Beckett then addressed the committee on behalf of the water companies, and contended (if correctly reported) that Mr. Smith had given a figure by far too little. He denied that there had ever been an arbitrary increase of water rates in any district of London, and declared that the companies had not been aware of the full value of their property until the committee had made them so aware. "He doubted if there were a hundred people in London who understood these bargains,"—a doubt in which, if the argument of the learned counsel is at all fairly reported by the daily papers, he evidently included those whom he addressed. He declined to call witnesses, as he said that he did not see that he had anything to answer. As far as rehabilitating Mr. Smith's proposals went, he certainly did not attempt to answer any of the numerous objections of which we have referred to a few of the most conclusive.

PROMOTION OF SANITARY KNOWLEDGE.

THE PARKES MUSEUM OF HYGIENE.

A PUBLIC MEETING, to make known the purposes of this Museum, will be held in the Egyptian Hall of the Mansion House, on Tuesday next, July 27th. The chair will be taken at three o'clock by the Right Hon. the Lord Mayor, and amongst those who are expected to take part in the proceedings may be named the Earl Fortescue, the Earl of Dunraven, K.P., Lord Aberdare, the Hon. Evelyn Ashley, M.P. (Secretary of the Board of Trade), Mr. Torrens, M.P.; the President of the Royal Society, the President of the Royal College of Surgeons, and many others. All interested in promoting a practical knowledge of sanitary science are invited to attend. Tickets will be forwarded on application to Professor Berkeley Hill, 55, Wimpole-street; and, we hope, many will be asked for.

DEPARTURE FROM THE TERMS OF BUILDING CONTRACTS.

IT is a common saying that a person is "a man of business" when the speaker wishes to impress on the person whom he is addressing that the subject of the conversation is a man of remarkable accuracy. If any student or professor makes mistakes in his monetary transactions, the excuse is at once given that he is not "a man of business." It may be doubted, however, whether this is not a very fallacious expression, for any one of accurate habits of mind, who observes how blunders and inaccuracies daily occur by the hundred in commercial circles, cannot fail to wonder that they should happen if the man of business is the exact person he is generally supposed to be; and if we class builders and architects as mere men of business, it is often a matter of astonishment to see how frequently mistakes and oversights occur of so palpable a nature, and often so injurious in their consequences, that it is much to be regretted that more of the typical rather than the actual man of business is not to be found in connexion with these transactions. It may be useful to work out these general assertions somewhat more fully. In the first place, there are constantly being drawn up throughout England every day contracts so limited in their extent, and so dubious in their form, that they open a door to numerous disputes, which sometimes actually occur, and sometimes are avoided, not by any good management, but by the fact that the point upon which the parties might split does not actually arise, or because the parties happen to be blessed with more good temper or forbearance than is often found. And very often these contracts are drawn up meagrely, because a man thinks to himself that such and such event will not happen, and if it does, that he can trust to the person with whom he is contracting to oblige or to meet him in the matter. And we feel sure that it is under this same impression that terms in contracts are not acted up to. Probably most of the readers of the *Builder* are familiar, in some way or other, with that very common term in a contract, that no extras shall be begun, or no additional work or decorations allowed for, without the same are ordered in writing by the employer or by his architect. But there is, probably, no proviso in an agreement which is more constantly or more patently broken than this is. The contracts with this term are signed by builders every day with full knowledge of their contents, and yet they go on doing extra work without written orders, feeling sure that they will be paid for what they spend time and labour upon. And no doubt employers do not always enforce this term, but, on the other hand, any man with any kind of experience in regard to building disputes must be aware of numerous instances in which employers have availed themselves of the absence of written orders to avoid payment for work undertaken without the agreed formalities; and therefore, in regard both to contracts generally and to this particular term, we say that no accurate builder or contractor who wishes not to be harassed by disputes should ever omit to insert clauses in his contracts dealing with all usual possibilities; nor when they have been inserted should he omit to see that they are carried out exactly and to the letter; for, as we have pointed out, human nature cannot be relied on to deviate always from strict legal rights. It is all very well for judges to style defences which rely upon the proviso as to written orders, as was done in the case of Myers *v.* Sarl (30 L.J., Q.B., 9; Roscoe's Digest of Building Cases, p. 34), as "shabby," when, unfortunately for the contractor, the Bench have to add that the point against him is too clear for argument. And we are by no means sure that, if a builder executes work without written orders, he is entitled to much commiseration if afterwards he is unable to recover; for those who enter into contracts should abide by them.

Then, to take another instance, architects often do not attend to the clauses as to certificates with sufficient strictness. Thus in the reported case, decided a long time ago, of Morgan *v.* Birnie (9 Bingham, 672; Digest of Building Cases, p. 20), the architect sent a letter merely enclosing the builder's account checked by him, and this was held not to be a certificate. In many instances, of course, a not very strict compliance with the contract does no harm, because the parties may be solvent, well-intentioned, and not disinclined to pay; but, on the other hand, if troubles spring up, the absence of a thoroughly formal certificate may be the cause of annoyance, not to say trouble and loss of money. Instances of such trouble, from a want of these accurate certificates, must quickly occur to the mind of any one who has had to do with building contracts, especially if he has had some experience of those about which disputes have arisen. Then, again, there is yet another point in regard to which a good deal of looseness prevails, and which too often entails very disagreeable disputes, and this is the absence or the presence of the proviso as to time. When no proviso of this kind is to be found in a contract, it needs no demonstration as to how it is likely to work in an injurious manner; but when it does occur, it may cause difficulties in two ways. A contractor may, urged on by competition, most shortsightedly give himself an unreasonably short time to complete the work. Then he lays himself open, by not completing by the appointed time, to the payment of penalties. If the employer is good-natured, when the contractor explains that he cannot finish in time, he gets the period extended, no harm is done, and he will very likely tell his neighbour, as a sort of general proposition, that "you can always get the time extended," whereas such extension is by no means always the case; or extra works may take place, and then the contractor may forget to stipulate for extra time. So troubles may arise. But all these difficulties spring from the one source of not making full and accurate contracts, and not sticking close to provisoes contained in them. Builders and those who have to do with buildings should always bear this fact in mind.

FROM THE BANKS OF THE SEINE.

NEVER can those living on the banks of the Seine, from Charenton to the Point du Jour, expect to witness such a scene of splendour as that which Paris presented on the *fête* of the 14th of this month, and never can the architectural features which crowd with such historical interest and familiar beauty the old city be more distinctly marked out by the skill of the emphasising artists than they were on that evening. It was, indeed, a novel sight to see the familiar old towers of Notre Dame, with a strangely fresh beauty added by the arrangement of their flags and lights, and not even Viollet-le-Duc could have quarrelled with the graceful lines that art and accident effected on the old towers of the cathedral or the graceful spire of the Sainte Chapelle. Even the too-captious disposition of the proverbially irritable artistic mind would find it difficult to complain of a deficiency of thought or the absence of suggestive sentiment in the *fête*. The complaint that we have heard that there was somewhat of the theatrical in the character of the adornments,—although it is supposed that that accusation is especially applicable to the French, is not happy at the present moment; for if they were successful just now in all their theatrical attempts, they might, as in their decoration of Paris on the 14th, be indeed fairly credited with having accomplished the highest possible achievement in the way of a theatrical display. To those who remember any of the great illuminations in London, or the illumination of Florence on the occasion of the independence of Italy, or any of the *giandole* during the most popular period of Pio Nono's pontificate, or the magnificent displays during the late Emperor's career, must admit that the display of Wednesday in last week, notwithstanding its entirely popular character, was not by any means deficient in that element of sentiment without which all true art must be far from successful, and such a sight as the gardens of the Luxembourg displayed on the termination of the fireworks at the Observatory (just as the short and rapid thunderstorm burst over Paris) must admit that the sentiment of the show was sufficient to satisfy the most enthusiastic romancer. Strangely enough, and little to be expected, the illumination of the Tuileries was wanting in the sentiment that lingered and manifested itself so strongly at the Luxembourg, and we can imagine that an enthusiastic American might, at the Tuileries and the Champs Élysées, even with the Arc de l'Étoile at the end, have dreamt of the possibility of rivalling such a display; but his courage and his natural good sense, and his gradually increasing knowledge of the enormous interest of the old world, would make him despair of ever getting up an illumination similar to that of the Palace of the Luxembourg. In the thick air the outline of Marie de Medici's home, the

fountain and the pond lighted up by fitful lights, the singular mixture of the sixteenth and seventeenth century art, and the latest development of the epoch in the electric-lighted dome of the Pantheon, in the gardens themselves the quaint and gnarled forms of the orange and pomegranite trees, the glow-worm lanterns in the shrubbery shining out amidst the sombre darkness, all produced a fairy-like effect suggestive of the period of the utmost romance.

At the École des Beaux-Arts the competitors for the Prix de Rome have exhibited, this week, the pictures on which they have been occupied during the last seventy-two days in their solitary *loges* at the École. Again the pictures are monotonous in their academic and minutely realistic character. Academic, from the choice of subject,—the meeting of Ulysses and Telemachus,—realistic, and in parts exceedingly meritorious, from their resemblance to the familiar models who have sat for the heroic characters. In all such competitions one is disposed to wonder how the judges are able to detect the peculiar excellence that secures to the successful the prize so dearly sought for; and it appears to us this year that there is more than ever a singular equality in the ten pictures submitted. The Prix de Rome offers, in the first instance, a reward so fascinating to the young artist, that it appears almost to create in his mind an innocent belief that the highest point that a French artist can arrive at is thereby obtained, and a belief like this in a Frenchman's mind is equivalent to the possession of the highest honour that the world can afford: having arrived at a position so enviable, he appears henceforth to rest on his honours; at least, so urge some, and when one thinks of the delightful position that a Prix de Rome laureate secures by success in the trial, one scarcely wonders that men so young should in many instances be spoiled.

That all is not rose in the lives of the artists here any more than in England is a fact which finds cruel proof from time to time, though the appeal of charity comes to relieve the distress. Very recently a number of ladies, well known in the Parisian artistic world, have founded an orphanage for the unhappy young girls (natural and legitimate) left unprovided for by their parents,—literary men, painters, musicians, sculptors, and dramatic artists. Voluntary subscriptions are to support the society, the statutes of which are already drawn up. A large house with a garden and workshops has been rented, and the orphanage is already in working order Its usefulness no one can deny; the more so as, till this moment, no regular institution existed in Paris for the orphans of artists.

Infancy and old age, the extreme points of life, have from all time been the care of the philanthropic and the provident. Infancy abandoned offers a danger to society; old age neglected is unworthy a civilised community. This latter consideration has led to the formation of an association bearing the title *Arti et Amicitiæ*, the object of which much resembles that of a society proposed not long since in London, to rent a beautiful villa as a place of retirement for all those who, devoted during their lives to the study of the liberal arts, have been unable to arrive at fortune,—a number, alas! very large. The names of Meissonier, Cerôme; Charles Garnier, the architect; Henri Lehmann (the brother of Rudolf Lehmann and the new member for Evesham); Charles Blanc, Victor Hugo, Littré, Alexandre Dumas, de Quatrefage, and many others known in France, speak sufficiently for the unanimity with which the idea has been welcomed. In its arrangement, the society *Arti et Amicitiæ* resembles, it will be seen, Lord Lytton's great failure, the Guild of Literature and Art, of which we once heard so much.

In the death of M. Isaac Pereire, which took place a few days since, the cause of philanthropy, if so it may be called, has sustained a heavy loss. If M. Pereire's name is not quite so universally known in England or America as that of his co-religionists, the Rothschilds, in whose house, when young, Pereire was, we believe, a clerk, his acts of enlightened generosity have none the less won for him the esteem of the observant, and among journalists his memory is peculiarly cherished. Pereire's life has been an interesting one, passed at an interesting period of the history of modern France which he has taken no small share in forming. Among the many financial schemes with which his name is connected, Isaac Pereire founded the first French Transatlantic service which competed with our own steamship lines to America, while his brother Emile was the manager of the first railroad in France, that from Paris to Saint Germain, and though blind during the last ten years of his industrious and literary life, Isaac Pereire, like our own Postmaster-General, Mr. Fawcett, had kept his mind ever alive to the passing interests of the day. As one, cited among many, of his acts of philanthropy, only a short time since he set aside a sum of 4,000*l.* to be awarded, as, we believe, we announced in those pages, in prizes to the essayists who should most sensibly propose a series of reforms by which pauperism could be reduced and thrift and more general ease secured among the masses. In the frivolous world there is more than one foolish story told of the rivalry that used to exist between old James Rothschild and Pereire. One of these, which rests on the authority of Captain Gronow, of Anglo-Parisian reputation, attributes to James Rothschild (whose want of urbanity, by the way, will always be remembered in striking contrast to the affability of his descendants), a characteristic expression of wonder, in bearing of Pereire's financial success, that any one could transact business with "such a Jew." But M. Pereire has known how to make his name respected, and long will his superb mansion in the Faubourg Saint-Honoré, near the British Embassy, recall to passers-by the industrious activity, the large fortune, and the broad-minded generosity with which it was expended by old Isaac Pereire.

From England the writers, who have been quite numerous this season on the banks of the Thames, condescend, "when they have leisure," to write to their Parisian readers, and very comic reading it offers to those familiar with London. It is certainly calculated, even in weather as severe as the present, to rouse a warm glow of pride at the patronising praise of a correspondent in his criticisms on "Erving," or the doings of "M. Bencroff;" "Tooles" ("Ici on parle Français" doubtless) would be flattered to hear himself compared to Got, but it is under the epithet of "Benedictus" that is hidden the deepest mystery, alone thrown light upon by the casual mention of a recent benefit concert, the pecuniary success of which arouses the surprise of the French critic. The worthy professor seems sadly to have puzzled "the intelligent foreigner." This season, as in another journal, we meet with further mention of "Sir Julien Bénédit." Dealing thus with names as familiar as these printed in every newspaper and on every placard and boarding in the city, one trembles at the prospect of such a gentleman perhaps at present attempting what many a Frenchman has not hesitated to carry out, a complete review of England, its society, its manners, its political, scientific, literary, and artistic institutions.

The sad announcement of Mr. Tom Taylor's death has been noticed by the Parisian press with exceedingly good taste, and a knowledge of his usefulness and his loss which is not often shown by French writers. No ill-natured allusions are made to the accusations of his plagiarism, and due credit is given to his merit as one of those rare English critics on art, dramatic and pictorial, who are more than commonly acquainted with the subjects of their critiques.

EDINBURGH.

As our readers are aware, the late Sir John Watson Gordon, P.R.S.A., bequeathed a sum wherewith to found a Chair of Fine Art in the University of Edinburgh. The fund having now become available, candidates were invited to offer themselves for the professorship, of which invitation, eight gentlemen availed themselves, viz., Mr. Gerard Baldwin Brown, M.A.; Mr. P. G. Hamerton, Mr. F. E. Hulme, Mr. W. Roscoe Osler, Mr. J. P. Richter, Ph. D.; Mr. John Forbes Robertson, Mr. J. F. Rowbotham, and Mr. W. Cave Thomas. The choice of those with whom the appointment rested has fallen upon the first-mentioned gentleman, Mr. Gerard Baldwin Brown. The professor-elect is the son of a Congregational clergyman in London, and was educated at Oxford University, where he graduated as Master of Arts in 1874. He was successful in a competition for a Fellowship in Brasenose College, and carried off the Chancellor's Prize for an English essay, the subject chosen being "The short Period during which Art has remained in its Zenith in various Countries." The predilection thus shown for this line of study was followed out in a course of practical training for the profession of an artist, which, combined with a knowledge of the history and theory of art and a good literary style, entitles the Professor to consideration as an art-critic; an example of his power in which direction will be found in an article in the current number of the *Nineteenth Century* on "Modern French Art." Mr. Brown has already had some practice as a lecturer, having, under the auspices of the London Society for the Extension of University Teaching, delivered a course of twelve lectures on "Greek Life and Culture," which have met with commendation.

The building of the new Medical Class-rooms is progressing favourably, and it is hoped that the Chemical Department may be fit for occupation next session, the rooms at present in use being crowded to excess, and very ill-ventilated. In the centre of the quadrangle of the new chemical department, a ventilating shaft and chimney has been erected, which has given rise to a paper war amongst those interested in the amenity of the city. It is objected that, both as regards material (white brick) and form the shaft bears too great a resemblance to an ordinary factory-chimney, and tends to vulgarise the otherwise very remarkable and elegant group of buildings to which it forms an appendage. There is undoubtedly some truth in this notion, but it would not be an improvement, as some suggest, to cause the shaft to assume the form of some other feature, such as an obelisk or a campanile. Mr. Anderson, in his first design, showed two separate shafts, one acting as a smoke-vent, the other as a ventilating-shaft. Both of these were intended to be in stone, and would have formed characteristic features, having been treated in a distinctly artistic and expressive manner; but these he has had to abandon for the more economical feature now in question.

Another indication of the prosperity of the University is to be found in the increased attendance at the botanical classes. The lecture-room at the Botanical Gardens is seated for 350, but instruction has been imparted by the Professor to upwards of 500 by separating the students into two classes and lecturing twice daily. A new building has been designed in which provision will be made for 600 students, and the room to he vacated will be used for practical studies. The erection of the new building will necessitate considerable alterations in the laying out of the ground at the northern entrance to the gardens, but on the ground to be cleared there are fortunately no specially valuable trees or shrubs. The ground is rather choked up at this point, and the opportunity will be embraced of opening up the approach to the conservatory and palm-house. The new building will be octagonal in form, and will abut upon the west gable of the present class-room. The plans have been prepared in her Majesty's Office of Works, and operations are expected to be begun so soon as the necessary funds are voted by Parliament.

The poorhouse for the parish of St. Cuthbert, erected some years ago on the rising ground to the west of Fettes College, has, for a few years past, been found inadequate to meet the requirements of the parish, and plans for additions to accommodate 192 inmates have been prepared by Messrs. D. & J. Bryce, involving an outlay of about 10,000*l.* The additions consist of wings at either end, in front of the main building, of four stories in height, the upper one being contained in a high-pitched roof lighted by dormer windows. Each of the wings has a separate staircase, and can be shut off from the main corridor.

A new United Presbyterian Church has been erected in the High-street of Portobello, from designs by Messrs. Stewart & Menzies, architects and civil engineers. The building is Gothic in style, and exhibits more of the engineering spirit than of architectural knowledge, some of the details being exaggerated in the most extraordinary manner. The church consists of a nave, 61 ft. long, and transepts 66 ft. wide. At the north-west angle there are a tower and spire rising to a height of 130 ft., which form a conspicuous object from many points of view. The principal entrance towards the High-street is flanked by buttresses, having attached foliated finials, and on each side is a two-light window with cusped tracery, and the upper part of the gable is pierced by two large windows and a traceried circular window. The side elevations show three large traceried windows, with intervening buttresses, and the transepts have four-light traceried windows, with

circular window above. There is a gallery over the main entrance, which is approached by a stair in the tower, and accommodation is provided for a congregation of 700. The pulpit is placed in a recess at the south end, and is backed by panelled timber work with crenellated top and finials, and over this is a wheel-window, filled with stained glass by Messrs. Ballantine & Son. The roof is of open timber principals, plastered across at the collar-beam. When the scaffolding was up for the erection of the spire, it formed a very striking feature as seen from the railway, suggesting the idea that a tower would have been more effective on the site than a spire. Some of the designs submitted in competition showed such a feature.

MUSSELBURGH.

WHILE most of the towns and hamlets of Midlothian are making progress more or less rapid, there is one most conspicuous instance of the converse position in the case of Musselburgh, —an old-world, old-fashioned, half-fishing, half-manufacturing town, situated at the mouth of the river Esk, and, next to Dalkeith, the most populous township in the county. It forms one of a triad of Parliamentary burghs on the east coast; the other two being Leith and Portobello. But long before either of these municipalities had risen into existence, Musselburgh was already famous.

> "Musselburgh was a burgh
> When Edinburgh was nane,
> And Musselburgh will be a burgh
> When Edinburgh is gane!"*

So sang Thomas the Rhymer, or some other ancient poet and prophet of the same era; and whatever we may say about the probable truth and fulfilment of the prophecy, the poetry is true enough. Musselburgh was not only a burgh in the modern, but in the ancient Anglo-Saxon sense of the word; and long before the Saxons or the Northmen, or the Danish men, had set their foot on the fertile shores of the river Forth, the Roman galleys rode at anchor in its beautiful little bay of Fisherrow, which thus constituted a seaport of the province of Valentia.

During the Middle Ages, Musselburgh was also celebrated in the civil and ecclesiastical annals of Scotland. Its original name was "Eskmouthe," by which it is mentioned once or twice in the pages of that veracious chronicler "Simeon of Durham," as early as the seventh century. It appears also from other records to have had a maritime and agricultural population throughout the whole of the Northumbrian period. In the year 1201 it begins to figure in the contemporary chartularies as "Muschelburg," which accounts for the etymology of the name; and it was here that the barons of Scotland assembled to swear "fealty" or allegiance to the infant son of William the Lion of Scotland, who was afterwards King Alexander II. In the reign of King David I. a grant was made of the manor of Great Invsresk, or "Musselburghshire," comprehending Musselburgh, Fisherrow, the church of Inveresk, with its tithes and pertinents, together with the mills and fishings of the manor, to the Abbey of Dunfermline; and this grant, like others of Saint David's, was confirmed in the year 1236 by a bull of Pope Gregory IX. From the original grants the monks enjoyed a baronial jurisdiction over the manor; and from the date of its confirmation they acquired the increased jurisdiction of a regality. Alexander II., in the year 1239, granted to the monks a right of free forestry over all the lands of the district; and Robert III. gave them all the new customs which were levied upon the burgh. We may just add here that, even at this early period, the altar of our Lady of Loretto had risen into that importance which gradually obtained for it the character of the most celebrated shrine in Scotland. The chapel and hermitage stood on the margin of the links immediately beyond the ancient eastern gate of the town; and it was nearly as well known and frequented during the Middle Ages as its celebrated Italian prototype and namesake, and was believed to possess the same degree of sanctity and power of supernatural cure. Its pilgrimages were equally famous, and comprised as numerous an army of devotees. Even King James V. performed a pilgrimage on foot to the chapel of Loretto from Stirling so late as the year 1530, before setting sail for France to marry the celebrated Mary of Guise. No trace of it now remains for the study of the archæologist. Of this noble shrine there is absolutely no vestige to be found in Musselburgh at this moment. The ancient chapel has given way to a modern school; and the gardens and orchards once sacred to the prayers and orisons of the pilgrims are now the scenes of juvenile games and the diversions of a public school. The very courteous head-master did his best to show us some sculptured stones on our last visit, but we could discern nothing of an earlier date than a pediment of the Elizabethan age, built into a side wall of the garden.

Musselburgh, we may mention incidentally, is celebrated as a centre of the celebrated game of Golf, a pastime which is almost peculiar to Scotland,† although we have observed it has now crossed the Tweed. It is uncertain when the game was introduced into Scotland, but it was practised by all classes during the reign of King James II. Charles II. was engaged in playing a game on Leith Links during his visit to Scotland in 1641, when the news was brought to him of the rebellion in Ireland, whereupon he threw down his club and returned in great agitation to Holyrood House.

The river Esk, which cuts the burgh into two sections, takes its rise in two branches among the springs of the Pentland Hills, united, as we have seen, at Dalkeith; and, swollen in its devious and tortuous passage through the beautiful glens and valleys by innumerable brooks and rivulets, flows through the arches of the old Gothic bridge which still connects Musselburgh, in one of its principal thoroughfares, with Fisherrow, in a slow and half-sluggish condition. Although still much polluted, we are bound to report that the river is a perfect pattern of purity now as compared with its filthy and disgusting condition some ten or twelve years ago. This is, doubtless, due to the greater care and conservancy of the river, induced by the result of the celebrated Esk pollution case in the Court of Session, which some of our readers may remember by its jocular title of "The Lairds against the Millers." In that well-known and protracted trial the Lord President (Inglis) laid down the law in a weighty sentence, which cannot be too often repeated,—that the upper proprietors of a river are bound to send down the water to the lower proprietors *undiminished in quantity and unimpaired in quality*. The paper-makers accordingly had to erect an expensive series of retaining-ponds for their liquid refuse; and the Messrs. Cowan, with their well-known spirit and enterprise, removed their esparto-mills altogether from Penicuick to the mouth of the river at Musselburgh, where at this moment the manufactory of the pulp forms one of the leading industries of the district. Hard by these esparto-mills we noticed another curious manufactory of fishermen's netting, which is also carried on to a very large extent. We may mention here that we have ourselves observed very large trout taken out of the river Esk in the grounds of the Marquis of Lothian at Newbattle,—a phenomenon to which the inhabitants of the Esk valley have been unaccustomed for the space of a quarter of a century.

The modern buildings in Musselburgh are hardly worth noticing, if we except a very neat episcopal chapel in the early English style, built on Sir Archibald Hope's grounds, and one or two villas, particularly those in the neighbourhood of Inveresk. The old town-hall has no architectural value whatsoever, unless its antiquity go for something, for it is certainly the most peculiar-looking town-hall we have seen in Scotland or anywhere else. Of course, it was originally a prison, or "tolbooth," and was built about the year 1590 from the materials taken from the Chapel of Loretto; for which dilapidation of so sacred an edifice, by the way, the burgesses of Musselburgh were annually excommunicated at Rome for sacrilege during the long period, as Fullarton tells us, of two hundred years. The council-chamber, which we looked into, is of a more modern date, and is the scene sometimes of very stormy discussions. With regard to the drainage of this ancient burgh, the less we say the better. We question very much if such a thing exists. The water supply is derived from the Edinburgh system, and has only been recently introduced. After taking a look at the very picturesque fishing cobles, with their single lug-sail, crawling slowly out of the small harbour of the Fisherrow to the broad and blue waters of the Firth of Forth, we observed at the Musselburgh station a marble statue of Dr. Moir, the "Delta" of "Blackwood," which put us in mind that this spot had been the scene of the lives and labours of not a few eminent Scotsmen.

But, unquestionably, the "pearl of great price" in Musselburgh is the old-fashioned historical mansion of Sir Archibald Hope, of Pinkie, with a glance at which we shall conclude these hurried notes. Pinkie House stands within a belt of fine old trees and shrubbery, at the south-west extremity of the High-street, and bears something of the same relation to Musselburgh that the Bucclench palace does to Dalkeith. The salient points of this remarkable old house are briefly these. It is of a very early Scotch baronial style,—a low quadrangular building, obviously unfinished, with very steep gables and projecting turrets. A sculptured fountain stands in the foreground, in the well-known form of a crown, or rather a Papal tiara, which distinguishes the fountain in the esplanade of Holyrood Palace, and, from the circumstance of its also being found at Linlithgow, would seem to be a characteristic of Scottish baronial architecture in its original and probably its highest form of expression. An air of antiquity, indeed, hangs over the whole town,—which, however, is no manner of excuse for sluggishness; and, as we understand, there are plenty of Police Bills at the command of the municipal government. Let us, therefore, express the hope that Musselburgh may soon do something to emerge from its old-fashioned condition; and, like its Parliamentary neighbours Leith and Portobello, address itself to the work of improvement and reform.

THE CORPORATION IMPROVEMENTS AT WHITEFRIARS AND THE NEW CITY OF LONDON SCHOOLS.

THE new streets and other improvements which have for some time been contemplated on land lying between Tudor-street and the Thames Embankment are about to be carried out, and preparatory to the commencement of the works the building materials, fixtures, and fittings of about twenty houses, ranges of warehouses, sheds, stabling and workshops in Temple-street, New Wharf, Grand Junction Wharf, Phœnix Wharf, and Tudor-street, were sold by auction on Tuesday, by Messrs. Horne, Eversfield, & Co., and the land will now immediately be cleared. The improvements include the construction of a new street, running north and south between Whitefriars-street, at its Junction with Tudor-street, and the Embankment, which will open out a direct line of communication between Fleet-street and the Embankment.

The first portion of the works in connexion with the erection of the new City of London Schools, at the south-east corner of this land, and facing the Embankment, has already been commenced. The land has been enclosed, and the ground is being excavated and levelled preliminary to getting in the foundations, for which Messrs. Hill & Higgs are the contractors.

PRINCIPAL ENTRANCE, SANTA MARIA DEL MAR, BARCELONA.

THE historical church of Santa Maria del Mar is one of the oldest of Barcelona, and, perhaps, also of the province of Catalonia. A chronicle of the sixteenth century attributes its foundation to the Gothe; according to another tradition, it is supposed that the primitive church, named Santa Maria de las Arenas, occupying the same site on the seashore, was erected upon the ruins of a Roman temple dedicated to Minerva.

The present building, next to the majestic cathedral the principal temple of the noble city of the house of Condé, was commenced in the year 1329, and finished in 1377. It consists of a nave and two aisles, and may be described as at once bold and elegant. They are separated by grand columns, which sustain nineteen arches and lofty vaults.

The exterior corresponds with the interior. The two high Gothic towers include much beautiful work, and the four portals, one in each façade, are justly celebrated.

Our engraving represents the principal portals

* This curious old stanza will be found in "Chambers's Popular Rhymes of Scotland." Edinburgh. 8vo. 1842.

† Golf derives its name from the "Club" (Ger., *Kolbe*; Dutch, *Kolf*), with which it is played. See an article in Chambers's "Encyclopædia," vol. IV., p. 823.

PRINCIPAL ENTRANCE, SANTA MARIA DEL MAR, BARCELONA, SPAIN.

THE BELGIAN EXHIBITION OF 1880: TRIUMPHAL ARCH.——M. BORDIAUX, ARCHITECT.

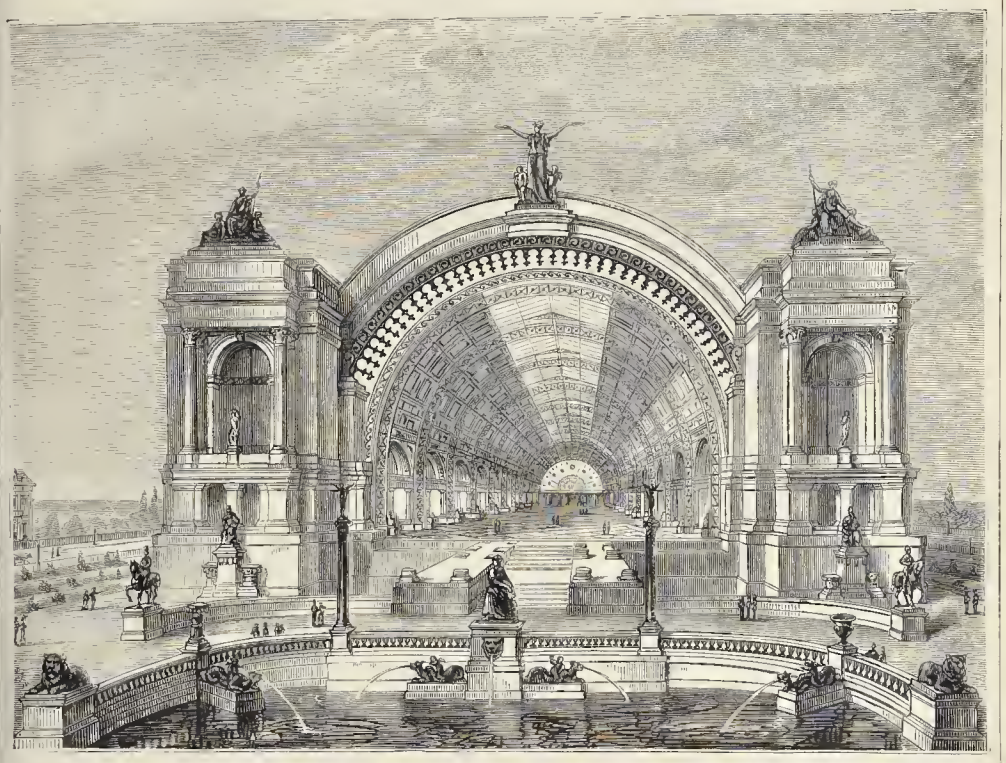
THE BELGIAN EXHIBITION, 1880.

IN mentioning recently the opening of the Brussels Exhibition,* we spoke of the building as including a semicircular colonnade, with a large portal, forming a triumphal arch, surmounted by a colossal group, the colonnade uniting two "pavillons" with colonnaded wings. We now give a view of the triumphal arch, and of one of the pavilions, as designed by M. Bordiaux, architect. The pavilions are the only substantial parts of the whole yet completed. They, in fact, form two separate buildings, standing boldly out in advance, the lateral extensions of the whole front being in a line with the central portico of the colonnade. At present this adds to the effective appearance of the pavilions, but greatly dwarfs the rest. As to the final effect which this arrangement will have upon the outward appearance of the whole, it is far too early to judge; for the two sides of the central portal are but raised to half their height; the arch is but scaffolding, and only the basement of the semicircular colonnade has been built, all the rest is wood, canvas, and rather clumsy make-believe, as is also the case with the colonnaded lateral extensions. Built substantially, finished artistically, and admirably situated on the old Champ-des-Manœuvres, the exhibition building would present a front that any Belgian might contemplate with pardonable national pride as he approached it from the broad length of the Rue de la Loi. Whether the eyes of the young nation are not larger than its hands, and whether time and money will serve to make this great front of the Belgian Exhibition building all that it is designed to be before the exhibition itself comes to an end, remains to be seen.

Along and against the basement of the semi-circular colonnade, on each side of the central portico, there is in course of erection a great amphitheatrical gallery, where spectators will be grouped at the several fêtes which during the next three months are to be held at the exhibition. The intervening space, lately cut up with traffic, and encumbered with constituting portions of portico, colonnade, and gallery, is now handsomely laid out. The great open space leading up to the building is already putting on the appearance of a beautiful garden. It is laid out rather more according to the rules of pictorial art than refined taste, and the many rather than the few will be consulted. The many, especially in the hot summer weather that is yet to come, will remain longer outside than in the building, footing the broad meandering walks, amid trees, flower-beds, cascades, waterfalls, and fountains, and in, and out, and around the erections now being raised to exemplify strength, taste, or wondrous utility in the building art. There will be but two restaurants in the grounds, one of *premier ordre*, the other *à pointe du jour*; but several *buvettes* will supply cold meats and other substantial refreshments; while more than one tasteful building offers all manner of fancy non-alcoholic drink, and the very fragile refreshments that French confectioners purvey.

The great iron and glass parallelogrammatic case that lies behind the architectural façade of the main building, and wherein the nation shows its ruder and rougher handiwork, is fully completed, and the arrangements for light and air promise to be effective, and to present a great contrast to those of the exhibition at Paris in 1878. Wood is judiciously introduced into the roofing, and the arrangements of white and very artistically colour-bordered canvas for subduing the light and guiding the currents of air are judicious and effective. The agricultural and woods and forests departments alone had their exhibits fully laid out, and were ready, with floors swept clean, for view when the exhibition opened. All the rest was more or less disorder, while in many parts the fittings for intended exhibits were wanting to the extent of whole groups, and chaos reigned. Still, judging from the compartments more or less forward, the

* See vol. xxxviii., p. 777.



THE BELGIAN EXHIBITION BUILDING: PAVILION.

provision alike for exhibitors and spectators is ample, and everything will be easily seen, and all may see it. The internal arrangements, decorations, and fittings of the pavilion of modern art present a *tout ensemble* of artistic beauty most admirable; and those of the pavilion of ancient art are complete. The great avenue and vestibule leading from the great central portico so long a way from completion, will, it is feared, from the gold and Dutch metal now being expended upon them, be somewhat of a glaring failure. But one must withhold judgment until the decorations are nearer completion.

That the buildings and erections of the exhibition should have been opened in so unfinished a state is to be deplored; but 70,000 square mètres are a great deal of ground to cover in the time that has been allotted for the work. The Belgians are not inexperienced in such works, but this is a much larger undertaking of the kind than any they have yet compassed, being fifteen times the extent of their Halles-Centrales in 1874, and seven times the space occupied by the objects of health and for the preservation of life in 1876. They have complained that the exhibition which they made of their national industry in Paris in 1878 cost them a million francs, and have boasted that this will cost them but 200,000 francs more. That boast is over, and they are now willing to expend double the estimate, provided that the exhibition be but a success, and win for their country the admiration of Europe in general and great surprise and a little envy on the part of England in particular. Special facilities are to be given to the English to go and see, judge, and compare. At a conference in Brussels between representatives of the South-Eastern, London, Chatham, and Dover, and the Belgian State railways and of the Belgian marine, it was resolved that at stated periods during the exhibition and *fêtes* of the jubilee, return tickets between London and Brussels, *viâ* Ostend and Calais, should be issued for a single fare.

NEW (R.C.) CHURCH OF ST. FRANCIS, GLASGOW.

THIS church, which is now being built for the Franciscan Friars (the Very Reverend Father Cuthbert Wood, guardian), is situated at the corner of Cumberland-street and Mathieson-street, in the south side of Glasgow.

It is being built entirely of Williamswood stone, both for facings and dressings. When finished the church will consist of chancel and chapels, nave, aisles, baptistery, choir for the friars, west gallery, and corridor connecting the friary with the church. The nave, which is the portion now in course of erection, consists of seven bays, and is 150 ft. long. The nave is 38 ft. wide, and the aisles are 13 ft. 6 in. wide, the total width being 72 ft. The height to the wall plate is 60 ft., and to the ridge 96 ft. In the clearstory there are triplets of lancet-windows, which will form one bold lantern, a most necessary feature in a town like Glasgow. At the west end there is a buttressed staircase which leads to the gallery. The roof is composed of framed main and intermediate principals.

The church is very severe in style, and quite in harmony with the order for which it is being built. It is not generally known that the Franciscan fathers are one and the same with the "Friars Minor" or "Grey Friars," and the following few particulars of the ancient foundation in Glasgow will be interesting to some of our readers.

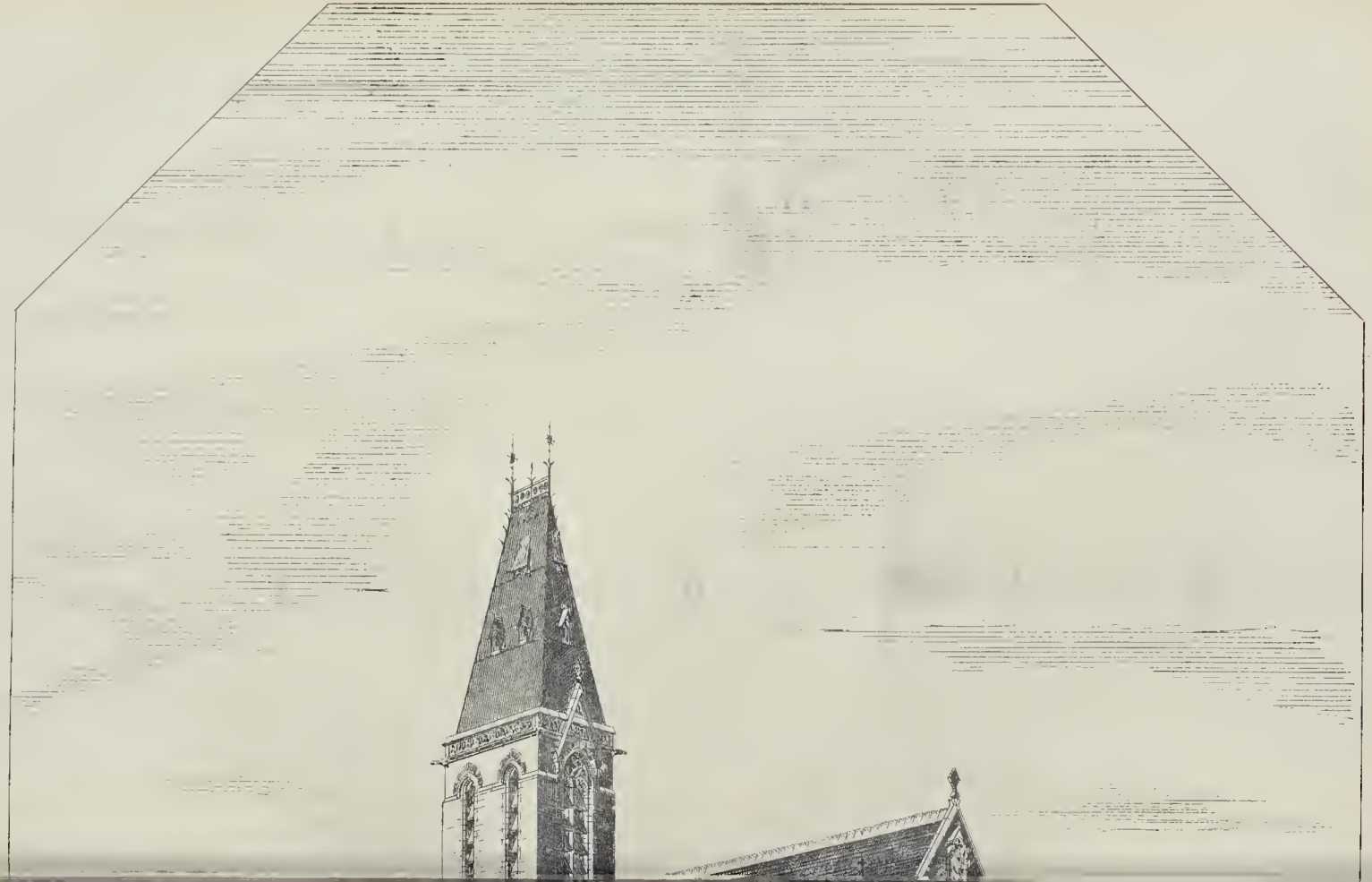
The Friars Minor came into Glasgow in the year 1449, at the instance of Bishop William Turnbull, then bishop of Glasgow, and were lodged in a private house in or near the High-street, where they were generously supported during twenty-six years by the Very Rev. Thomas Forsyth, a canon of the cathedral.

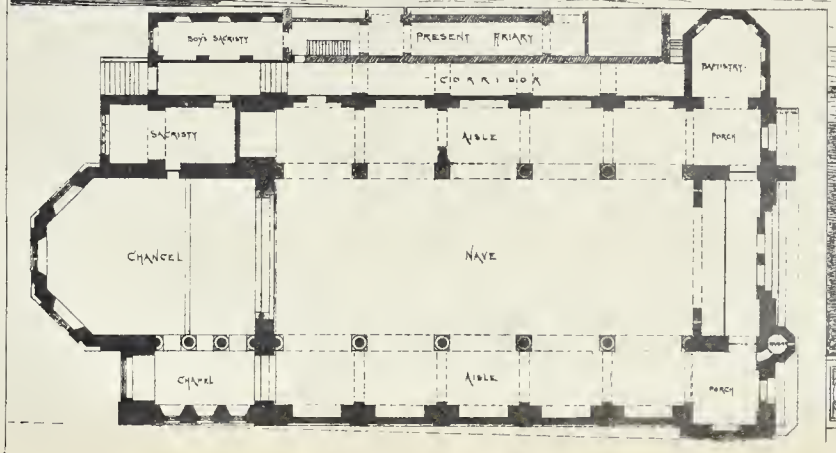
Under the episcopate of Bishop John Laing, his private residence was extended and formed into a regular friary in the year 1476. This bishop assisted Canon Thomas Forsyth in erecting a church and cloister, and on the ninth Sunday after Pentecost solemnly consecrated the same in honour of the Mother of God. Bishop Turnbull sent the first F. Guardian of the Glasgow Friary (F. James Mirhead) to Rome to obtain the Bull of Pope Nicholas V. for the foundation of the Glasgow University. The first Professor of Philosophy in the same, Elias Forbes, afterwards became a Franciscan, and died in the Glasgow Friary. F. Francis Govan, second guardian of the house, was the first provincial of the restored Scotch Franciscan Province. The friars were expelled from their home in 1560, and their church and house ransacked under the Duke of Chatelherault and Earl of Argyll.

After an absence of 308 years, the Friars-Minor were re-established in Glasgow, on the south side, in 1868, and took possession of their new friary in 1862,—the same year that the city improvements swept away the last remaining portions of the ancient structure, which, along with the "Grey Friars Wynd," become things of history.

The church, which is rapidly rising, is expected to be completed about the middle of next year. The whole is being carried out from the designs and under the superintendence of Messrs. Pugin & Pugin, of Westminster.

The original estimate for the nave was 10,060*l.*, but subsequently another bay was added, which raised the total cost of that portion to about 12,000*l.* Mr. John Devlin, of Glasgow, is the contractor; the clerk of works is Mr. Dalton.





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THE INFLUENCE OF ART AND THE DRAMA ON RELIGION.

THIS was the subject of a discourse delivered on Sunday morning last (*apropos* of the death of Mr. Tom Taylor) by the Rev. Jeffery Worthington, at Brixton Unitarian Church, Effra-road. Taking as his text the fourth, fifth, and sixth verses of the twelfth chapter of St. Paul's First Epistle to the Corinthians,* the preacher observed that the "diversities" of which the apostle speaks may be taken as inclusive of a range extending far beyond the circle of "gifts" and "administrations" and "operations" exercised within the immediate fold of the Church. St. Paul, in the chapter from which the text is taken, is writing of "spiritual" gifts. But surely we may here reckon a vast variety of powers that are accessory to and often directly promotive of the reign of a true faith and a pure religion. Who, for instance, shall estimate the influence of so-called secular art and literature in relation to religion? I have no intention of dwelling upon the somewhat debated question of the introduction into our actual worship of God of extensive art surroundings, although I have never had any hesitation in avowing the deep-seated conviction that, when taking a due place only in relation to matters of the foremost importance, a careful attention to "the beautiful," both in God's House and God's Acre, may be made a large means to a noble end. Not to offend, but rather to satisfy, the eye and the ear, undoubtedly aids the reverence of many, and surely need hinder the prayer and praise of none. There are but few, I think, who gaze upon the vaulted roofs and stately proportions of some venerable cathedral, or upon

> "Each minute and unseen part,"

as wrought with loving hand by many a humble devotee of art, without a sense of peace stealing over the heart, which is a fit preparation for the attitude of adoration; while that man must be indeed devoid of some manly attribute on whom the swelling organ and the solemn anthem, or the apt words of eloquent pleading from an earnest brother's soul, tell no tale whispering of saintly things. This, however, is not the matter for chief consideration to-day. I have in mind the relation of Art and Literature with Religion, taking Art and Literature in that sense which is, with a certain absence of precision, termed secular. During the past week there was removed from the midst of an honourable career,—and that with a measure of suddenness,—a neighbour of ours in this South London district, who has been for many years intimately associated with the world of art as well as of literature, and his death seems a not unfit occasion shortly to dwell upon the theme which has been suggested. It was, perhaps, as one specially apt to descry and to point out the original genius of others, that the late Tom Taylor (who was two days ago followed to the grave by a gifted company of mourners) excelled. Yet he was not without a measure of originality of his own, else he would never have attained the eminence he did. He exercised his powers, perhaps, most particularly in three directions: as a professed art critic, as a dramatic author, and as the editor of a well-known publication, at once passingly popular, and most incisive in good-natured satire of the foibles of our public men and our every-day customs and fashions. Let us take these three directions of our departed brother's work in life, and examine the bearing of each upon the cause of religion.

I.—As I thought over how I should speak this morning, there lay before me on my table a couple of volumes consisting of a catalogue of a great "Art Treasures" exhibition, held twenty-three years ago, and of the handbooks to the various departments, in which, though originally prepared anonymously for the current literature of the day, I have reason to know that the deceased critic had a considerable share. The exhibition to which I refer was held in the great commercial city of Manchester,—the centre of a district more populous than any other in the Queen's dominions. In that same centre the last week has witnessed the formal proceedings connected with the foundation of a new English University. "What do you want with a University in Manchester?" has been the question of many. And, curiously enough, a quarter of a century ago, a noble duke (on being applied to for a contribution from his gallery to the exhibition to which I have referred) is said to have inquired, "What in the world do you want with art in Manchester?" The fact is that wherever there is a great population, and where a desire exists on the part of the cultured few to raise and refine the standard of culture amongst the many, there it will be found that efforts will be made to introduce the potent influence of art as well as of learning. It cannot often happen that great collections of art-treasures, such as the one to which I have alluded, can be placed within public reach. The works of noted excellence have become private property, and can only be gathered together by means of much labour and self-denial. Once in a generation only, perhaps, can the matter be accomplished. Yet even such an occasional exhibition is of unspeakable value. It helps to create a taste,—to promote a craving,—for the beautiful, even in the most prosaic of people; and this taste, this craving, leads to the adoption of means for its satisfaction. Annual exhibitions of works of art have long since ceased to be confined to the metropolis; while not only the mansions of the rich, but the cottage homes of England, are increasingly adorned with the insignia of a larger appreciation of art, and a more refined taste. The inexpensive reproductions, through latterly-devised processes, of some of the finest known pictures and statuary, have helped on the good work, and the man who has aimed to popularise a knowledge of the rules of art, and to educate society by his appreciative criticism, is worthy of a place amongst those upon whose tomb a garland of honour shall be thrown. Will any one ask what is the bearing of all this upon religion? It is, indeed, sadly true that history bears record of those who adored the outwardly-beautiful, and knew, seemingly, no deeper thought. Yet it may be that they, even, were less coarse and brutal than otherwise they would have been. And how, in other cases? Questions concerning what has been aptly termed the "Philosophy of the Beautiful" must not come under lengthy consideration now. This, however, may be said, to use the phraseology of Victor Cousin,—that "Art is the representation of the ideal." And here we touch the key-note of an answer to the question. Passing by the current fashion of excessive realism in art,—which its noblest devotees have always acknowledged as connected with a sincere effort to school the artist for higher things,—let me quote a sentence or two from Cousin's discourse,* translated into our own tongue:—

> "Nature is an artist that enwraps the ideal in variable contingent forms, and these forms, more or less debase the moral idea enshrined within them. Art is a perfected Nature that conceives of unity beneath variety, of the general with the particular, the moral with the physical, the absolute with the relative, the ideal with the real, and that strives to reproduce the object of this conception, but by means more faithful. Art imitates nature in this sense: it draws out the moral idea sketched in every object. Art surpasses nature in this sense: it renders the forms more pure and more in unison with the moral idea they express. Art undoubtedly does not *realise* the ideal in very deed, but it bestows upon it more clearness and higher majesty. It is in this light that we must understand this sentence, 'Art is the representation of the ideal.'"

The author from whom I have borrowed this suggestive thought includes here a reference to Poetry and Music, placing Painting, Sculpture, and Architecture last in rank, "because [he asserts] their action, more limited, has in view works more special and confined than that of Poetry or of Music, and consequently at a greater distance from the ideal." Finally, setting a law before the artist, Cousin adds,—

> "Endeavour to appreciate by your taste the beauty presented you in Nature, but do not be contented with this merely meditative opinion, which belongs chiefly to the philosopher; display your genius; set the ideal free from the enthralment of the real, and bring back the absolute afresh, clothed in purer forms. If you shut yourself up within the narrow boundary of the individual and the variable, your works will vanish and be forgotten, like all that is changeful. That you may live for ever in the hearts of other men, lay hold on that which never passes away, the absolute, the ideal, the pure idea of the beautiful; this is one of the manifestations of Infinite Being,—of God."

And thus, it seems to me, we are led to a conception of the manner in which Art is the handmaiden of Religion. The true artist cannot satisfy his conception of the ideal, doubtless. But if he does his best, he rouses the noblest sympathies of his fellow-men, and leads them also behind the veil that hides the solemn mysteries.

II.—Having under review the varied labours of the man whose just-terminated earthly course has suggested these remarks, we have next briefly to note the bearing of the Drama,—and more particularly of a certain class of the Drama,—upon the religious culture of to-day. Time *was*,—and time *is*, in certain quarters,—when to place the two terms, "the stage" and "the pulpit" in any sort of juxtaposition were to commit a terrible impropriety. Yet, at the present moment, we have actually existing, amidst the numberless societies and clubs of London, one specially designed to bring together the teachers of the stage and the teachers of the Church, or, in other terms, those professionally connected with the drama, and the clergy of the Established and other Churches. The association appears to have a considerable measure of success, and the aim set before its members, viz., to raise the high moral tone of the great mass of the people, is surely pure and virtuous enough to secure such sympathy and support as may be accorded. None who know the history of the *English* stage,—to specialise the criticism,—but must admit in sorrow the misuse to which it has often been subjected, and a plausible excuse has, indeed, existed for those who avow themselves distinct opponents of the theatre under any practically possible conduct. I am disposed, however, to the conviction that the good far outweighs the possible evil, which is not, indeed, when the stage is duly supervised, in any way the direct outcome of the theatre itself. I spoke just now of the fact that a particular class of drama was suggested to us to-day, referring to the fact that the late Mr. Taylor chiefly exercised his dramatic faculties by seeking to "hold the mirror up to Nature,"—to delineate the joys and sorrows, the temptations and conquests over temptation, of his heroes and his heroines. The same critical faculty which enabled him to point out the excellence or the defects of a work of art,—which also, indeed, gave him the power of sketching the biographies of Haydon and Sir Joshua Reynolds,—further came to his aid when dealing with the characters introduced upon the stage. Doubtless in the case of the drama,—as in the cases of poetry, music, and painting, the *dictum* of Cousin that "art is the representation of the ideal" may be accepted, and the greatest dramatic masters produce their *dramatis personæ* in consistence with a carefully-elaborated study of mankind at large. Contemplation has been evoked, and in the creatures ultimately made to strut upon the stage, *all* men recognise features and traits of character in which *they* have a share, and for which they are conscious of a deeply-seated sympathy. But a more ordinary type of the drama,—and one which is especially popular in these days,—finds its sphere of work in what may perhaps be compared with the realistic school of painting. The characters of the play are just such as may be met with any day in the City bank or the West End drawing-room, in the workman's cottage or the nobleman's mansion, in the haunts of vice or amidst the ways where virtue shines triumphant. We see our neighbours photographed, and sometimes ourselves too. And though we may affirm that here is not the highest form of the drama, yet we must admit that there is presented to us a form which may be made highly conducive to good morals,—ay, very helpful to the cause of that true religion which crowns morality with its own beautiful crown of Faith, and Hope, and Love. There is a power in hand, then, here: one that may be made to preach sermons to those whom, alas! the pulpit does not reach.

III.—I have left myself but a moment or two to speak of the late Mr. Taylor's editorship of the most popular of our satirical periodicals. But the healthy influence exerted over a circle that scarce knows a bound needs no new assertion or proof. In many a happy home,—in every newsroom of the land,—at each railway bookstall,—through the window of its birthplace in Fleet-street,—the genial humour and merry wit of *Punch* are enjoyed to the full. None ought to be offended by its sallies, and many should be warned by its half-veiled wisdom. I go further, for I am well convinced that faults have been corrected, and moral victories achieved, through the instrumentality of this keen, though generous, mentor. Now and then, moreover, we have noted in its pages some record of tender memories and loving

* "There are diversities of gifts, but the same Spirit. And there are differences of administrations, but the same Lord. And there are diversities of operations, but it is the same God which worketh all in all."

* "The Philosophy of the Beautiful." By Victor Cousin. Translated into English by J. C. Daniel.

honour of brethren gone to the far-off land (far-off and yet so very near!); and we have felt how, behind the critic's lash, was concealed the spirit of Christian feeling and Christian trust. I donbt not bnt that, ere many days are over, we shall read a similar "*In Memoriam*," associated with the name I have named this morning, and that we shall he assnred how we shall miss from our midst one whose pure motive and high intent rendered him not only a valued private friend, but also a devoted servant of the brethren whom he saw, and of the God whom he could not see.

PRIZE DRAWINGS AT SOUTH KENSINGTON.

THE drawings, and a few models, for which prizes have been awarded hy the Department of Science and Art this year, have been, as usnal, collectively exhibited in one of the exhibition galleries adjoining the Horticultural Gardens. We may add that they were very inconveniently placed for visitors in a far remote gallery on the npper floor, the route to which was not to be found without a good deal of interviewing of police officers. If it is desired that it should be a snbject of interest to the public, it would be better to exhibit tbe collection in a more easily accessible room, and give some clear announcement of it at the proper entrance.

Tbe whole collection of drawings does not show any material alteration in general merit from those of last year. As usnal, the decorative work is the best. The figure-drawing does not show any attempt at original thought or design; on the contrary, one cannot hut he impressed with its exceedingly prosaic character. The drawings from the life seem mostly taken from models possessing no qualities whicb could he said to lend themselves to the suggestion of graceful or picturesqne pose or expression; and one cannot help feeling a donbt whether this kind of rather laboured drawing from inferior models is at all likely to evoke in the stndents any feeling for the really expressive power of tbe human figure. Of carefnl and painstaking work there is a good deal; bnt we confess to a feeling that there is a good deal of vulgarity in the drawings of this olass, arising partly from the subjects, partly from the want of style and feeling in the artists. To copy carefnlly and in a black heavily-shaded style, the imperfections of some rather ill-shaped figures, seems a process too much calculated to stifle the real art-feeling in the mind of the student, and snbstitute for it a cold attempt at mechanical accuracy. One does not, of course, expect studies from the life to represent always Apollos and Vennses, but we have seen many studies that represented much more of artistic feeling than these. Tbe drawings from the round (caste) are mostly good; and some of the anatomical studies are very thorough and well drawn. We may mention a drawing in sepia of a skeleton, with the figure outlined upon it, hy Mr. W. Fergnsson, which is excellent, and has received a "National" book-prize. As far as we can nnderstand the pecnliar phraseology of the Department, however, tbe adjective "National" does not convey that the student has beaten all others in the kingdom in that class of drawing, for the word seems to be tacked on indiscriminately to a very large proportion of the prizes. Bnt we have given up trying to nnderstand the numerous terms which are nsed in a special sense belonging to the Department alone, whose awkwardness and affectation in dealing with the English language seems part of a system. The prevalence of red tape is conspicnous also in the elaborate system of numbering and ticketing everything, which makes the descriptions of the drawings look like a snm in arithmetic. As a sample: in connexion with one drawing, an architectural one, of no great consequence, we noted the following various numerations: the anthor of the drawing is in one relation "5759," in another he is "38 N" (if we read the ticket right); at the foot of the drawing "23 A" is placed after his name, and he is described as having received a "National Bronze Medal 420," and a "third-grade prize 712,—1880." It is to he hoped, with all this effort, that the position and statns in the Department of the author of the drawing are sufficiently defined to the official mind, though the result is hardly intelligible to outsiders; bnt one cannot help thinking that if we had more figure-drawing and fewer figures it would be more to the purpose.

There is not much development of oil painting, the most prominent works being three studies of still-life, for one of which a gold medal has been gained by the artist, Mr. Watson, and a silver medal bas been awarded to each of the other two. Tbey are not hung in a good light, and are probably, therefore, seen to disadvantage. The gold medal work is carefully finished and harmonious in colour, but is heavy in appearance, and we are again strnck, as in the case of the figure-drawings, with the want of artistic feeling; there seems no effort to realise any charm in the grouping of the decorative objects portrayed, only a dull, dead realism. To say of a still-life picture that it is deficient in life may seem a contradiction in terms, bnt that is the impression these paintings give us. The still-life drawings in water-colour have more sparkle and more feeling for incidents of light and colour, and there are two or three admirable specimens among them. When we come to the decorative work, the standard is much higher, and there is a good deal of design among the works of this class which is as good as it can be in colonr and form, taking the artists on their own ground, though we find too much of naturalism, and should like to see a little more studied conventionalism in the wall-paper designs and other things of that class. Among some of the decorative work we noted as very snccessful a design for a tapestry cnrtain (Miss Deeley, Lambeth); a design very well drawn and coloured, for a perforated Parian vase in Indian style, hy Mr. J. Crook, of Worcester,—a place from which one naturally expects ability in designing ornamental ware; various wall-papers, among which one hy Mr. Farnsworth (Nottingham) is remarkably good, and has the advantage of being more conventionalised and more thonghtfully composed than most of the others. A sheet of pencil outline studies of historic styles of ornament, hy Mr. W. Stevenson (Edinburgh), though not exactly design, shows careful study of the characteristics of different schools of ornament. The design for a ceiling snitable for a synagogne (Mr. Bradbnrn, Coalbrook-dale), in which emblems of Jewish faith and ritual are worked into the design, has a great deal of merit both in design and in its careful and elaborate drawing. There are many very pretty designs for lace, among which we may single ont two for flonncings, hy Miss Emily Heise (Birkenhead), which are charming. Some designs for chintzes, by Mr. Sewell, are very pretty and very effective, and suitable; and the Owen Jones prize has been given to Mr. Smith for a design for fireplace tiles, based on honeysuckle, which is very pretty and original, but not qnite sufficiently conventionalised to have pleased Owen Jones himself.

Nothing among the architectural work seems worth mentioning. The drawings for which prizes are bestowed are mere commonplace pieces of imitation Gothic, or very ordinary house designs, with no feeling or originality in a single instance that we noticed; all we can say is, that we saw nothing among them so positively and absurdly had as we remember noticing in one or two former collections. The conclusion from the whole seems to be that the Department is a good school for the promotion of decorative design, but in the other, and what are in some respects higher, walks of art, it has not succeeded in evoking much artistic feeling.

TRURO CATHEDRAL.

IT has just been decided to build a wooden temporary church for nse whilst the choir of this cathedral is being built. The structure is to be at once commenced, and as soon as it is np,—in abont two months' time,—the present building will come down, all bnt the sonth chancel aisle wall, which, it will he remembered, it is intended to incorporate into the new building. The wooden church, which will hold about 400 worshippers, is to be erected on the north-east site, in snch a way as not to interfere with the footings of the catbedral foundations; the choir will, therefore, he completed without any interference witb the temporary structure. The stones of the old church will he all incorporated in the new walls. The work of restoring the south wall of the chancel to its proper perpendicnlar will be one of some little difficulty. It is 8 in. out of the upright, and the stone,—a soft Elvin,—being all face-bedded, is terribly decayed. The work upon it is of a particularly rich, though somewhat late, character, not altogether nniqne in Cornwall, the church of St. Mary Magdelene at Launceston exhibiting similar, even much more elaborate work, all over its exterior.

Under the managing clerk of works, Mr. James Bubb, of London, to whom the carrying ont of the work of the cathedral is entrusted, a staff of men are engaged in getting in the footings of the east end of tbe choir. Tbese go right down to the solid shillet rock beneath, which forms a splendid foundation. The concrete for the foundations is made with the stone of the old houses which originally stood upon the site now to be built upon. The wooden staging that was used at the late royal ceremonial has all been sold by auction, and removed. Both the foundation-stone and the memorial one are of grey Cornish granite. Tbe former is from the Mahe Quarries, near Penryn, and the latter from the neighbourhood of St. Dennis, six miles north-west of St. Austell. The foundation-stone stands upon the plinth of the north-east angle buttress. It measnres 3 ft. 8 in. by 2 ft. 1 in. by 11 in. The memorial-stone is at the other end of the church, and occurs in the south arcade, three bays from its western respond. The base and one course of the columu that would occur there were fixed prior to the ceremony. Upon this the Prince placed another course, which forms the memorial in questiou, and since then yet another has been added on the top of it, all in St. Dennis granite. Mr. Dan. Delafield is the foreman.

VALUE OF PROPERTY IN ELY PLACE.

THE value of land and property in Ely-place was shown hy a sale of houses there which took place at the Auction Mart last week. Messrs. Fox & Bousfield offered for sale, under an order from the Court of Chancery, ten freehold houses on the east and west sides. Amongst the advantages which the property was said to possess, it was stated that, being on the verge of the City, bnt just ontside the liberties, it was free from many of the hurdens of citizenship and taxation, whilst its central position, with facilities of access both from the east and the west, gave it a great value both for professional and commercial prrposes. The particulars also stated that as all the ground leases were about to expire, some of the present tenants were only holding on sufferance at nominal rents, and that the houses would be snrrendered in good repair. Tbe information was added that Ely-place is governed hy its own commission, under a special Act of Parliament. Mr. Bousfield, the auctioneer, before offering the property, which consisted of ten lots, adverted to tbe snbstantial character of the buildings, although old, remarking that after having stood for a period of something like ninety-nine years, they were still in the very best of condition, and far more substantial than many other houses which bad been erected during the present century. He added that should any purchasers intend to rebnild, they would find in the houses as they now stood some of the very best timber, and other materials eqnally good. Tbe sale then proceeded, the first lot consisting of a house containing a ground area of 1,138 superficial feet, being sold for 3,520*l.*; lot 2, a house and ground area, 1,120 ft., 3,400*l.*; lot 3, ground area 1,090 ft., 3,500*l.*; lot 4, 1,116 ft., 3,640*l.*; lot 5, 1,340 ft., 2,900*l.*; lot 6, 1,498 ft., 3,600*l.*; lot 7, 1,529 ft., 3,450*l.*; lot 8, 1,538 ft., 3,300*l.*; lot 9, 1,523 ft., 3,650*l.*; lot 10, 1,520 ft., 3,610*l.* The total proceeds of the sale amonnted to 34,550*l.*, the average price obtained for the several lots being about 3*l.* per foot.

Public Art Museums.—Through the efforts of the Bradford Free Library and Art Museum Committee, the authorities at South Kensington Museum have been induced to vary in their favour the usnal regulations with respect to loans of artistic objects to provincial museums which prevent the loan of such objects to corporations. Hitherto such loans could only be obtained through schools of art, or by electing members of the schools of art as members of the Art Museums Committee. Official information of the change referred to has been received from the South Kensington Museum by Mr. W. T. M'Gowan, Town Clerk of Bradford, and a deputation has been appointed by the Bradford Free Library and Art Museum Committee to confer with the officials at South Kensington with the view to the selection of snitable objects.

WALSALL SEWERAGE SCHEME.

At a recent meeting of the Walsall Town Council, the chief business was the consideration of the sewage scheme which has been prepared by the borough surveyor (Mr. W. J. Boys), in pursuance of the directions of the General Purposes Committee. These were given after full consideration and final rejection of the schemes which were sent in to compete for the 200 guineas which the Council offered as premiums.

The Borough Surveyor's report on the new scheme commences by stating the general idea in the following words:—"In order that you may be able to thoroughly comprehend the question, it is necessary for me to state that the area of the borough is 8,080 acres, the present population being estimated at 58,460, residing in 10,707 houses, the present estimated daily average quantity of sewage to be disposed of being calculated from a population of 57,000 at 40 gallons per head = 2,280,000 gallons, or 10,178½ tons. The quantity of sewage to be disposed of day by day may appear large, but, after careful gaugings extending over a long period, and taking into consideration the average rainfall at Walsall, which was during the decade ending 1877, ·68 in. per week, or 33·55 in. per annum, I am of opinion that 40 gallons per head per day is the proper quantity to be estimated for. I propose, for the purpose of my scheme, to divide the borough into two districts,—viz., Walsall and Bloxwich,—and to deal with the whole of the sewage from each district separately, by gravitation, and without any chemical treatment whatever. The Walsall district comprises the town of Walsall, Caldmore, Palfrey, Pleck, Bescot, James Bridge, Park Brook, Birchills, Bloxwich-road as far as Pratt's Bridge, Coal-pool, Sargent's-hill, and Park-lodge, —the area being about 5,302 acres, part rural and part urban, with a population estimated at 47,460. The scheme provides an outlet for the drainage of all the places mentioned, and every house, and the estimate includes the cost of all outfall and branch sewers that are, in my opinion, now necessary. The sewage from this district will flow, by gravitation, to the land selected for the purification thereof,—viz., the Brockhurst Farm, and other land adjoining, and will be discharged at three levels commanding the whole of the land. A portion of the Walsall sewage which I propose to discharge into subsidence tanks at the lowest level (*i.e.*, by the outfall sewer near Wallow's-lane, now in course of construction) is largely diluted with subsoil water and waste tap-water; it contains a large quantity of trade refuse of various colours, chiefly from the tanyards and curriers and other trades where dyes are used. The remaining portion of the sewage, which I propose to discharge at higher levels, will be purely domestic, and may be applied to the land direct without passing through the tanks. The Bloxwich district is to the north of Pratt's Bridge, and includes Bloxwich, Blakenall, Leamore, Harden, Wallington-heath, Little Bloxwich, Fishley, Goscote, Sneyd-lane, Broad-lane, and Bloxwich-road coming down to Pratt's Bridge,—the area being about 2,778 acres, with a scattered population of about 11,000. The sewage from a population of about 9,500 residing in the district will flow by gravitation to the land selected for its purification, which adjoins Slacky-lane, Goscote. The quality of the sewage from this district is purely of a domestic character, and may be applied direct to the land. The scheme provides, as far as is practicable with one system of sewers, to exclude the rain water; and ample provision is made for the disposal of the storm water by overflows or storm-water outlets at convenient places." After fully describing the plans showing these details, the report proceeds,—"The land proposed for the purification of the Walsall sewage is known as the Brockhurst Farm, and other land adjoining thereto, near Bescot Station; it comprises an area of 175a. 0r. 36p. or thereabouts, including watercourses, roads, farmyards, and buildings; it is partly situate in the parishes of Walsall, West Bromwich, and Wednesbury, and joins up to a part of the land where the West Bromwich sewage is to be treated. Thirty-four trial holes have been excavated in this land, to an average depth of 5 ft., to ascertain the nature of the ground; these prove that about 152 acres of this land is such that, if properly under-drained, it will be very suitable for the purification of sewage. A portion of the land, about 13 acres, is of a retentive nature and clay, and, in my opinion, is not so suitable; but, notwithstanding this, I have included it in the scheme, believing that it will be more economical to treat for the whole than pay a large price for severance and take a portion only. . . . . The land proposed for the purification of the sewage from the Bloxwich district is situate on the northern side of Slacky-lane, Goscote; it comprises an area of 21 acres or thereabouts, including canal basin, marl pit, cottage and garden, and watercourse; nearly the whole of it is situate within the Borough, a small portion, less than one acre, being in the parish of Pelsall."

The report proceeds to explain the system of purification proposed,—namely, subsidence in tanks and filtration through closely under-drained land. It also points out why this is advocated,—namely, because broad irrigation would necessitate taking more land than can be obtained in the neighbourhood, and because chemical treatment is both uncertain and expensive. It then proceeds,—"The proposed outfall sewers, designed for this district, are at such a level that the sewage from all the existing sewers will be intercepted thereby, at the same time affording ample facilities for intercepting the sewage from those places still unsewered. Special care has been taken in choosing the line of these sewers, to secure good gradients for all the sewers without deep cuttings, thereby reducing to a minimum the first cost and future maintenance. The outfall sewers are designed to contour the lands through which they pass, and it is proposed to construct outlets at suitable points, to enable the intervening lands to be irrigated, if and when required. The scheme provides for three outfall sewers for the Walsall district, viz.—1st. The main outfall sewer, now in course of construction, to receive the sewage from a population of about 34,500, and low enough to drain the lowest house in the borough. Another outfall sewer, commencing at the end of the existing sewer in the road to Palfrey to receive the sewage from a population of about 2,000, and low enough to drain all the houses that may hereafter be erected on the Palfrey side of the town. A third outfall sewer from Ablewell-street, to consist of iron pipes laid to a hydraulic inclination of 1 in 592, to receive the sewage from a population of 11,000. The combined delivering capacity of these sewers will be equal to 14,525,000 gallons per day, so that ample provision is made for a large increase in population. There will be two outfall sewers for the Bloxwich district. The scheme provides for sewering all the declared streets where sewers are necessary, and the cost is included in the estimates. The length of sewers required in the Walsall district being 200 lineal yards, 9 in. diameter; 2,477 lineal yards, 12 in. diameter; 2,755 lineal yards, 15 in. diameter; and 882 lineal yards, 18 in. diameter. The length of sewers necessary in the Bloxwich district being 832 lineal yards, 9 in. diameter; 3,167 lineal yards, 12 in. diameter; 2,323 lineal yards, 15 in. diameter; and 366 lineal yards, 18 in. diameter." A summary of the estimates is also given, and shows the probable cost to be,—Walsall and Bloxwich districts: Land, including cost of provisional order, arbitration, and other legal charges, under-draining, preparing surface, levelling, making carriers, and engineering tanks, main carriers, engine-house, turbine, pumps, pipes and alteration to brook course, 51,380*l.* 4s. 1d. Outfall sewers,—Walsall district, 11,360*l.* 0s. 3d.; Bloxwich district, 3,297*l.* 1s.; total, 14,657*l.* 1s. 3d. Branch or street sewers,—Walsall district, 2,852*l.* 11s.; Bloxwich district, 2,724*l.* 0s. 5d.; total, 5,576*l.* 11s. 5d. Add 10 per cent. for contingencies, 7,161*l.* 7s. 8d.; total 78,775*l.* 4s. 5d. To this the scheme adds,—"The annual working expenses in utilising and purifying the sewage on the proposed farms will, in my opinion, be more than repaid by the crops and other produce; I do not, therefore, charge the scheme with any expense in manipulating the sewage;" and then proceeds to give the following estimate of the annual cost, viz.:—"To repay principal and interest on loans for the land and works necessary for the purification of the sewage,—viz., on land at 4 per cent. per annum, extended over a period of fifty years, and on works and other charges at 4 per cent., extended over a period of thirty years, will require an annual instalment of 2,540*l.* 6s. 8d. Outfall and branch sewers, total estimated cost, 20,233*l.* 12s. 8d.; to repay principal and interest at 4 per cent. per annum on a loan of 20,244*l.*, in thirty years, will require an annual instalment of 1,170*l.* 0s. 7d. Total annual cost of purification and collection, 3,710*l.* 7s. 3d. To repay principal and interest on a loan of 7,161*l.*, in thirty years at 4 per cent., will require an annual instalment of 414*l.* 2s. 6d. Annual cost of maintenance of sewers, pumps, pipes, &c., 200*l.* Total annual cost, 4,324*l.* 9s. 9d." The scheme is designed of sufficient capacity for a population of 100,000, so that no further sewers will be necessary for some time.

The Town Council resolved to adopt and carry out the scheme.

No. 42, OLD BROAD-STREET.

THE premises, No. 42, Old Broad-street, recently in the occupation of the London and Provincial Bank of Ireland, are in course of demolition, the business of the bank having been removed to premises in Throgmorton Avenue. The house is not of any great interest in point of art or age, but is a fair type of a London merchant's house of 100 years ago, and as these houses are gradually disappearing from the City to make way for structures better adapted to the wants of the age it may not be superfluous to record its destruction.

"In June, 1780," said Sir Charles Reed the other day, in the course of a speech in which he contrasted the present condition of the metropolis with its condition a century ago, "London was in the hands of a fierce and lawless mob; incendiary fires were burning in every direction, the trained band were called out, the military were quartered in St. Paul's Cathedral, the Lord Mayor was summoned to the Privy Council, and on the Mansion House was posted a royal proclamation in the following words:—'That the outrages committed by bands of desperate and abandoned men in various parts of this metropolis have so far overborne all civil authority . . . . that I feel myself obliged by every duty and affection for my people to suppress in every part those rebellious insurrections . . . . by the application of the force entrusted to me by Parliament.'"

These "rebellious insurrections" were afterwards known as the Gordon riots. Broad-street was the scene of an encounter between the trained bands, or City Volunteers, and the people, in which some five or six of the latter were killed and others taken prisoners, by which, as a contemporary account states, "the first damp was struck into the spirit of outrage."

The house No. 42, Broad-street, is shown on the left of the picture of the Riot in Broad-street on the 7th of June, 1780, painted by Francis Wheatley, of which an engraving was published by Messrs. Boydell, dedicated to the London Light Horse Volunteers and Military Foot Association, which associations appear to have distinguished themselves by their efforts to subdue the rising, and were publicly thanked by the City authorities for their exertions.

From this plate the house appears to have undergone but little change during the last hundred years, the only alteration perceptible being the covering the whole of the brickwork with cement, and the removal of the two lamps which formerly stood on each side of the entrance doorway.

The house was in all probability originally an inn, with the sign of the White Horse. In old maps a narrow alley is show in the rear of the house called White Horse-place. Union-court, which adjoins the house on the south, was formerly called White Horse-yard, and this name was in all likelihood changed to its present title after the Act of Union of 1800.

From the Pyrenees.—Dr. Phené writes us that in making a survey of the mountain d'Espiaup, near the Spanish frontier, in the Pyrenees, he found circles and ovals formed of stone, like those on Dartmoor, and both straight and curved avenues. He has also witnessed the ceremony of the fires of St. John, on the eve of his festival. The fires are lighted by the clergy while a service is chanted, and after the burning the charred wood is distributed to every household, and kept religiously all the year, as was the custom in Britain before the Christian era. At one of those fires, at Luchon, living serpents are burned in the flames. He is at present making an examination of the antiquities in the Balearic Islands, for a comparison of the Talayots of Minorca with those of Malta, and with the similar structure found by him in Brittany.

RESUSCITATION OF OLD ART.

THE practice of architecture in modern times has been so different from that which prevailed in the periods of Mediæval and Classical art, and a comparison of results is so little favourable to the present system, that it is perhaps worth while to inquire whether it may not be possible to revert to the old method of procedure, or, at least, to adapt it to the circumstances of our own day, especially as we are just now,—as regards style or mere fashion,—in a rather uncertain and transitional state.

Looking back into the earlier centuries of the architectural world, we see that "there were giants in those days;" while a glance at the last few hundred years forces from us the melancholy confession that in them there were but pigmies. If we ask ourselves what really noble edifice,—what great original work,—has been accomplished in modern times, we stand abashed at the answer, "None." If a really original edifice exists, which competent judges would venture to say is equal in merit to some well-known ancient structure, it must be altogether an exceptional example. The Houses of Parliament are very magnificent, but they are so only from the profusion of forms and details borrowed from fifteenth-century remains, but which are not at all of the nineteenth. They are honourable to the skill of their designer, considering the time and circumstances of their erection; creditable if we admit that mere resuscitation is the proper work of a modern architect. But resuscitation of the dry bones of antiquity was not the principle that produced the great work of Classical or Mediæval times. On the contrary, the old was constantly destroyed to make way for the new. The improvement and perfection of one style was the rule, however long it took. The Greeks, with a mental perfection which the world can no longer match, required at least four centuries to bring a single style to perfection. It was only by almost innumerable, and most gradual changes, that they eventually produced that perfect example of architecture,—the Parthenon at Athens. The Byzantines and Arabs also adopted a single style, and produced great and beautiful architectural work. In the West of Europe, in the Middle Ages, the same method was pursued, and each progressive step in the gradual development of style was an illustration to a page of history. Thus, in ancient times the results were perfectly satisfactory. The vital principle of originality was everywhere at work, and noble buildings rose in all countries.

What, then, is the cause of the difference? How is it that in modern times there is an absence of all originality of all power to design a really noble edifice that is not evidently more or less a copy of some other building or its details, more or less a mere adaptation,—in fact, a lithic plagiarism? Have the religious, political, and social circumstances of recent generations eradicated the power of original conception and design, or have we, as architects, been at fault in our mode of working in our architectural practice?

The facts above stated, and a little consideration of our ways and doings in these days, points to the latter as the cause of modern architectural failures. Whether from vanity, or the desire to attract public attention, or the eagerness to grow suddenly rich,—from whatever cause,—there is a restless working in numerous styles, the very principles of some of which are as opposite as the poles asunder. Since the time of Elizabeth there have been nearly a dozen changes of style, and now we have again the Anneite fashion,—a new birth of an older Renaissance. Elizabethan, Jacobean, Revolutionary, Queen Anne, Greek, Gothic, Italian, Renaissance, have followed one another in rapid succession during 300 years. Deducting 100 years for the Hanoverian period and 100 for revolutionary Cromwellian and Interregnum periods, when, strictly speaking, there was no architecture, we have a little period of twelve years or so for each fashion against the 400 which the Hellenic architects required to perfect one.

To come to our own day. In the present exhibition at the Royal Academy the designs for modern buildings range in style from the period of the Plantagenets to that of the Hanoverians. Of course, there is a great cleverness and much beauty in the designs, but scarcely such as to make the reflective observer happy, for he cannot help asking himself, "Shall we ever do anything really original at all equal to the work of the great ages of art if we continue our present method of *dilettanti* copying this, that, and other styles for mere fashion's sake, and our present mere antiquarian draughtsmanship, which are alike unworthy of the true architect and of any national encouragement?" Quite as rational would it be for a fashionable man to don a Tudor or even Georgian suit, and appear to-day in it in Kensington-gardens or Regent-street, but his friends would probably question his sanity, although the dress of those periods,—from an art point of view,—was more beautiful than that worn by men of the present day.

Let us hope, then, if there be any truth in these remarks, that the Council of the Institute or the next conference may initiate for us, or help us to initiate, some better principle of architectural practice by which the efforts of all shall be concentrated upon one style that may be decided to be the best suited to national and social requirements. By this means,—as like causes produce like effects,—there may be not only such a thing in the future as an Anglican style, but national buildings that may fairly and favourably be compared with the architectural *chefs-d'œuvre* of past ages. As Mr. Fergusson tells us that we are of a race which produced some of the wonders of ancient architecture, we must by nature possess the power to do great things in art, and we may, therefore, hope that the power only wants proper direction.

H. T.

THE TRUE CRITIC.

GIVE me the critic with a mind well stored,
A judgment balanced, and a heart sincere,
To pick my faults, and set me in the way
When I have miss'd the beautiful, the true;
Not some coarse blatant, with outpour of words,—
All foul extremes, that reek of prejudice,—
Whose reason lists from Truth's just equipose,
And dang'rous heels o'er to the depths of wrong:
Nor subtle flatt'rer, with a diction smooth,
Trimming to all, as changed occasion prompts,
Who fools the dullard into outward show,
To don fine aire but natural to the best,
Or weighs down genius with his fulsome praise,
With sense of shame to be bespatter'd so,
By one inconstant to the paths of truth.

Where artist fails the critic can but aid
To make that whole which else would seem a part,
A falling short of perfect excellence,—
Of excellence in work, in work still low,
Compared with that grand spiritcraft divine,
That excellence the critic cannot word,
The excellence that flows from deeper source,
The unseen schooling of the inmost soul.

METER.

OBITUARY.

Mr. John Guest, F.S.A., died suddenly at his residence at Rotherham, on Sunday last, while preparing to attend church. Mr. Guest was well known for his industry in historical researches. His latest work was "The History of Rotherham."

Mr. Edmund James Smith, C.E.—We regret to learn that Mr. E. J. Smith, C.E., died somewhat unexpectedly on Wednesday morning from the effects of an operation which he had undergone. His name has recently been prominently before the public as the principal witness before the House of Commons Select Committee on the Metropolitan Water Supply. He was a partner in the firm of Smiths & Gore, past-President of the Institution of Surveyors, member of the Northern Institute of Mining Engineers, Associate of the Institution of Civil Engineers, Crown Receiver for the Northern Counties, and surveyor to the Ecclesiastical Commissioners. After the prorogation of Parliament last year, Sir R. Cross, the then Home Secretary, entrusted to him the work of considering the matter of the water supply of London, and of negotiating with the water companies for the purchase of their undertakings.

Exeter Hall.—We understand that the committee for the altering of the hall for the purposes of the Young Men's Christian Association have requested Mr. A. Pite, Messrs. Searle, Son, & Hayes, and Mr. Charles Bell to submit designs and estimates for the same.

ARCHITECT AND CONTRACTOR.

A CORRESPONDENT writes as follows:—

"A has a contract for a large building, and has made a sub-contract with B to lay Portland cement concrete floor to the entire satisfaction of Mr. C., who happens to be the architect under whom A has to work. The work having to a certain extent proceeded, Mr. C. notices to A that it is a mixture of lime and cement B is putting down, and orders the work laid,—value over 300*l.*,—to be taken up. A sends a copy of this notice to B, and insists on breaking his contract. B asserts most positively that no lime whatever has been used, and offers to abide entirely by the arbitration of four of the best known architects. A declines to do this, relying on that condition of the contract that the work was subject to the satisfaction of Mr. C. alone.

Now, as a fact, none but the best cement was used,—no lime whatever. B's character is considerably damaged by the stoppage of the work. What remedy has B? We are told none against A, the terms of the contract being that the work was to be to the satisfaction of Mr. C. Please say if an architect can make a sweeping charge of this kind with impunity. B asked Mr. C. for an explanation, but he ignores B, simply acknowledging A in the matter. Your opinion is anxiously looked for by many contractors.

B, THE SUFFERER."

*** We can give but little satisfaction. It seems to us that B has no remedy against A, or the architect, unless some kind of fraud existed. The determination of a particular person has been made supreme, and those who have put him above them, and raised him to a *quasi*-judicial position, must for good or ill abide by his decision. At the same time, so much depends on the wording of the contract that, if all the facts were known, something more favourable to the sub-contractor might possibly be said. Proper advice should be taken. One practical point occurs to us, viz., what was the difference in the material relaid from that put down in the first instance,—though we are not quite sure from the letter whether the work was completed by some one other than B, which might materially affect the question. Thus the suggestion would occur, would an action for libel lie at the suit of B against C? To which, again, comes a counter suggestion. Possibly in that case the architect could plead that the communication was a privileged one. As to the first question, however, we feel no doubt; for the position of architects is so like that of a judge that one can give an opinion on broad principles subject to any special terms in contracts.

LION'S HEAD BY THE LATE SIR EDWIN LANDSEER.

ONE of the colossal lions' heads mentioned in our article on "Lions and Eagles," of May 29 (vol. xxxviii., p. 653), has been placed in the first large entrance-room of the South Kensington Museum. It is at present in plaster of Paris, but it is to be hoped that eventually, as we suggested before, it will be preserved in some more durable material, by being exactly copied by electro-deposit, in copper, so as to retain all the delicate touches of texture, on which, as in his paintings, so much of the felicity of effect of this great artist's work depends.

ACCIDENTS.

ON Saturday afternoon the roof and a portion of the wall of a stable situated at Pope's-hill, Shadwell, fell into the street with a crash. Four children, aged between three and six years, who were playing in the road at the time, were struck by the falling *débris*, and injured in a more or less serious manner. They were conveyed to the Children's Hospital, Shadwell. The building is stated to belong to what is known as the Shadwell Estate.

A lofty obelisk, which is in course of erection on Tower-hill, Beaumaris, as a public memorial to the late Sir Richard Bulkeley, formerly lord-lieutenant of Carnarvonshire, suddenly fell on Monday morning, a number of workmen having a very narrow escape. The monument, which was to have been formally unveiled next week, stood in a very exposed situation, and it is supposed that the recent heavy storms weakened its foundations.

THE NEW HALL OF THE SCOTTISH CORPORATION.

THIS interesting building, which was opened on Wednesday last by his Grace the Duke of Argyll, is thus described by its architect, Professor Donaldson:—

The New Scots' Hall, Crane-court, Fleet-street, London, has been erected in the years 1879-80, upon the site of the hall destroyed by fire on the 15th November, 1877. A building committee was appointed to confer with the architect of the corporation, as to the arrangements and accommodation of the new building. After much consideration it was determined to adopt a suggestion of Mr. Shand, member of the committee, that the new hall should be built on the space occupied by the old main building next Crane-court and by the four blocks of dwellings in Fleur-de-Lis-court, which had been burned down in the general conflagration. Three of these block were to be thrown into the main building, and one was to be left uncovered to afford an opening into Fleur-de-Lis-court from the northern court lying between the main building and the old chapel in Trinity Church-passage. This open space would thus afford light and air to Fleur-de-Lis-court and the premises of the Corporation,—an arrangement the more necessary for the health of the occupants in the Scots' Corporation premises, as the dwellings in the immediate vicinity are closely packed and densely occupied. Another part of this scheme was that the block of the old chapel, next Trinity Church-passage, should be left quite distinct from the new buildings, and available to be let or sold, as the Corporation might deem best.

The new block of buildings as carried out consists of three stories in height, the lowermost one being occupied by the entrance-hall from Crane-court, and by the principal staircase, as also by a back entrance for pensioners from the north court, with a secondary staircase for them. There is a spacious chapel, having 1,450 ft. superficial, and a height of 17 ft. for the congregation of pensioners on pay-days, and the religious service on that occasion. There are also convenient easements for the pensioners in attendance. The first floor contains the principal feature of the building; that is, the hall for the annual and other meetings of the governors, and for the transaction of the public business of the corporation. It has a northern aspect, and is 43 ft. 9 in. long by 18 ft. wide and 16 ft. high in the clear. It is well lighted, with a central bay-window and two large windows on the north side. At the east end of the hall is the fireplace, with a handsome white marble chimney-piece, resembling that at Craigievar Castle, Scotland (illustrated by Billings in his "Baronial Buildings"), with granite columns on each side, and surmounted by a large coat of the Royal arms, as at Craigievar, here heraldically emblasoned. It is of stone, and was saved from the unhappy conflagration of 1877, and, consequently, is a precious relic of the past. Over these arms are two panels, containing the shields of his Royal Highness the Prince of Wales and Duke of Rothsay, president of the corporation; and of his Royal Highness the Duke of Edinburgh, quartered with the arms of their Royal and Imperial Princesses, so as to produce a pleasing variety in the two panels, and at the same time a compliment to the two illustrious princesses. It is proposed to fill in twenty-nine like panels, which run along the three sides of the hall, immediately under the ceiling, with shields of the Scottish nobility, or chieftains of clans and representatives of historical Scottish families, who may be disposed to contribute their armorial bearings. So natural a series would keep alive the traditional spirit of feudal brotherhood, a leading and attractive feature of the Scottish character. This would to a degree, and for the present, serve to replace the picture of Mary Queen of Scots, a portrait of his Majesty King William IV., by Wilkie, and various other paintings which decorated the old hall, but were destroyed by the fire.

Adjoining the hall is the committee-room, about 19 ft. long by 15 ft. 6 in. wide, and a clerk's office, about 23 ft. long by an average width of 14 ft., which two rooms and hall, with the principal and pensioners' staircases, occupy the whole area of the first floor. The story above has a private room for the secretary of the corporation, and nine other residential apartments for the two under-officers (visitor and collector and the beadle), with their several conveniences attached, and they are well lighted and airy.

The architect has sought to infuse into the building as much as possible of the national sentiment. He has therefore largely adopted in the ornamental details the lion rampant, the thistle, and similar emblems; and, in the architectural arrangement, the high-pitched roof and small turrets to the front, and such-like features of Scottish architecture.

The Building Committee have proceeded with the greatest economy in the erection of the new building, consistent with its purpose and as a representative establishment.

The Corporation had to receive 3,768*l.* from the insurance company; and proceeded to receive tenders from well-known builders for the main erection, the lowest one being for 5,778*l.*, from Mr. Hobson, of Duke-street, Adelphi, whose work has been carried out very satisfactorily.

There have been executed other additional works, which, with professional charges, furniture, and other disbursements, will altogether exceed the funds immediately applicable to building purposes by a large balance of 5,000*l.*, which must be raised by special donations from the friends of the Corporation and of the Scottish poor, in order not to cripple the funds appropriated to their relief.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT a special general meeting on Monday last (Mr. John Whichcord, F.S.A., president, in the chair), held in accordance with By-laws LXIV. and LXXI., to authorise the sale of 2,300*l.* Three per Cent. Consols, for the purpose of discharging the remaining liabilities in respect to the recent premises alterations, and of reimbursing to the ordinary funds a portion of the advances made therefrom, the discussion was opened by the President, and continued by Mr. Henry Currey, member of council; Mr. Joseph Jennings, Fellow; Mr. R. W. Edis, F.S.A., Fellow; Mr. Arthur Cates, member of council; Mr. T. Roger Smith, Fellow; Mr. David Brandon, F.S.A., member of council; Mr. Wyatt Papworth, Fellow; Mr. Octavius Hansard, member of council; Mr. E. R. Robson, F.S.A., Fellow; Mr. Charles Fowler, Fellow; and the President. It was ultimately resolved:—

"That the council be authorised to instruct the honorary treasurer to sell 2,300*l.* Three per Cent. Consols, for the purpose of discharging the remaining liabilities in respect to the recent premises alterations, and of reimbursing to the ordinary fund a portion of the advances made therefrom."

Donations to the Premises Improvement Fund amounting to 32*l.* 6*s.* were announced.

ARRANGEMENTS FOR NEXT SESSION.

The Council announce that a trial will be made, during the next session, of the following arrangements, namely:—

(1.) *Ordinary and other Meetings of the Session.*—*a.* That the prescribed number of meetings be, as at present, fourteen. *b.* That the said fourteen meetings consist, as at present, of one annual, one special (for the award of prizes), and twelve ordinary. *c.* That four of the twelve ordinary meetings be devoted to business, as follows:—One to be the opening meeting on the first Monday in November; another to be the closing meeting in May, when the Gold Medal is presented; the two others, if not required for adjourned discussions, to be convened principally for the discussions of professional questions and the interchange of opinion on matters of practice, as well as on current topics not open for criticism at other ordinary meetings and referred to in By-law LXIX. *d.* That the remaining eight ordinary meetings be devoted exclusively to the reading of papers and discussions thereon.

(2.) *The Preliminary Business.*—*e.* That the ballot for new members be taken only at the four ordinary meetings for business, and that notice of the same be duly sent to each proposer of the several candidates requesting his presence. *f.* That the announcement of donations of all kinds to the library, the library fund, and to other funds, be made only at the four ordinary meetings for business. *g.* That new members be admitted by the chairman at any meeting during the session. *h.* That nominations of candidates for membership be read at such meetings only as will conform with the terms of By-law XV., whereby a recommendation must be read at one ordinary meeting, hung up during that and the two successive ordinary meetings, at the latter of which the candidate shall be balloted for. *i.* That in announcing the nominations the name and address of the candidate shall alone be read,—the nomination paper to be immediately afterwards hung on the board in the meeting-room. *k.* That, at the eight ordinary meetings for the reading of papers and discussions thereon, no questions other than relating to the subject of the evening be submitted.

(3.) *Papers and Discussions.*—*l.* That subjects for papers and discussions be invited under the following heads:—I. New materials, building appliances, and systems of construction. II. Architectural works in progress at home and abroad, the foreign papers to be translated for the authors if required. III. Fine art specially relating to architecture. IV. Archæology. V. Building and municipal legislation. VI. Sanitary science. . . . .

(4.) *Publication of Proceedings and Transactions.*—*o.* That the Journal of Proceedings be issued, as at present, on the Thursday following each meeting; and that an abstract of the papers and discussions be printed in that journal. Further, that the Presidential addresses at the opening meeting, the Gold Medal presentation, and on other occasions, be printed in full in that journal. *p.* That the volume of Transactions be issued annually to members; and that the volume of Transactions consist of accepted papers, philosophical, practical, or artistic, together with full discussions thereon. Also that the Presidential addresses be therein reprinted, together with an appendix containing the memoirs of deceased members, with such other matter as the Council may deem desirable. . . . .

The Council regret to announce that Mr. Thomas H. Wyatt, F.S.A., past-president, has retired, in consequence of ill-health, from the office of honorary secretary. In accepting Mr. Wyatt's resignation, the Council referred to those duties which, since February of last year, had been performed to the advantage of all his colleagues, and to the undoubted satisfaction of the general body of members, offering him at the same time a cordial expression of their thanks and a renewed assurance of their sincere regard. The election of Mr. Wyatt's successor will take place at the opening meeting of next session.

ARCHÆOLOGICAL SOCIETIES.

Norfolk.—The annual excursion of the Norfolk Archæological Society took place a few days ago to Woodton, Hedenham, Bedingham, Darrow Wood, Denton, Earsham, and Bungay. At Woodton Church some notes respecting the building, prepared by Mr. R. M. Phipson, architect, were read, in his absence, by the Rev. C. R. Manning, who supplemented them by observations of his own. There is no chancel arch, and the old, like the new, roof, ran through the nave and chancel. The walls of the church are almost entirely Early Decorated, and Mr. Manning puts their date at 1280-90. On the north side of the nave are two two-light Decorated windows. The south aisle is divided from the nave by four very plain Early Decorated arches and piers; the west pier being larger than the others,—a not very uncommon occurrence. Various and somewhat fanciful reasons have been given for this arrangement. The Decorated east window of the south aisle is one of the best in the county. It has wave mouldings and two sunk shafts, a very unusual head inside at the point of the arch, and a finial and two corbels outside. The chancel east window is of a Transition character, having a dog-tooth ornament in the jambs and arch, partly restored and injudiciously picked out in unsatisfactory colours. If relieved at all the colour should be much more subdued. There are remains of stairs to the rood-loft, and a rather rare two-light little opening into the church of Early Decorated work, or transition from Early English. The position of the rood-beam must have been peculiar, as it terminated over the point of the easternmost bay of the south aisle. One of those curious architectural contrivances, a squint, enabled the priest in the chancel to see into the chapel at the end of the south aisle. In the chancel is an Early Decorated piscina of rather uncommon design, a plain sedile, and beneath the east window a double aumbry or locker. The font is Early English, if not late Norman, as it has a Norman arcade of Purbeck marble. The smaller shafts are modern. The tower is of the eleventh century, with the exception of the octagon top story, added three or four centuries later. On the outside of the north wall, near the north porch, is an early arch, supposed to be the recess for the founder's tomb. At Hedenham the excursionists visited the restored Church of St. Peter, of which, according to Mr. Phipson, "the good old interesting work seems to have been restored off the face of the earth,—another case of over-zealous and mistaken restoration." The building consists of a nave, chancel, and square west tower, the latter in three stages without buttresses, and appears to be of the Early Perpendicular style. The walls of the nave are Early English, almost Transition. The nave has a plain oak roof of Decorated work, like the chancels of Howe and Mutford churches. Notwithstanding the slight tie in construction, these kind of roofs have stood well together for nearly 500 years. The font, plain Perpendicular, is said to have remained plastered over for 200 years, the plaster having been used to protect it from Puritanical demolition. At Bedingham Church, the lower part of the chancel walls is, according to Mr. Phipson's notes, Early Decorated, almost transition from Early English (about 1300). There is a good south priest's door, with dog-tooth mouldings, and a four-light large east window, with interesting tracery, without cusps, of the same date. A

Perpendicular clearstory of late dato has been built over the original chancel walls, which were low. The north and south aisles are Decorated, with Perpendicular insertions, with a Transition doorway, from Early English to Decorated, preserved in the former. At the east and west ends of the north aisle are Early Decorated windows, which, like the doorway, Mr. Phipson believes, are not *in situ*. The circular west tower of the thirteenth century has an octagon top of later date. The Perpendicular font is enriched with carved emblems of the evangelists; but one peculiarity is that St. Matthew is represented holding a guitar instead of a scroll. The most striking object in the church is the Perpendicular rood-screen, which has been well preserved. There are no figures upon the panels. There is piscina and a sedilia in the chancel, and also a quaint piscina in the chapel of the aisle. On the way to Denton the carriages were pulled up by the side of some fields, and the party were obligingly led by a farmer of the old school to a lot of leased ground with a clump of trees on the top, known as Darrow Wood, and just visible from the highway. By traditions, this modest eminence is known in the village as the Castle-hill, with a small ridge beyond called Hangman's-hill. As the party approached the wood, which is in the middle of some pasture land, it was found to be a hill about 15 ft. high, and surrounded by a moat containing water nearly all round. The hill has a hollow in the centre. On one side, from the moat, there extend earthworks enclosing a considerable portion of land, and beyond that is the ridge called Hangman's-hill. This interesting spot,—of which no mention is made in any Norfolk history,—was visited thirty years ago by Mr. Greville Chester and by Mr. Rix. Mr. Alfred Suckling, in writing to the latter gentleman, suggested that it was Danish work, and served as a look-out in connexion with the Danish camp at Earsham. But, Mr. Manning now observed, it is clear not only that Mr. Suckling was mistaken, but that in these earthworks, partly hidden beneath the woods at Darrow, we have the site of the residence of a Saxon lord. In the bollow of the mound was his timber-built residence: perhaps the edge of the mound was palisaded; and over the moat was a drawbridge which gave access into the exterior enclosure, that was no doubt also palisaded, where the cattle were secured. It was suggested that the name, Hangman's-hill, given to the slight eminence beyond, may perpetuate the site where the lord executed justice; and Mr. Manning remarked that no doubt the Saxon lord had the right of hanging, and would have what would be called a gallows-hill. The society will no doubt respond to an expressed wish, and have a survey of the place made for publication in a future number of its Proceedings. On arriving at Denton, a very welcome break occurred in the day's proceedings, suggested by the bospitable feelings of the Rector of Denton, the Rev. C. A. St. J. Mildmay, who, with Mrs. Mildmay, most kindly received and entertained the visitors. The church of Denton, dedicated to the Virgin, is a grand Early Decorated building. The east window is of similar design to that at Bedingham, but is filled with stained glass, some of it of a very old date. Earsham Church having been visited, the party departed for Bungay, and an inspection of the ruins of Bungay castle brought the programme of the day to a close.

Derbyshire.—The members of the Derbyshire Archæological and Natural History Society recently had an excursion to Norbury and Ashbourn. At Norbury Church, Mr. J. C. Cox, author of the "Churches of Derbyshire," described the building and the fine altar-tombs in the chancel. The Manor House at Norbury, formerly the residence of the Fitzherberts, and now occupied by Mr. Maskery, was next visited. Here the ancient court-yard, the quaint old panelling, and the interesting cartouches of stained glass still preserved in the windows, were inspected with much interest. After luncheon the Grammar-school at Ashbourn was visited, and here Mr. J. Sleigh, J.P., read a paper on "Old Ashbourn Families." The party then proceeded to Ashbourn Hall, where the rest of the day was spent.

Honour to the Craft.—The successful competitor for the Queen's Prize at Wimbledon this year, Mr. Ferguson, is a stonemason, from Argyllshire. What winning this prize means is only understood by those who have tried at it.

FEES UNDER METROPOLITAN BUILDING ACT.

FLATS.

AT Westminster Police-court Messrs. Perry & Co., builders, of Tredegar Works, Bow, appeared to an adjourned summons, at the instance of Mr. Edward Drury, the district surveyor of St. Margaret and St. John and the Close of St. Peter, Westminster, to show cause why they should not pay the sum of 10*l.* 2s. 6d., fees which had accrued by reason of Mr. Drury surveying and causing the regulations of the 18th and 19th Victoria, chapter 122, section 51, second schedule, to be carried out with regard to the works known as Queen's Mansions East, Victoria-street, Westminster, not yet finished. Mr. Drury conducted his own case, and Mr. Greenwood defended.

Mr. Drury relied firstly on the 27th section, sub-section 2, and contended that the blocks known as A, B, C, D, E, F, and G were separate buildings, and as such were entitled to be charged for. In January, 1879, he received notice from Messrs. Perry that the building in course of erection was intended to be used as residential chambers of an area of 10,300 ft. He drew attention to sub-section 2 by letter, and on the 22nd January notices were received that Perry & Co. would erect three blocks of buildings. Notice was then sent that there were no continuous party walls, and attention was drawn to the section relating to this. After communicating with Mr. Knowles, the surveyor, and seeing him, the defendants were written to asking for separate notices, and on the 17th of July a Mr. Bartlett called, the notices were filled up, and they were signed, for four sets of chambers on the basement and seven each on the ground and next five floors. Mr. Drury had constantly surveyed the buildings, which were advertised as residential chambers in sets, and were so constructed as to be occupied by separate tenants, and consequently the claim for 10*l.* 2s. 6d. was made up of fees under the Act for separate buildings.

Mr. Greenwood, for the defence, contended that in signing these notices his clients had no idea that this building was going to be considered separate buildings. They were really given in mistake for the original plans, and the intention was that it should be an hotel.

In answer to Mr. D'Eyncourt, Mr. Drury stated that the fee for an hotel would be 10*l.*, payable a month after the roof was on. There was communication from set to set only by a balcony. These notices were good, and they were really separate tenements.

Mr. Greenwood objected to the claim for the basement, 10*l.* 15s., as they took it of another builder, and it should be charged to him.

In the end Mr. D'Eyncourt came to the conclusion that the fees were due as claimed, and ordered them to be paid.

A CONTRACTOR'S CLAIM.

WILLAN *v.* THE MAYOR OF ROCHDALE.

THIS was an action (tried at the recent Manchester Summer Assizes before Mr. Justice Lindley) brought against the Corporation of Rochdale, to recover 143*l.*, the balance of a contract for the construction of a sewer.

Mr. Ambrose, Q.C., in opening the case, said the plaintiff was a contractor, living at Chorlton-upon-Medlock, and his claim arose upon a contract which he had accepted to make a sewer, and the larger portion of his claim had been practically admitted in a letter he had received from the corporation surveyor; but a counter claim had been set up by the corporation on account of a claim which they had most absurdly paid for damages alleged to have been done to certain houses by the excavations for the sewer. He contended, however, that not only was the plaintiff in no way liable for the alleged damage, but neither were the corporation liable.

On behalf of the defendants it was contended that the damages to the houses arose from the negligence of the contractor.

His Lord-hip said that being the case he could not see how the corporation had been compelled to pay for the damages if they were due to the negligence of the contractor, and it appeared to him that they could not sustain the counter claim.

Mr. Potter, Q.C., for the defendant, applied to his Lordship to allow the action to stand over with leave to the defendants to amend.

His Lordship thought the only fair thing would be to decide against the corporation with regard to the counter claim without prejudice to a further action if they saw their way to it.

After a long discussion with regard to two accounts of minor importance, a verdict was entered for the plaintiff for the amount claimed, with liberty for the defendants to bring an action, if so advised, for 132*l.*, the amount which the corporation had paid on account of damages alleged to have been caused by the negligent construction of the sewer.

HOUSE PROPERTY.

ON Monday Messrs. Mallett, Booker, & Co. offered three valuable West End residences for sale, at the Auction Mart, Tokenhouse-yard. The first property submitted was the large freehold mansion, No. 15, Lancaster-gate, close to Kensington-gardens and Hyde Park, described as a handsome building of imposing elevation, containing five floors and basement, together with a range of spacious stabling and coach-house. The mansion was stated to be built on arches, with iron girders, and let on lease for twenty-one years at a rent of 330*l.* per annum, the present estimated value being 400*l.* The property was sold for 7,020*l.*, the purchaser being stated to be the present occupier.

SHIPBUILDING AND ENGINEERING PROPERTY AT MILLWALL AND CUBITT TOWN.

THREE large business properties on the banks of the Thames, at Millwall and Cubitt Town, connected with shipbuilding and engineering, which have now been unoccupied and idle for some few years past, were offered for sale at the Auction Mart, on Monday last, at upset prices, upwards of one-third less than their original cost and present estimated value, without meeting with an offer for any one of the three. The auctioneer was Mr. Bradshaw Brown. Thus, for property offered for an aggregate sum of 39,500*l.*, but estimated to be worth 79,330*l.*, no purchaser could be found.

STATUES.

Lord Lawrence.—It is stated that the executive committee for this object have determined to erect a standing statue in bronze in the open air, and to give Mr. Boehm the commission for the work. No site has as yet been fixed on, but it is desired, if possible, to obtain the unoccupied corner of Waterloo-place.

Robert Raikes.—The model of a group of statuary to the memory of Robert Raikes has been unveiled at Gloucester in connexion with the Sunday School Centenary. The group consists of two figures,—Robert Raikes, 8 ft. 4 in. in height, and a little child who is nestled close to his side, and over whom he has thrown his right arm with an air of protecting kindness. The attitude of Raikes is very striking. He is standing on the left leg, with the right advanced; with his left hand he holds a Bible closely pressed to his heart. The face is open, and beaming with the love and kindness which were so eminently characteristic of the man. The sculptors are Messrs. W. & T. Wills, of London. The marble group is to be placed in the cathedral when the necessary funds,—1,000*l.*,—are raised by public subscription.

Daniel O'Connell. — On Saturday last a special meeting of the O'Connell Monument Committee was held in the Mansion House, Dublin. The chair was occupied by the Right Hon. E. Dwyer Gray, M.P., Lord Mayor, who said he had called the meeting because it appeared to him there was a very strong public feeling that the base of the monument, as it at present stood, was too wide. Memorials to that effect to the Corporation had been prepared, and the feeling was that the base at present was, more or less, an obstruction. He had, under these circumstances written a letter to Mr. Brock, asking him would it be practicable to reduce the size of the base without injuring the appearance of the monument? The following was the answer he had received from Mr. Brock:—

> My dear Lord Mayor,—If it is deemed important to secure a greater space for the thoroughfare around the O'Connell monument, the base may, I think, be reduced by 8 ft. without serious detriment to the appearance of the monument. This would bring the extreme width down to 32 ft. I propose to obtain the reduction by taking the steps up entirely, dispensing with the lower one altogether, and setting the two remaining ones back 4 ft. all round. Anything more than this could not be done without completely spoiling the general effect.—I am, my dear Lord Mayor, yours, &c., JAMES BROCK.

It was resolved to apply for the consent of the Corporation to the proposed alteration.

Sewage Purification at Paris.—As the city of Paris has tried various chemical and other means of dealing with sewage, and is now irrigating about 1,000 acres of land within five miles of the Tuileries, the following from the *République Française* will be of interest:—"On June 23rd last, the Municipal Council of Paris resolved, among other things, 'To approve, firstly, the continuation of irrigation in the fields of Gennevilliers, and the carrying of the sewage to the lower north-western part of the peninsula of St. Germain and adjoining farms, and the delivery of sewage from the conduits to persons on their routes, who shall be willing, by agricultural, chemical, or other means, to cleanse it, at their own expense and risk, for the sake of what they may be able to get out of it, subject to rules to be prepared; secondly, to ask the Government, in case the 1,500 hectares (3,700 acres) might be insufficient for the purification of the sewage without annoyance to the neighbourhood, to take into immediate consideration the extension of the present proposal and the irrigation of other districts in the valley of the Seine.'"

EMPLOYERS' LIABILITY BILL.

STRONG objections are raised by the master builders of the United Kingdom to Sub-clause 3 of Clause 1 of the Employers' Liability Bill, as the one which entails the greatest hardship upon employers, and especially those engaged in the building trade. They urge, and with justice,—

"That in the business of a builder a very large proportion of the persons employed throughout the various departments comprised in such business are persons who are of necessity in a position of some authority. The general foreman exercises authority over the other foremen, and these again exercise authority over those beneath them, and so on in a descending scale, until at last the person exercising authority is often a workman, and a workman in a comparatively humble grade: thus each bricklayer has working with him a labourer, who is expected to conform to the directions of such bricklayer, and the effect of Sub-clause 3 will therefore be not only to render the employer liable for the negligent acts of his general foreman, and his other foremen, but also for the negligent acts of all his bricklayers whereby the labourers working with such bricklayers sustain injury.

That the above case of the bricklayer and labourer is given simply by way of illustration, but in a large building business the persons who exercise authority such as the bricklayers may be counted by hundreds, and yet each of such persons will, by reason of Sub-clause 3, be in a position to render his employer liable to the payment of heavy damages."

It appeared, from the observations of the Right Hon. John George Dodson, made on moving the second reading of the Bill, that the object and scope of the Bill was only to render the employer liable for the acts of a person "to whom the employer distinctly delegates his own authority." The Sub-clause 3, however, as above pointed out, goes much further, and neutralises the effect of the definition clause, which limits the liability of employers to cases of negligence of persons who are not ordinarily engaged in manual labour, and thereby (so far at least as builders are concerned), almost abolishes the defence of common employment.

It is to be hoped, therefore, that Sub-clause 3 may be omitted from the Bill.

BUILDERS' TENDERS.

SIR,—"London Builder" is to be commended for having drawn attention to the forms of tender which almost invariably accompany bills of quantities. Clearly the intention of those who issue them is to obtain an undue advantage either in regard to any error that may have occurred in calculation, or through the conditions of contract.

Many builders have, I believe, protested against these forms by sending in tenders so worded as to avoid legal binding, such as,—"I estimate cost as per plans, &c., and subject to my approval of contract conditions, at the sum of—" but in this,—ignoring the architects' form,—they generally risk the non-reception of their tender, and consequent loss of time and money. The injustice of the proceeding is great, and calls for a remedy.

There is, I believe, a Builders' Association; but very little is heard of any practical work being achieved by that body. Much might be gained by mutual agreement in regard to this and other matters detrimental to the trade.

I would refer it to the consideration of the before-mentioned Association.

DELTA.

A CURIOSITY IN THE BUILDING LINE.

A "SURFOOT HOUSE."

FORTY years' experience in building, and a perusal of the usual works of reference, had, I thought, entitled me to consider that I pretty well knew all the various systems of building, especially in this neighbourhood (Taunton); but a few days since when at Othery, near the site of the castle of Sedgmoor, in Somerset, I was shown something quite new to me, and, I think, to most of the readers of works on building. It is known by the above name, a "surefoot house," and the term is well applied. It will be generally admitted that the destruction of most old houses is caused by the spreading of the roof forcing the walls out of the perpendicular. When the walls are of "cob," or mud, it is bad enough; but when erected of sandy deposit from a river, and the roof formed of heavy green unseasoned timber, covered with wet reeds or rushes, the poor walls have but a small chance. Now, in this neighbourhood, when it was wished to erect a house that should stand against the evils mentioned, it was the custom to first select crooked trees, which were cut down the centre, and then planted in the ground, say 20 ft. apart, with their tops touching each other at the ridge, and forming (when the joists were in) a figure something like the letter A with its lower ends buried in masonry to form the "surefoot," which could not move or spread. When several of these frames were erected in a line the "side timbers" were laid on the upper part of them, then the rafters, and finally covered with such reeds, rushes, or peelings as could be procured. The spaces below and between were then filled up with mud, cob, or sand; leaving openings for doors and windows, and a firm and durable house was formed, cool in summer, warm in winter, and in time dry and tolerably healthy. The exteriors were plastered down and lime-washed, shrubs planted, and ready for occupation.

EDWARD JEBOULT.

BRITISH MUSEUM LIBRARY.

SIR,—The remarks "C. C." makes in reference to publishers sending to the British Museum Library only what books they choose, and the time current numbers of periodicals are kept from the reader (usually said to be "at the binder's") are certainly well timed, for several times I have been unsuccessful in my quest after books. These, at the time, I made a note of, but unfortunately cannot lay my hand on it at present. One I distinctly remember,—requiring a certain number of the *Journal of Anatomy*, for 1878, I was handed vol. xiv., part 1, October, 1879, and courteously told that was the only number of the journal they had in the library. Another time I looked in vain for a now defunct journal, one that had some little existence previously to 1850, and we are made to believe every printed scrap, in the shape of a book or pamphlet, is to be found in this national library. Surely if there be not room at present to warrant calling for any stop to printed matter, the Treasury should be called upon to give additional room.

H. C. STANDAGE.

PROVINCIAL NEWS.

Hull.—On the 16th inst. the new stalls which have been erected in the market-place by the Corporation were used for the first time. From within the memory of the oldest inhabitant the old dilapidated wooden stalls, with the concomitants of refuse and filth which accumulated in the principal thoroughfares each market-day, have been associated with the market-place; but now all is changed. The market-place has been thoroughly purged of the old structures, and in their places a neat iron frame-work, with suitable coverings, has been erected in continuous lengths on the south and north church sides, and in the open space at the west end of the parish church.

Ripon.—Several street improvements are about to be effected in this city. These improvements, together with the operations which have just been commenced for the widening of North Bride, when completed, will confer considerable advantages upon the city.

Birmingham.—The fountain which occupies a considerable space in the centre of the Birmingham Market Hall has been removed, in accordance with a resolution of the Town Council. The fountain has been presented by the Markets and Fairs Committee to the Baths and Parks Committee, and the latter having decided to place it in Highgate Park, a number of men have been engaged, under the superintendence of Mr. Alfred Rodway and Mr. Hearn, in preparing the site, which is in the centre of the large grass plot lying between the terrace and the children's playground. The fountain will undoubtedly prove an additional ornament to this place of public resort.

Liverpool.—The Liverpool Town Council have, on the recommendation of the Markets Committee, accepted the tender of Mr. James Cheetham for altering the Roe-street end of St. John's Market to the improvement line, in accordance with the plans and specifications of the borough surveyor, amounting to 5,297*l.*

Manchester.—Proposals are made, in connexion with a movement for providing public entertainments in Manchester, for the erection of a room in a central position, of convenient size, and suitable for concerts, balls, bazaars, banquets, public meetings, dramatic performances, and public entertainments generally. A suitable plot of land, consisting of some 900 square yards, has been selected, situated in one of the principal thoroughfares of the city, which may be obtained at 12*l.* per yard. It is proposed to erect a building containing a hall capable of holding, according to requirements, from 800 to 1,200 persons. The hall will be so constructed as to be convertible into a small theatre when required, and have every accommodation in the way of waiting and dressing rooms. A design has been submitted, the estimate for which would be about 10,000*l.* It may be mentioned that the ground floor would include several shops.

Langport.—On the 3rd inst. that portion of the new cemetery which is intended for the burial of persons connected with the Established Church was dedicated and consecrated by the Bishop of Bath and Wells. The site for the cemetery, which is about an acre and a half in extent, was given by Mr. J. Broadmead, of Langport. It is situated on the high road between Langport and Aller, and is equally divided between Churchmen and Nonconformists. A large and commodious chapel has been erected by Mr. Davis, builder, of Langport, from designs prepared by Mr. Hall, architect, London. The building is in the Early English style, and is divided in the centre by a screen. One side is set apart for the Established Church and Nonconformists, but both portions are fitted up almost similarly in every respect. The building is of white lias stone, with Ham stone dressings. The total cost is about 1,200*l.*

Penzance.—A new vicarage-house for St. Paul's, Penzance, has been undertaken. The building is to be erected on a vacant spot at the end of Clarence-place, given for the purpose by the Misses Jago. Plans have been prepared by Mr. John Trounson, in accordance with the requirements of the Ecclesiastical Commissioners, who will make a grant towards the work. The building will cost nearly 1,500*l.*

Warrington.—For some three or four years it has been known at Warrington that the Cheshire Lines Company had purchased a large plot of land in Marsh House-lane, and contemplated the erection of engine-works thereon. The erection has now been determined upon, and the contract for the building, amounting to some 15,000*l.*, has been let to Mr. Aaron Houghton, of Godley. The works will be of an extensive nature, and it is believed that in the end the company will make as well as repair their engines at Warrington. In addition to this building, the branch line which is intended to shorten the distance between Liverpool and Manchester, and for which powers were obtained some time ago, is about to be constructed. The new branch line will be but two miles and a half long, and will extend from the Sankey Viaduct across Little Sankey Fields, the top of Bewsey-road, on to Padgate. The line for the fast expresses will thus miss Warrington altogether, and will have an almost straight run from Liverpool to Manchester, instead of the curves which exist from Sankey Viaduct to Warrington Station on the present line. The new branch, which will cost a large sum of money, will save about five minutes in the journey between the two places, which will then be accomplished in forty instead of forty-five minutes. Mr. Robert Heaton, contractor, of Warrington, has obtained the contract for the construction of about one mile and a half of the new line, from the Sankey Viaduct to Folly-lane, Warrington, and the work will be commenced forthwith.

Books.

Classic and Italian Painting. By E. J. POYNTER, R.A., and PERCY R. HEAD. London: Sampson Low & Co. 1880.

THIS is one of the art text-books edited by Mr. Poynter, another of which, that by Mr. T. Roger Smith on architecture, we noticed the other day. In the present case, however, Mr. Poynter seems to have done more than merely edit, as he mentions in the preface that he has made considerable additions to Mr. Head's work, "especially to the accounts of the earlier schools where it was important to show the connexion between them, and the means by which art spread from one part of Italy to another." This has been particularly the case in regard to the lives of great artists of rather exceptional genius and position, such as Mantegna. The more familiar of the great names in the sixteenth century are not treated as corresponding length, because information about them is easily accessible, and their merits are already matter of almost popular knowledge.

The editor, in the preface to the book, comments on the impossibility of pretending to carry the learner far on so vast a subject, in a mere text-book of this limited size, which hardly admits of its being more than a compilation. But "the least," he thinks, "that the future possessor of a fine house or a picture-gallery can get from such studies will be an insight into his ignorance concerning many things

which surrond him and meet his eye at every turn; and if his interest in tbem carry him but little further than the acquisition of a certain nnmber of names and dates by heart, the mere fact that he has been taught these may be an indication to him of their importance; and thus his small store of acquired facts may add to his contemplation of pictures and buildings that respect which is always attached to matters learnt in youth, and perhaps teach him to gaze upon them with a less vacant eye." This is certainly not an exorbitant demand to make for the usefulness of the work. We hope it may do a little more than this; but it is pretty clear that Mr. Poynter has a very low idea of the average capacity of the Englishman to understand what painting means, and perhaps he is not without too good reason for his opinion.

The little that is known in regard to wbat Greek painting may have been is brought together in the second chapter of the book, and forms an interesting memorandum on this head which may be useful even to those wbo are already not ignorant of the subject. Tbe first chapter deals with Egyptian painting, of wbich we know so much more, strangely enough, than of the douhtless far bigher art of the Greek painters, and some of the peculiarities of the Egyptian method in paicting are well illustrated. We cannot agree, however, in the supposition that the Egyptians, in their figure drawings, "combined profile and full view in a way which was no doubt intentional and systematic. Thus, for instance, thongh their faces are always drawn in profile, they represented the full face view of the eye." We opine that the eyes are drawn full just for the same reason that the face is drawn in profile: in either case it is the only way in which the feature can be represented by a draughtsman who is unable to foreshorten. Most children who try to draw a head do the same; they generally draw a profile head, and they then invariably put a full eye in it. The Egyptians were children as far as figne-drawing is concerned, and followed their instincts in the same way. The cbapter on Egypt is, we observe, signed with the editor's initials; we must therefore conclude that tbis is his opinion, in regard to which, we may say, in Dugald Dalgetty's formula, "We trust he will permit us to he surprised."

In regard to a hook going over such well-known snbjects in a brief and popular manner it would he out of place to say many words; the hook seems entirely to fulfil its intention as a popular introduction to the subject, and the characteristics and special position of each painter in regard to the history of art are clearly indicated. In the brief account of Michelangelo we must take exception to the statement that be "imparted to architecture a grandeur of style, fonnded on the study of proportion." This is about the last praise he deserves, his great architectural work heing, in fact, spoiled exactly hy the want of sense of proportion which destroys its scale. The cbapter on Greek painting, hefore alluded to, contains a good deal which is applicahle, and, perhaps, intended to he so, in a more general sense. Thus when we read in regard to Nicias, who insisted on the importance of choosing subjects worthy of the dignity of the art, that "this was a right and much-needed protest against the growing taste for petty trivialities wbich not long afterwards debased Greek art," and when we are told in the next paragraph how works of this latter trivial kind fetched great prices, "but high and serious art was nusaleable, although it was the fashion to profess much admiration and to give vast sums for works bearing the names of the great old masters," we feel pretty sure that any but the dullest reader will make a further application of the sentiment.

VARIORUM.

In a pamphlet entitled "A New Proposal for providing Improved Dwellings for the Poor" (Skeffington & Son), Mr. Fras. Rivington, the writer of it, suggests the introduotion of a *State Guarantee* for a moderate rate of annual interest npon a fixed amount of capital, to he supplied hy pu hlic companies for the erection of suitable dwellings for the poor and industrial classes. ——To *Social Notes* for July, Mr. Cave Thomas contributes an illustrated notice of the late Rev. F. D. Manrice, whiob includes an interesting sketch of the foundation of the Working Men's College, Great Ormond-street. —— The July nnmber of *Time* is hright and pleasant. The illustrations by Mr. Alfred Thompson bave become an important feature of the magazine. *Time* jumped into a good circulation at starting, and worthily maintains it.—— The current number of the *Quarterly* includes an informing srticle on "Middlesex." The writer says,—"The first English inhahitants of the most populous of English counties in the present day were a handful of rude settlers dwelling far apart along the banks of the Thames, and still further apart in the valleys of the Brent or of tbe tributaries of the Lea. A few villages marked the course of the ancient roads; hut there were no populous towns, no great market-places, no fortresses. Down to the time of the Norman Conquest, and much later, Middlesex remained but half cultivated, and a vast forest flourished over the face of the county. The land-springs of the heavy clays sent forth water-hrooks in abundance, and the brooks nourished willows and hazels, oaks and beeches. Many of the names which survive tell us of tbis time. The North Haw and the South Haw were divided hy the Coln. Acton is the town of the oak. Norwood and Ashford, Hounslow and Willesden, Southgate, Highgate, and a score of names besides, testify to the ancient condition of the county. There were, as there still are, high hills and lesser ones, but there was, and is, hut little level ground. The undulating character of the snrface of Middlesex cannot he hetter tested than hy taking the levels along a line at a distance of ahout a mile from the river's bank. This is easily done by following the conrse of a great modern thoronghfare like Oxford-street. There is almost a straight line of roadway from Shepherd's-hush to the site of the old City wall at Newgate; hut, in spite of the levelling process wbich the ground has suffered, there are not 100 yards of really flat grond along the whole route. At Shepherd's-hush we are only 21 ft. above the sea-level. Thence there is a gradual ascent to Plough-lane on the top of Notting-hill, which is 72 ft. higher. Orme-square is 34 ft. above the ornamental water in Kensington-gardens, wbence the ground again rises, until, at Park-lane, a height of 92 ft. is reached."

Miscellanea.

The Competition Memorial.—*The American Architect* says:—"The *Builder* completes, in the last nnmber received, its list of the signers of the memorial in regard to competitions, of which we have repeatedly had occasion to speak. It is rather a surprise to us to find so many of the most distinguished names in the profession among the signatures; not that we douht their goodwill toward the cause, but because men of eminent position, and advanced in years, have usually formed a network of ties and habits ahont themselves which makes them cautious about putting tbeir own hands to anything whioh may tend to change the traditions of their profession, even for the hetter. They may in private advocate reforms, hut as a rule they prefer to leave the accomplishment of the end to tbe younger generation. It is, therefore, all the more gratifying to notice the active co-operation in the work of such men as Messrs. Blomfield, David Brandon, and James Brooks, Professor Donaldson, Messrs. R. W. Edis, Ernest George, Micklethwaite, Penrose, and Seddon, tbe two younger Scotts, Alfred Waterhouse, and many others of perhaps equal note. It is no idle form which all these architects subscribe, hut an agreement which with some, especially the more distinguished, practically means a voluntary renunciation of the advantage which their well-earned reputation gives them in contests with their less eminent fellows, in favour of fair and open rivalry, in which the best shall win. Tbat this is no trifling sacrifice, those who have witnessed the manner in which, with laymen, a great name overbears even distinguished merit in obscure competitors will readily understand, and the sincere gratitude and esteem of the profession are due to those who, out of love of fair play, and desire for the advancement of art, have been willing to make it."

Intended Establishment at Cleut.—On the 22nd nlt. the Cleut Hills Hydropathic Estahlishment Company (Limited), was registered. Capital 50,000*l*. The directors propose to erect a building to accommodate ahout 150 visitors, and the architects, Messrs. Smith & Mackenzie, of Birmingham and Stourbridge, estimate the cost of the building at 36,000*l*. The directors intend to proceed to build at once, on a site near Hagley Hall, Lord Lyttelton's seat.

Underground Railway Completion.—Mr. O'Shaugbnessy, the chairman of the Committee of the House of Commons, to wbich the Metropolitan and Metropolitan District Railway (City Lines and Extensions) Bill was referred, on the 13th inst. announced that the Committee, after carefully considering the evidence (some of which was reported in the *Builder*, p. 59, *ante*) before them, had decided to declare the preamble proved, subject to the embodiment in the Bill of certain suggestions contained in several resolutions which they had arrived at. The conditions which the Committee attach to the passing of the preamble are:—

(1) That the burrowing powers of clause 10 should only be exercised in the event of the scheme for the completion of the new street not being agreed upon within eight months of the passing of this Act; (2) that if these powers are exercised, they should be confined to the portions of the line which were intended to be affected by the construction of the new street; (3) that the exercise of such powers should be guarded by the insertion of a clause enabling the assessing authority to determine whether in each particular case they can be exercised without material detriment to the property which they affect; (4) that the right of appeal from the assessing authority to a Divisional Court of the High Court of Justice should extend to the question whether the exercise of the powers under clause 10 can be effected without material detriment to the property affected; (5) that the right to compensation—to be estimated once for all—for injury to trade by the exercise of such powers should be recognised by the Act; (6) that the section in the Act of 1879 providing for compensation for "recurring injuries" should be considered applicable to recurring injuries caused by the exercise of the powers sought under Clause 10; (7) that a power analogous to the power given by tbe Act of 1879, section 14, to the owner, lessee, or occupier, in the case of underpinning, of obtaining directions with regard to the mode of underpinning from an engineer, to be agreed upon or to be appointed by the President of the Board of Trade, shall be extended to cases where the powers sought by Clause 10 are exercised; (8) that the powers of deviation sought by Clause 5 shall not be exercised in case the new street is agreed upon within eight months of the passing of this Act, nor shall they be exercised to the west of the junction of King William-street and Cannon-street, nor to the east of the eastern limit of the proposed new street; (9) that the power of taking additional lands, and the extension to such lands of Section 42 of the Act of 1879 shall not be exercisable in case the intended new street is agreed upon within eight months of the passing of this Act.

Matheson & Grant's Engineering Trades Report says:—"The improvement in trade wbich appeared last autumn, and which at the time of our January Report seemed likely to spread in its effects, culminated during January and February, and has since subsided. Due almost entirely to a demand from America, the extent and permanence of which was over-estimated, the collapse was sudden when the demand ceased, and there is a tendeucy now to exaggerate and misunderstand the fall. In the engineering, as in almost all other branches of trade, the rise in values was confined to raw and partly-finished material, and those who manufactured iron and steel into articles of utility fonnd it difficnlt in many cases to obtain from buyers sufficient increase in prices to defray the cost of greater prodnction. But the progress forward which was so eagerly welcomed is not all lost. Trade is in a much sounder condition than it has been for the last four years; a slight increase in the demand would rapidly raise prices; and if the coming harvest be as good as it now promises, and if the war-cloud already looming in Turkey he dissipated, an active trade may be looked for in the autumn."

Water Supply at Penzance.—At a meeting of the Penzance Town Council, on the 14th inst., the employment of a plumber to inspect the water-taps and fittings was reported to have resulted in redncing the consumption of water in the Market Jew-street district from 80 gallons per head per day to 40 gallons, and in the Folly district from 60 gallons to 30 gallons. As soon as possible the meters are to he removed, in order that the consumption in the other districts may he tested.—Mr. James, who moved that Sanitary Committee's report, embodying these facts, remarked that the present consumption was greater than they could afford in the present dry weather, and unless the inhahitants assisted the committee hy the greatest possible economy theirs wonld he the disagreeable task of giving an intermittent supply by day.—Mr. Coulson said the recent stringent inspection of fittings had resnlted in saving 100,000 gallons of water daily, and more than 100,000 gallons could be saved in districts not yet inspected.

Sanitary Institute.—The following gentlemen have consented to act as presidents of sections at the coming congress, to open at Exeter on the 21st of September:—Section I. Sanitary Science and Preventive Medicine, Dr. De Chaumont, F.R.S., Professor of Military Hygiene at Netley. Section II. Engineering and Sanitary Construcion, Mr. Robert Rawlinson, C.E., C.B. Section III. Meteorology and Geology, Sir Antonio Brady.

The Channel Tunnel.—The report of the directors of the South-Eastern Railway Company contains the following reference to this tunnel:—"The experiments made by the French engineers, after great pains and labour, tend to show that the geological measures are not only in the same position, but are of the same thickness on each side of the Channel; and the stratum known as the 'Old Grey Chalk' in England, and as the 'Craie de Rouen' in France, is impervious to water, and is without fissures. These are the foundation facts in this interesting question, for if a tunnel can be made without pumping or timbering, and entirely, from side to side, through the grey chalk, then an apparently formidable and even hopeless work becomes matter of close calculation. As the researches of the French engineers confirm the view for years past taken on your behalf,—namely that the proper point of departure for any future tunnel is at the outcrop of the grey chalk on the South-Eastern line between Folkestone and Dover, and not at St. Margaret's Bay to the east of Dover, where the grey chalk, dipping to the northward, does not crop out,—your directors have deemed it advisable to make arrangements for a series of important experiments which, so far, have shown favourable results."

The National Providence League.—The first annual meeting of the above society (formed for the Promotion of National Insurance), was held July 15th, at the office, 10, Lancaster House, Savoy. The chair was taken by Earl Brownlow. The balance-sheet showed a receipt of 612*l.* 7s., against an expenditure of 412*l.* 14s. 3d., leaving a balance to carry forward of about 200*l.* The report congratulated the members on the great and growing progress made by the cause in public opinion, especially as evidence of the fact that, though the proposal of National Insurance has been advocated and debated during the last twelve months on some thirty public occasions, it has never yet been made the subject of an adverse vote.

Monument to King Leopold I. of Belgium.—In connexion with the celebration of the Jubilee of Belgium Independence, a monument erected at Laeken, near Brussels, in memory of King Leopold I., was unveiled by the King on Wednesday last. The monument, which is of white sandstone, bears some resemblance to the Albert Memorial in Hyde Park. Its architecture belongs to the most florid fourteenth-century Gothic. The monument is erected on an elevated plateau. The statue of the deceased king, by William Geefs, of white marble, represents him in an easy attitude and in a general's uniform. The figure is placed under a dome supported by eight pointed arches, forming a circular gallery, from which springs a tall spire. The architect of the monument is M. de Curte.

St. Andrew's Church, Plymouth.—A new front of open carved oakwork has just been placed before the sedilia standing in the sacrarium of St. Andrew's Church, Plymouth. In design it is of similar character to the neighbouring stalls and bishop's throne. The front forms also a prayer-desk for the three clergymen, for whose use the sedilia is provided. Its standards are richly carved, and the front, which is of deeply-moulded and traceried work, is interspersed with carving. It was designed by Messrs. G. G. & J. O. Scott, and made by Mr. Harry Hems.

Rowland Hill Memorial.—The Post-office authorities have declined to allow a statue of Sir Rowland Hill to be erected under the portico of the General Post Office, St. Martin's-le-Grand, the space not being sufficient. The committee have determined to apply to the Court of Sewers for permission to erect the statue in the open space at the south-east corner of the Royal Exchange, facing Cornhill. Dean Stanley has consented to the erection of a memorial in Westminster Abbey near Sir R. Hill's grave.

The Institute of Art.—This institution, which has its rooms at 9, Conduit-street, is established for the purpose of encouraging art-work of every kind and for facilitating its sale. It is now the scene of a special exhibition, which includes the work for the most part of amateurs.

New Hospital, Ayr.—A new hospital is to be erected in Ayr, and the work is to be commenced immediately. The length of the buildings is to be 240 ft. and the depth 120 ft., with a central tower 65 ft. high. Mr. Murdoch, Ayr, is the architect.

Surrey Archæological Society.—The annual general meeting of this Society took place on Wednesday last, the 21st inst., at its Council-room, 8, Dane's Inn, Strand. Major Heales, F.S.A., occupied the chair, supported by Messrs. C. H. Cooke, F.R.I.B.A., Ralph Nevill, F.S.A., A. J. Style, &c. The report of the Council and balance-sheet were confirmed. Among other matters the report regretted the death of Mr. Planché, who was an honorary member of the Society. The retiring members of the Council, the auditors (Messrs. J. T. Lacey and W. F. Potter), and the honorary secretary (Mr. Thomas Milbourn) were unanimously re-elected. It was announced that the annual excursion would take place on Friday, the 30th instant, to Farnham, Waverley Abbey, and Farnham Castle, under the presidency of the Bishop of Winchester.

Ashmole's House, South Lambeth.—A correspondent writes:—"This historical house, in the South Lambeth-road, is about to be pulled down, though the efforts of the Society for the Protection of Ancient Buildings have not been wanting to stay its demolition. It was once the residence of the Tradescants, distinguished naturalists, whose collection formed the foundation of the Ashmolean Museum at Oxford. On the death of Mr. Tradescant, in 1653, the house came into the possession of the Ashmole family. In a short time it will be a thing of the past, and known only in history." It is suggested that, if no other record of the site is forthcoming, some tablet ought to be put up to remind future generations of the associations of the spot.

School of Art, South Kensington.—In the concluding lecture of the present course on "Art History," Dr. Zerffi, on Tuesday last, gave some interesting statistics with reference to the growth of the attendances at these lectures. Dr. Zerffi, in 1869, commenced to lecture to an audience of *seven*. Since then he has delivered no fewer than 116 lectures, attended on an average by 70 persons, making a total of 31,220 attendances. The present course of 10 lectures was attended by 3,600 persons, making an average of 90 per lecture. This affords satisfactory proof of the gradual spread of the taste for the study of the historical development of art.

London Fever Hospital.—We would aid an appeal that is being made to the public for funds in order to carry on the work of this hospital. The small invested capital of the hospital is fast disappearing, and if fresh funds be not forthcoming, in four, or at most five, years' time it will have to be closed, and a work which for eighty years has conferred the greatest benefit on London will come to an end. The aims of this hospital are preventive as well as remedial, and on this ground alone it may well appeal to the public, to whom it thus renders such invaluable services. The building was illustrated in our vol. vi., pp. 390-391.

Children's Home, Edgeworth, near Bolton.—Two corner-stones of a new school, in connexion with this institution, were laid, on the 6th inst., by Mr. Richard Bealey, J.P., of Radcliffe, and Mr. Henry Mathwin, B.A., Southport. The building, which is to be of stone, is being erected from designs prepared by Mr. Thomas Ormrod, architect, Bolton, and will comprise school-room and two class-rooms to accommodate about 263 scholars, at an estimated cost of about 1,200*l.*, including boundary-walls and out-buildings, &c. Messrs. Martin, Brothers, of Edgeworth, are the contractors for the building.

Sunday Art Exhibitions.—In addition to the Sunday opening of the Grosvenor Gallery, the Sunday Society has arranged for opening the Annual Exhibition of the Society of British Artists at Suffolk-street, Pall-mall East, next Sunday and the following Sunday.

Collapse of a Submarine Tunnel.—A telegram from New York, dated July 21, states that a shaft of a tunnel now in course of construction in Jersey City, under the Hudson River, fell in that morning. Twenty-two men were buried, and no hopes were entertained of rescuing them.

Value of Land in the City.—At the Auction Mart, on the 14th inst., Messrs. Edwin Fox & Bousfield sold, by direction of the First Commissioner of her Majesty's Works, premises in Seething-lane, Tower-street, at 4*l.* 17s. 4d. per square foot, or at the rate of 211,992*l.* per acre.

A New Paris Exchange.—It has been determined to petition the City of Paris to erect a new commercial exchange such as those to be found in London, Liverpool, Hamburg, and other cities.

An Industrial Exhibition at Leicester was, on Monday last, opened by General Burnaby, M.P., who remarked that the real prosperity of this country depended upon the sustained activity and excellence of its productive industries, and not upon that of mere selling, buying, and speculating, which, however useful in a secondary sphere, does not increase the store of man's necessaries.

TENDERS

For furniture warehouse, 204, Great Portland-street, and 72, Bolsover-street. Mr. William Wallace, architect. Quantities by Mr. F. Thomson:—

Watson Bros.	£1,250 0 0
Perkins	1,215 0 0
Toms	1,189 0 0
Richardson Bros.	1,089 0 0
Dowsing & Sons	1,020 0 0
White	970 0 0
Hunt (accepted)	967 0 0

For repairs, decorations, &c., to house, stabling, vinery, and Lodge, at Gilling Lodge, Haverstock-hill, for Mrs. Wilson. Mr. E. Crosse, architect:—

Hambling (accepted)	£293 0 0

For two new wool-stores, 140, Abbey-street, Bermondsey, for Mr. W. Wilkins. Mr. E. Crosse, architect:—

Bambery	£494 0 0
Brockwell	429 0 0
Downs & Co.	420 0 0
Almond	370 0 0
Preston	353 0 0
Wells (accepted)	350 0 0

For the Congleton Water Works:—

	Contract No. 1.	Contract No. 2.	Contract No. 3.	Total.
	£ s.d.	£ s.d.	£ s.d.	£ s.d.
Poole	—	—	1,710 0 0	1,710 0 0
Mackay	2,725 0 0	7,164 10 0	1,876 10 0	11,766 0 0
Drewitt & Pickering, Stoke	2,450 0 0	6,661 15 0	1,782 8 2	10,894 3 2
Biggs, Cardiff	2,280 0 0	6,250 0 0	1,600 0 0	10,130 0 0
Kirk, Congleton*	2,230 0 0	6,160 0 0	1,673 0 0	*10,063 0 0
Hunter	1,806 5 2	5,403 7 4	908 13 8	8,118 6 2

* Accepted.

No. 4.—*Pumping Machinery.*

Gwynne	£2,788 0 0
Turner	1,825 0 0
Atlas Engine Co.	1,815 0 0
Todeu	1,800 0 0
Hydraulic Engineering Co.	1,720 0 0
Scragg (recommended)	1,686 0 0
Butterley Co.	1,500 0 0
Barker & Cope	1,250 0 0
Sylvester & Sainsbury	1,201 0 0

For the erection of a church at Llawryglyn, in the parish of Trefeglwys, Montgomeryshire. Messrs. Jones & Parke, architects. Quantities not supplied:—

Hamer, Newtown	£1,470 0 0
Fisher & Co., Welshpool	1,230 0 0
Owen, Llanidloes	1,166 0 0
Jones, Trefeglwys	975 0 0
Williams, Newtown (accepted)	930 0 0

For three cottages for Mr. R. Lloyd, jun., Newtown. Messrs. Jones & Parke, architects. Quantities supplied:—

Davies, Newtown	£310 0 0
E. Williams, Newtown	295 5 4
Morris & Sons, Newtown	295 0 0
J. Williams, Newtown	287 0 0

For alterations to 20 and 21, East-street, Brighton, for Mr. W. D. Stewart. Mr. George Edwards, architect:—

Martin, Wells, & Co.	£1,524 0 0
Kemp	1,497 0 0
Stimpson & Co.	1,482 0 0
Nash & Co.	1,467 0 0
Richardson	1,150 0 0
Barnes	1,070 0 0
Garrett	1,045 0 0
Wright	996 0 0
White (accepted)	873 0 0

For two shops and dwelling-houses, Burgess Hill, Sussex, for Mr. Alderman Cox. Messrs. Scott & Hyde, architects. Quantities by Mr. F. W. Hyde:—

Andrews	£1,893 0 0
Hollands	1,800 0 0
Cheeseman & Co.	1,795 0 0
Patching	1,787 0 0
Lockyer	1,730 0 0
Norman	1,677 0 0
Cooper	1,629 0 0

For the erection of house and sale shop, Old Basford, Nottingham. Mr. Herbert Walker, architect. Quantities supplied:—

Hind	£656 0 0
Andrew	570 0 0
Clarke	566 0 0
Raven	562 0 0
Holdsworth	560 0 0
Morrison	560 0 0
Scott	560 0 0
Bains & Turton	557 0 0
McCulloch	550 10 0
Wooll Bros.	545 0 0
Hopewell & Son	540 0 0
Noble	518 0 0
Stainforth	499 10 4
Price (accepted)	463 1 6
Bailey*	402 10 0

* Withdrawn in consequence of mistake.

For building station-masters' houses at Shoreham and Kemsing, Kent, for the London, Chatham, and Dover Railway Company:—

Wiltshire, Sevenoaks (accepted).

For erecting premises, North End, Croydon, for Messrs. Batchelar & Son. Mr. R. W. Price, architect. Quantities by Mr. W. H. Barber:—

Downs	£4,963	0	0
Nightingale	4,943	0	0
Ward	4,937	0	0
Marriage	4,750	0	0
Smith	4,669	0	0
Hart	4,620	0	0
McLachlan & Sons	4,584	0	0
Taylor	4,490	0	0

For two villa residences, Cromch End, for Mr. A. B. Smith. Mr. Edward J. Paine, architect:—

Goodman	£3,521	0	0
Holmes & Son	3,336	0	0
Conder	3,312	0	0
L. H. & R. Roberts	3,147	0	0
Harper	2,965	0	0
King	2,920	0	0
Mattock Bros.	2,760	0	0

For concrete foundations for villa residence, for Mr. Pettie, R.A., Hampstead. Mr. William Wallace, architect. Quantities supplied by Mr. Frederick Thomson:—

Toms	£210	0	0
Brass	197	0	0
Woodward	195	0	0
Manby	187	0	0
Scrivenor & Co.	178	0	0
White	168	0	0
Cox	160	0	0
Hunt	152	0	0

For rebuilding the "King's Arms" public-house, Church-street, Deptford. Mr. W. T. Hunt, jun., architect:—

Jerrard	£1,543	0	0
Hubble	1,429	0	0
Rodwell & Smith	1,375	0	0
A. & F. Smith	1,340	0	0
Redman	1,280	0	0
Newman	1,280	0	0
Holloway (accepted)	1,247	0	0

For alterations and additions to Cecil House College, Beulah-hill, Upper Norwood, for Miss A. Bowra. Mr. Rawlines F. C. Pittock, architect. Quantities supplied by Mr. Elliott Hops, jun.:—

Wheeler	£595	0	0
Josolyne	558	0	0
Wright	535	0	0
Wilkinson	485	0	0
Cutting, Notting-hill	479	0	0

For erection and completion of a villa residence, for Mr. T. Cullen, in the Underhill-road, Lordship-lane. Quantities not supplied:—

Watson & Dennett, Dulwich (accepted)	£1,050	0	0

For alterations to house and erection of workshop at rear, 17, Alberny-road, Old Kent-road, for Mr. V. G. Daws. Mr. E. Crosse, architect:—

Amery	£340	0	0
Battley	334	0	0
Roffey	315	0	0
Everitt	304	0	0
Smithers (accepted)	278	0	0

For the erection of St. Mary's Vicarage, corner of Upper Rock Gardens, Brighton. Mr. Spencer W. Grant, architect:—

Lynn & Sons, Brighton (accepted)	£2,800	0	0

For house and shop, Murchison-road, Notting-hill, for Mr. G. H. White. Mr. J. Dunn, architect. Quantities by Messrs. Nixon & Raven:—

Buckle	£1,693	0	0
Green	1,593	0	0
Weymouth	1,550	0	0
Phillips	1,345	0	0

For new road and drains adjoining above sits:—

Parkhouse	£422	12	0
Neal Bros.	415	0	0
Stockwell	333	0	0

For the redecoration and improvements to Whitefield's Tabernacle, Tottenham Court-road. Mr. Alfred Burr, architect:—

Richardson Bros.	£1,848	0	0
Perkins	1,733	0	0
Bywaters (accepted)	1,593	0	0
For new organ:—			
Bishop & Son (accepted)	£493	0	0

For repairs and alterations to 22 and 23, Newcastle-street, Strand, for Mr. George Shenton. Messrs. Ebbetts & Cobb, architects:—

Steel Brothers (accepted)	£260	0	0

For work to be done at 13, Devonshire-square, for the Jewish Board of Guardians. Messrs. Davis & Emanuel, architects:—

				New Sashes		
Croker	£554	0	0	£34	0	0
Gold & Beard	463	0	0	24	0	0
Williams	430	0	0	28	0	0
Heeps	407	0	0	20	0	0
Roberts (accepted)	385	0	0	20	0	0

For the erection of house, at Acton, for Mr. H. Wright. Mr. Edwd. Monson, jun., architect:—

Brousden	£678	0	0
Baker	630	0	0
Pudley	613	0	0
Eydmann	595	0	0
Beck (accepted)	584	0	0

TO CORRESPONDENTS.

Tower.—The assertion is incorrect. The Albert Hall dome is 219 ft. one way, and 185 ft. the other. The central dome of the Vienna Exhibition Building was 333 ft. in diameter. The Philadelphia Exhibition included domed pavilions each 240 ft. in diameter.

Surveyor (It is the *section* of the ties in question which is registered; not the ties themselves).—J. B. Winchester (the statement is not very clear; as taxes are usually imposed in advance, there would seem to be no hardship).—P. T.—G. M.—M. G.—No. 1.—E. G.—Q. H.—E. S. H.—Col. F. P.—J. & P.—H. H.—Mr. R.—B. C.—G. S. & Co.—C. P.—B.—J. B.—H. C. C.—A. L.—N. & R.—P. G. S.—Dr. P.—J. L. R.—P. W. G.—S. W. G.—W. E.—S. & M.—J. R. V.—T. D. B. & Son—D. W.—Dr. Z.—W. E. H.—G. & G.—J. J. A.—A. B.—J. W. H.—E. & C.—N. H. J. W.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

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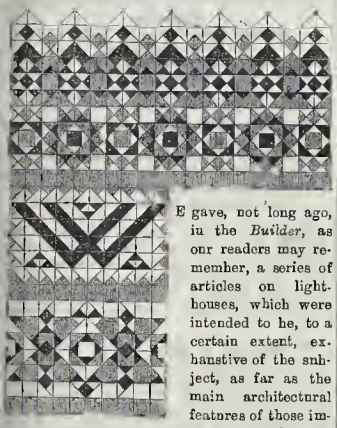
The Builder.

VOL. XXXIX. No. 1956. SATURDAY, JULY 31, 1880.

ILLUSTRATIONS.

CONTENTS.

Concrete Towers.



WE gave, not long ago, in the *Builder*, as our readers may remember, a series of articles on lighthouses, which were intended to be, to a certain extent, exhaustive of the subject, as far as the main architectural features of those important works are concerned. In connexion with those papers and a more general purpose beyond, it may be useful to draw attention to a communication addressed to the Institution of Civil Engineers, by Mr. Imrie Bell, C.E.

It will, no doubt, be in the memory of our readers that we gave reason for the proposition that, for sea-girt towers, the practice and the experimental reasoning of Mr. Stevenson and other engineers had led to the establishment of the rules,* that the outline of any such tower should be defined by a hyperbolic curve; and that the material for construction should be not only the largest, but also the specifically heaviest stones that could be practically obtained by the architect. To these two rules we refer, without any qualification, as far as the species of tower to which we confined them is concerned. In the case of a tower built on a promontory high above the dash of the waves, the same conditions do not exist, and therefore the same rules do not necessarily apply. We illustrated the classification of lighthouses by contrasting the very different experience obtained in the construction of the Morant Point Lighthouse, in Jamaica, by the late Mr. Alexander Gordon, and in the unsuccessful attempt to apply the same method of construction that was there found available in the very different situation of the Great Basses Rock, near Ceylon.

The experience of Mr. Imrie Bell is in full accordance with the rules that we ventured to indicate as absolutely to be accepted by the lighthouse builder. In the Morant Point lighthouse we described an edifice of which the base was formed of concrete protected by a shell of cast iron. We have now to look at the account of a tower which, standing at an elevation of 100 ft. above the sea, was constructed of concrete alone. And what strikes us as probably the most admirable part of the whole design is that the concrete was so disposed as to have, like an organised being, a proper skin of its own. The value of this simple but novel arrangement is the more worthy of remark inasmuch as it is not confined to the construction of lighthouses, but is likely to be adopted, with the best results, by the builders of houses and other structures.

Mr. Bell commences by remarking on the use of concrete by the Romans, on its gradual disuse, on its re-introduction as a foundation, and on the introduction of *béton*, or hydraulic concrete, by the French engineers, followed by our own (among whom the late Mr. John Hughes may be cited as one of the earliest to introduce the French practice). He then refers to the valuable and exhaustive researches of Vicat, and to the improvements made in the manufacture of cements. It would be desirable here to introduce a short account of the use of concrete in England by the house-builder. For this, however, we are as yet without full materials; although, having been for a short time resident in a house built, in a very exposed situation, of concrete, we are able to speak of one unexpected excellence which it possessed in common with others more generally known,—that is, the great quiet and silence which prevail in it in a high wind. Before rising in the morning, no idea was obtained that a gale was on. The cause we take to be the absence of those joints through which the wind rushes as in confined channels, which are thus indicated as the cradle of noise.

Mr. Bell tells us that he has been much struck by the want of attention paid to the art of producing a fair and finished surface in the exposed faces of concrete, as exemplified in many of the large engineering works in the course of construction, where the exposed face has a honeycombed appearance, as well as showing the marks of the rough timber planks forming the frames in which the concrete had been placed. In this remark of an engineer every architect will agree. Nor is it a question of appearance only. These unsightly hollows and projections retain damp, and offer needless resistance to wind, thus at the same time hastening the ultimate decay of the artificial mass, as well as destroying that quiet to which we before referred.

The result of the study given to this part of the subject by Mr. Bell is, that this objectionable aspect of a concrete building arises simply from neglect or indifference. It is possible, nay, even easy, with due attention, not only to produce a fair surface, but to form mouldings, and even tracery and ornament, and at the same time to make the face-work as durable as any other part of the block. It is evident that this is a view of the case which, if worked out, is likely to result in the very general introduction of concrete as a material for house-building. It is to be regretted, with reference to this, that although Mr. Bell has given the cost of the lighthouse of which we have to speak, in block, he has not given the price per cubic yard of the concrete, applied after his method.

When it has been attempted hitherto to give a face to a concrete structure, it has usually been done either by rendering with plaster, or by grouting with liquid mortar, both of which are more than questionable modes of effecting the object. The best result that can thus be attained is that of a veneer, liable to sudden decay, and particularly liable to destruction by frost. Failure is said to have so often occurred as to prevent recurrence to this imperfect and unworkmanlike finish; so that the concrete surface yet remains in generally its natural roughness.

The method adopted by Mr. Bell is one that, on the first blush, recommends itself to the architect. He has provided moulds, made of smooth-planed board, to act like the matrix of a seal, or the mould of a metal cast. Immediately before applying the mould, he coats it over with a mucilaginous soap, to prevent the adherence of the concrete. In filling the frame, or mould, care must be taken that a mixture of fine concrete or cement is laid in with a trowel close to the face-board, as the work proceeds, so that the mixture is carried up uniformly with the body of the work, and the whole forms one homogeneous mass. The face is thus like the skin of an iron casting; and if the mixture of materials be judicious, it will be really the strongest part of the whole structure. Mr. Bell tells us that he has followed out this process in harbour walls, both above and below water, exposed to frost, heat, storm, and rain, and that he has done so with complete success, and at an inappreciable increase of cost.

The first example, so far as we are aware, of the application of this method of construction to a lighthouse tower, is the Corbière lighthouse, in the island of Jersey. This lighthouse was erected in 1873-1874, on the design of Sir John Coode, C.E., by Mr. Imrie Bell as executive engineer. It stands upon the Corbière rock, off the south-western point of the island of Jersey, at a distance of about 1,600 ft. from the mainland. The spot might be thought to have been designed for the purpose by Nature herself, as here exists, reared above the fury of the waves, that very substantial rocky basis for the light tower, the artificial construction of which has so taxed the efforts of the lighthouse architect in less favoured localities. At high water, in all tides, La Corbière is isolated; but from shortly after half-ebb to a little before half-flood it is accessible, when the sea is smooth, over the crest of a ridge of rocks which forms a narrow causeway. The range of the tide on the coast is 23 ft. at ordinary neaps, and 32 ft. at ordinary springs, and the locality is much exposed.

The first operation commenced was the construction of a road of access, of above half a mile in length. Together with this work, dwelling-houses for the light-keepers, with necessary store-houses and outbuildings, were constructed on the main land; but there is nothing particularly worthy of notice as to this part of the scheme. The tidal causeway, however, constructed on the ledge of rocks above

* See *Builder*, vol. xxxvii. (1879), p. 767.

mentioned, required more consideration. The ledge was intersected by deep fissures and pools of water. Owing to its regular submergence the time for work was very limited, as the operations could only be proceeded with from the shore end. The cross section of the road has a top width of 6 ft., and is formed by two walls built of granite blocks, with a batter of 2 to 1, the height of which varied from 1 ft. to 8 ft. The space between these walls is filled up with Portland cement concrete, mixed in the proportion of eight parts of shingle and coarse sand to one of cement. The upper layer of 8 in. was made stronger and finer, in the proportion of four parts of shingle and sand to one of cement.

The action of the sea during gales has been enough to prevent any great accumulation of seaweed upon the surface of the causeway; and a sprinkling of hot lime in calm weather was found sufficient to prevent growth of vegetation.

The materials for the road and lighthouse were conveyed by sea from St. Helier's, and landed in an accessible and sheltered place near the site of the lighthouse. A patch of rocks formed a sort of natural wharf, from which an overhead rope railway was constructed to the site of the stores and workshops on the main rock; a wheel with grooved tire running along the rope, supporting a block and tackle for suspending the basket or bag containing the material. This wheel and tackle were pulled along the ropeway by a small endless wire rope, wound round a drum, and worked by two men at a windlass.

An inclined tramway, on a 3 ft. gauge, was laid, on longitudinal timbers, from the workshops to the site of the tower, and worked by a steam-engine. Details of all these contrivances are given by Mr. Bell; but their interest is chiefly special. What we have to regard with most attention is the method of building in concrete employed, which possesses a very general interest.

The base of the tower,—it is to be regretted that we do not find the level of the sea referred to in any of the drawings accompanying the paper,—was roughly quarried, leaving a core of about 13 ft. in diameter, and 7 ft. in height. The frame used for forming the exterior face of the concrete was a segment of one-eighth part of a circle, 3 ft. in height, dressed in face to a radius of 15 ft. 6 in., with a batter of 1 in 12. This was fixed in place by means of tie-bolts lewised into the rock. The concrete was composed of six parts of shingle and sand to one of cement. It was thrown into the segmental frame, the face being prepared as before described. The frame was removed on the third day, when a solid block of concrete was exposed, with a face equal to dressed ashlar, and a hardness about equal to that of a soft brick. A batten was fixed upright at each end of the frame, so that when the concrete hardened and the batten was removed, there was a vertical slot at each joint, about 9 in. deep by 4 in. wide; when the frame was shifted, and the next segment was filled in, the fresh concrete entered this slot, and formed a natural joggle or dovetail, holding the two blocks together. A concentric channel, 9 in. broad by 4 in. deep, was left in the top of each course for the same purpose. This was in its turn filled up by the concrete of the course above, so that the whole structure was bound together in its own substance. From the drawing it appears that there were three of these courses, the joints of which are marked by a chamfer. On the top of the third course is a recess of 4 ft., and within this the base of the tower itself is placed. This structure rises vertically for about 6 ft. 6 in., where there is a moulded soffit. From this the wall of the tower rises with a curved batter, and is topped with a heavy torus moulding. However much credit may be justly claimed for the engineering of the building, we cannot but hold that the elevation of the tower, so far as we can judge from the drawings, is not characterised by any architectural elegance. The stepped base and heavy top moulding seem to contain a not inconsiderable amount of material, the structural utility of which we fail to perceive. In the drawings attached to the paper a section of the lantern is given; but the sections and elevation of the tower show the masonry, that is to say the concrete, alone. It is thus not possible to speak with certitude as to the architectural effect of the complete building, and we may hope that the criticism provoked by the lines of the tower alone may be qualified by the addition of the lantern.

On the top of the platform, which is formed of a solid mass of concrete over the whole area, the tower was carried up in a mode very similar to that before described, with the exception that the mould frames were made to radiate from an iron centre, firmly secured in the true axis of the tower. Two blocks, forming opposite sectors, were filled in at the same time, so that each circular course was completed in four shifts.

The height of the tower and platform together is 44 ft. The well of the tower is 11 ft. diameter. The structure of the concrete circular wall diminishes from 4 ft. 3 in. at the plinth mouldings, to 2 ft. 6 in. under the cavetto at the top. The interior is divided into two chambers, although there is a landing and preparation for an intermediate floor. These floors and landings are supported on T-iron girders, built into the walls, and filled in between and above with fine cement concrete.

A hollow cast-iron column, 13 in. in diameter, and $\frac{3}{4}$ in. thick, is built into the platform in the axis of the tower. On the top of this is secured the pedestal of the optical apparatus. For further details we refer to the paper, which will be found in vol. lix. of the Minutes of Proceedings of the Institution of Civil Engineers. The total cost of the work is given as 8,001*l.*, of which 1,606*l.* was expended on the half-tide causeway; 2,976*l.* on the structure; 2,255*l.* on the lantern and apparatus, including fog-bells and clock; and 864*l.* on dwelling-houses and store-rooms. As far as we can collect by scaling from the drawings, the total height from the lowest part of the platform wall to the top of the ball supporting the vane is 62 ft. If we take the height of the centre of the light at 50 ft. above the foundation, we find that the total cost of the whole work, excluding the causeway, comes to 128*l.* per foot vertical, or to 160*l.* per foot vertical including the causeway; a figure which may be advantageously compared with those which we have already given for the cost of this class of buildings.

The interest of the paper of Mr. Imrie Bell is far wider than that which concerns the construction of lighthouses. That he has been alone in his treatment of concrete we are not prepared to admit. But that his paper has been the first to call the attention of his own section of the structural profession to the true mode of procuring a good, durable, and workmanlike finish to a building composed of this material, we think is the case. Nor can it be denied that by this treatment the value of concrete as a building material is very considerably enhanced. We may regard the compound as an artificial stone, which possesses the quality that it is in the power of the maker to vary the composition at will, and not only to do so block by block, but to give to the exterior of the block a fine and sightly skin; while the bones of the work,—like the human skeleton,—are composed of a more rough and cheap material.

REBUILDING OF THE TAY BRIDGE.

A SELECT COMMITTEE has been appointed by the House of Commons to inquire into the Bill introduced into Parliament by the North British Railway Company for the reconstruction of the Tay Bridge. The heads of the order of reference were, first, as to the expediency of rebuilding the bridge in the original position; secondly, whether a more suitable site might be selected; third, the interests of the navigation; fourth, the security and permanent safety of the bridge, if authorised to be rebuilt. Some petitions were presented against the scheme; but they were not supported by counsel.

It was stated by Mr. Clark, Q.C., on the part of the promotors of the Bill, that the cost of the new bridge was estimated at 346,000*l.* To provide this sum it was proposed to raise 200,000*l.* on the authority of the Bill; to borrow 66,000*l.*; and to take 80,000*l.* out of the 120,000*l.* which is the present reserve fund of the company.

As to the design, counsel stated that it was proposed to lower the height of four of the thirteen new spans by 11 ft., or from 88 ft. to 77 ft. high; and to reduce the height of the other nine spans 2 ft., from 57 ft. to 55 ft. The Lord Provost of Perth gave evidence to the effect that ample height would be thus allowed for the navigation, with which the Board of Trade concurred. The largest vessel ever known to have passed up the river above the site of the bridge was stated, by the pilot-master of Dundee, to be 600 tons. Uncontradicted evidence was adduced in support of the convenience of the actual site. Sir Massey Lopes, the chairman of the committee, suggested that it would be desirable if three or four experts, independent of the Board of Trade, were appointed to look into the matter,—an excellent suggestion that was at once agreed to by Mr. Michael, Q.C., on the part of the Board of Trade.

Mr. Brunlees was examined as to the design for the new bridge. He said that he had found the Tay bottom well adapted for the carrying of a heavy weight. He had examined the bed of the river, and thought that there was no danger to be apprehended from scour but such as it was easy to obviate by the use of stone. The plan before Parliament was presented under the authority of Mr. Brunlees. He had decided on replacing the iron work of the piers with brickwork, the cost entailed by which change was estimated at 111,725*l.* The total estimate for the design, allowing 10 per cent. for contingencies, was 356,323*l.* Mr. Brunlees found that the cost of the brick piers would be about the same as that of thoroughly making good the iron pillars now standing, and gave preference to brickwork as more stable.

We trust that some public professional body will take steps to ensure a full discussion of the stability of this important bridge, both as far as concerns the past and the future structure. Notwithstanding the lengthened inquiry which has taken place, the professional world is yet in ignorance of the very important fact of the actual surface exposed, in one of the large bays, to the action of the wind. The importance of having this point cleared up is obvious. So long as the Board of Trade inquiry was going on, the usual caution of lawyers probably caused the withholding from the Court of the designs of the bridge. We offer no opinion as to the propriety of this course. We may doubt its wisdom. But now that the report is made, we call attention to the importance of the possession of the information on the part of engineers and architects. To take one point alone, it appears that investigations as to the force of wind-pressure are to be instituted by the Board of Trade. It will be impossible for that body to make an experiment on so large a scale as that afforded by the disaster itself. If we are made aware of the actual surface exposed by the bay which first yielded, and of the strength of the piers, we shall have a direct measure, not indeed of the maximum force of the wind, but of that which was exerted at the moment of fracture. This is quite a distinct question from that of either the strength which ought to have been given to the bridge, or of the highest fury which the storm of the night in question attained. If we are made acquainted with the surface on which the wind acted, and with the strength of the piers which yielded to the stress, we shall at once obtain a measure of the wind-pressure per square foot of the surface of the girder at the moment of collapse,—a datum on the value of which it is useless to dwell.

It should also be borne in mind that the mere substitution of brick for iron in the piers is not in itself a guarantee of their stability, if the present disproportion between the height and the transverse width,—that is to say, the width at right angles to the wind-pressure,—is maintained. The case of a chimney, or lofty tower, is in no way analogous to that of a thin, tall, narrow pier, sustaining on the top a structure that will catch an enormous quantity of wind. The case of a windmill is more apt; and we know what precaution is taken for maintaining the stability of the central tower that supports so moderate a surface as that exposed by the vanes of a windmill. Speaking without having made that mathematical calculation, for which it does not come within our province to assume the responsibility, and thus with all proper reserve, we should conjecture that piers of dry bricks, set on the present bases, would be overthrown by such a storm as that of which we have the proof before us. The stability of the piers, if that be so, would depend altogether on the adhesive quantity of the cement in which the bricks were set. We do not say that this is inadequate, but we desire to call attention to the fact; and we think that some attempt to prove the pressure of a statical equipoise, not altogether dependent on the adhesion of each course of bricks to that below it, considered as resisting not a sliding, but a lifting motion or tendency to move, ought not to be left out of consideration. We cannot afford to run any more risks, and the disproportion between the height at which the side pressure comes on, and the lateral strength of the pier, lies at the very basis of danger.

[Since the above was written, the Select

Committee have reported that, having regard to the safety and security of the public, they do not feel justified in sanctioning the scheme which the Bill proposed. The Bill was therefore thrown out.]

THE MANUFACTURE OF FURNITURE IN GERMANY.

THE development of the manufacture of furniture during the last decade formed the subject of a lecture delivered by Herr Carl Behr, the manager of the furniture manufactory of Herr A. Bembé, at Mainz. Being of general interest, we give an abstract of the lecture from the German version of it.

Furniture represents those products of art industry which interest us in, perhaps, a far greater degree than other objects which we use, because they immediately surround us, and appeal directly to our sense of domestic comfort. For this reason it has been ever the endeavour to produce furniture of tasteful design; but it has been reserved to modern times to make real progress. About ten or fifteen years ago the furniture industry of Germany was at a very low ebb, and it was accompanied at the same time by an aberration and absence of taste which were most surprising. Furniture was made in Germany either in simple or heavy forms, or else in absurd imitation of French models. The French then, as now, were in the habit of resuscitating the various styles of the past, according as the taste of buyers happened to change. It was a great defect in the manufacture of furniture in Germany that most makers worked without models or drawings, and that with the introduction of new wood-working machinery the traditionally delivered forms were gradually transformed without any regard being paid to the beauty of the whole composition. One of the most flagrant aberrations of taste at that time prevalent in Germany, greatly encouraged, it must be owned, by a large demand for the article, was the manufacture of so-called old oak furniture. The way in which that class of furniture was produced was most barbarous, machine-made naturalistic ornaments, such as fruit, objects of the chase and still-life, &c., being stuck on to the smooth surfaces of the wood, without any regard whatever to the harmony of the whole composition.

Many technical journals of the better class, such as the *Oesterreichisches Museum* (Vienna) and the *Gewerbehalle* (Stuttgart), fought hard against that practice, and exhorted makers to return to a legitimate production of such work, urging that this might best be achieved by an adherence to the forms of the German Renaissance, as being most in accord with the taste of the people. But it was reserved to the time of national re-awakening, the years of the war of 1870-71, to give an impulse to the endeavours of regaining the lost prestige in art-industry by the adoption of those long-neglected forms. An improvement was noticed as early as the Vienna Exhibition of 1873. But of especial influence in the development of the manufacture of furniture in Germany was the Exhibition of the Bayerische Kunstgewerbe-Verein of Munich in 1876, a society which has done inestimable service in raising German art-industry. That exhibition pointed the road to be taken, and enabled a more uniform system to be pursued. From that period dates a steady and speedy development of this industry, which was demonstrated at a series of important exhibitions, such as those of Hanover, Berlin, Leipzig, Offenbach, as well as smaller local shows. The foundation of new art-unions and the increased activity of already existing ones contributed considerably to this development.

The author next considers the work of French makers of furniture as shown at the last Paris Exhibition, and compares the French and German modes of manufacture.

The furniture of Paris manufacturers,—the makers of other French towns being far behind them,—is distinguished by a perfect execution of the separate parts, a harmonious effect of colour and ornament being likewise aimed at. Most of the furniture, however, is of such an expensive nature as would prevent its sale in Germany; prices ranging from 20,000 to 25,000 francs for some articles being not at all rare. The workmen are consequently very highly waged; it is a fact that clever men are paid at Fourdinois', in Paris, as much as five francs per hour. But it is a remarkable fact that German workmen execute the best work in Paris establishments, though they have no opportunity, on their return home, to make use of their acquired skill.

In the design and composition of French furniture, however, there is a striking absence of the noble forms of the Renaissance, the place of which is taken by the pompous shapes of the styles of Louis XIV., Louis XV., and Louis XVI.; here and there, also, the more sober one of Henri II., in the development of which the French have achieved extraordinary things.

If we compare the work of French furniture-makers of the present day with that of the same class from the end of the sixth decade of this century, it will appear at once that there has been an undeniable standing still. If we compare with this the great strides made by Germany, the time will not seem very far distant when the German furniture industry will be able to compete with that of France without misgiving. This highly favourable state of things has been effected principally by the foundation of societies and the holding of art and industrial exhibitions; yet its fuller development has to some extent been hindered by an absence of artistic feeling on the part of the general public, which can only be created gradually by a more universal training in the elements of art. This artistic understanding is being by degrees instilled into the public mind of Germany by the exhibitions already mentioned, but it might be still further stimulated, the author thinks, by very elementary means, such as rational, systematic instruction in drawing in all schools, for example. The practice of having work which might well be done at home executed by foreign hands, and of submitting it to public competition, according to the author also affects injuriously the growth of the art-industries in Germany.

The author endeavours finally to demonstrate that the utilisation of German Renaissance forms in the manufacture of furniture of the present day is highly advisable, for various reasons. The Italian Renaissance is intended for another climate, other conditions, and other manners, and is especially not to be recommended for Germany from pecuniary considerations; for by dispensing with rich carvings, &c., part of the original characteristics of the style is lost. The art-workman must study all styles which have been artistically developed, in order to be able to appreciate their excellencies, and to keep from falling into the mistake of onesidedness. To do this successfully requires study and application: study alone will make it possible for him to adapt and utilise the styles of former times for the artistic requirements and to the changed wants of our age. Study classic models, but impress your own ideas on your work: such is the advice of the author to the art-workman. This alone will guard him against monotony and repetition.

ROYAL ACADEMY SPECULATIONS.

HOWEVER indifferent as compared with some other nationalities a large portion of the British public may be to art and art influences, there can be no doubt of the interest felt in the annual Royal Academy display of pictures. From the day of opening to the day of final closing, these rooms, so full of pictures, are constantly and incessantly crowded with eager and anxious spectators. It cannot be said that the public care not for individual pictures, or for the detailed incidents and information contained for the most part in them, for all have catalogue in hand, and are found perpetually to refer to it, not only for mere titles, but for more detailed information, when such is to be found. Much would, indeed, be missed, and would disappear, were this annual art-show to cease, and the art-public would be not a little at a loss to find a substitute for it. It is looked forward to for long months with eagerness, and when the time of opening does arrive, this exhibition of the art-work of the year is found to afford the means, as far as it goes, of testing the artistic capacity of the time, and of ascertaining the bent of the public mind as to art; and we then see how this has been responded to, and how far the art-strength of the time is equal to the work before it, and how the work has been done. It may be of interest, then, to glance back for a moment on this fine-art show, and to ponder for a moment on its general tendency and influence.

But more than this: from all sides there is a constant series of criticisms and explanations, more or less exhaustive, of the subject matter of at least the principal pictures. No one, thanks to this, can be at a loss as far as explanation goes, and as far as such can compel the intelligent looking at a fine work, whatever the subject of it. Most people go to the Academy rooms to look at the pictures as art objects, and as representations of actual things and occurrences, and at such in the main as the time has furnished,—the living men and women, and the objects they are interested in. When the exhibition is over, a good deal of this passes away, and is forgotten, and the next year's show is as anxiously looked forward to as was the last and past one, and for the same reasons. It is hoped on all sides to see a something fresh, a new face, and graceful forms in new and present fashionable costume, and new views of distant places and buildings, and, in short, to see, as far as pictured representations go, or can afford it, what the world is doing and looking like. That the Royal Academy annual show does this none will dispute, and that it does it in the main well; but that a something and a somewhat more than this might be accomplished, and the public further pleased and instructed, there can be but little doubt. It is a somewhat singular thing, and difficult to account for, that all sketches so called are inadmissible.

It must not be concluded, as perhaps many do, that such a display of pictured art is altogether new, and of modern and all but of to-day's growth. In Gothic days there was and must needs have been its equivalent,—in days wherein the artist worked immediately on every new building of public importance and destined for a public use, as the great cathedrals and churches, every such structure formed the ground or "canvas" on which the painters and sculptors and great draughtsmen worked, and the opening of any such building, as we know, was always the occasion of calling together an art-loving crowd to see it, as a famous picture is nowadays viewed. A newly-drawn and painted cathedral window must have been as the "picture" of the season, such being, in less enlightened days than these, the personal handwork, as well as the brain-work, of the artist workman who produced it; and it was most certainly the window itself *in situ* that was the special object of curiosity and admiration, and not a small and mere representative drawing of it on the walls of a room that the eager crowd went to see. We may pause a moment to say that perhaps but scant justice has been done to the great artists and painters of the glass of the Middle Ages. It is at times magnificent in its fine sense of colour and harmony.

That this was so in antique and classic days there can be no sort of doubt. There were and must needs have been exhibitions every now and then of such doings as these, and every new and at all important building must have afforded opportunities, during its execution, of art displays of the kind. We have always thought, though the thought may be perhaps a little fanciful, that, looking at the mind and character of the Greek race, it would have been well nigh impossible for the people of Athens to have had always before them such magnificent works in course of construction, and afterwards their *decoration*, and so great a master as Phidias, without periodical visits to the scene of his labours, and without keen comment on the value of them. Surely each one of the magnificent forms which together made up the story of each pediment of the Parthenon must have attracted an eager and art-loving crowd to look at it, and to wonderingly admire it, and in not a few cases to study it. Indeed, it is difficult to see how this could well, among such a people, have been otherwise; for, looking at the way in which such works were designed and put together, and the perpetual and ever-present personal activity of the architect and artists who designed and built it, it would have been strange, indeed, if such working artists had not had a vast following of students and others equally interested in it. It must needs have been as an academy,—always open, and wherein not only were the works of the artists always visible, but they themselves were always to be seen at work. A great school of art indeed!

Thus we may fairly say that this exhibition of the Royal Academy has had its predecessors in antique days, though, in all probability, so very different in external aspect and surroundings. Much more, we cannot but think, might yet be learned about this by a little further and deeper looking at and into that distant past of art displays; and it might, may be, lead to efforts to make this art-show more general and even more useful

as a national and high-art display and record of what is doing, and has yet to be done. At present, and as matters now are, it is for the most part confined to paintings in oil for the decoration of rooms and private apartments, and certainly without any wide idea of "interpretation" of any kind, as Turner undoubtedly had when he commenced the famous "Liber Studiorum," of which remarkable performance a good deal has yet to be said. The idea, evidently, of this great interpreter of Nature was throughout, to represent Nature in all her aspects, and as he saw them, and was gifted to interpret them, and it would seem a matter of some regret that so good and potent an example is not followed, and that some systematic interpretation of Nature's infinite work is not attempted. We forbear details, which might lead us far, but commend the good example to those who might follow it. In this Academy Exhibition there was a large number of landscapes and "views," and transcripts of Nature's forms, and not a few of them evidenced the skill and high faculty of those who produced them. A wild flower, in how many, many ways, it may be interpreted!

We are here simply looking back at this picture and art display generally, and so must needs avoid the naming of special pictures of whatever kind; but it may be further observed of these landscapes and views, and hedge-rows, that the painters of them would seem to have avoided the naming of the places where they were found, *e.g.*, "A Thames Breakwater,"—but whereabouts in the long length of the river? Many might like to see the spot itself. The "Beached Margent of the Sea." "On the Coast of Cornwall." "June." "An October Evening,"—but, where are these? and a host of others, all of them evidently taken from some one or another attractive spot, which, if worth the painting, is and must be worth the seeing, and the knowing a somewhat about. A famous picture in a former exhibition, and one which most readers well remember, as evidence of what its painter can do when the fit takes him,—"Chill October,"—whereabouts was that scene, in what part of the wide expanse of England? Surely a fact is worth stating, and where is the picture now? It might well have been made national property. But this in passing. There was here, too, "God's Shrine," but where? and a "Woodland and Stream," and of sea-views no end, but whereabouts, who shall speculate? The "Sea" surely is always worth the painting; it ever varies, no two hours alike, and to present a vivid idea of it on canvas is and must be a notable feat, in whatever state, whether of calm or storm, to accomplish. But why not say where painted?

And this again leads us to a thought or two on what, perchance, might prove a useful addition to the present somewhat narrow professional Academy programme. Might there not be one small room devoted to the exhibition of what are called "Sketches," and first thoughts on great subjects? "Sketches" are not, as is known, as matters are at present, permitted; nona but pictures worked close up to the gilt frames, as though there was a something of import in the hard outline of the frames. Sketches and first thoughts are of no small value at times, and some of the finest and most valued of the thoughts of the great masters left us are in the form of sketches, whether as memoranda, or as complete work, as at times is the case. We need not cite examples of this: they will readily occur to all, and certainly to those who strive to look into the minds and methods of the great masters of the painter's art. No one, we think, who has been privileged to look through the portfolio of a painter or a sculptor but must have wondered at times at the skill and power of expression exhibited in these may be hasty "sketches," and sometimes, too, at how much has been lost of this in the more finished and completed picture. We believe a single room, or even one wall of a room, thus filled would be most attractive, and would, perhaps, afford to the expert what the more completed and finished work fails to do. It is thus well to look back sometimes.

Bachelors' Ball at Kensington House.—The decorations and illuminations on this occasion were on an unusual scale, and were carried out by the firm of J. Defries & Sons. The effect was remarkable. The terraces, gardens, lake, islands, &c., were outlined with variegated lamps artistically arranged, and festoons of myriads of Japanese and Chinese lanterns were spread from tree to tree and every point of vantage.

FINE ART EXHIBITION AT TURIN.

THE building erected for the exhibition of Italian works of art at Turin is described, by the *Giornale dei Lavori Pubblici e delle Strade Ferrate*, as presenting an aspect that is at the same time light and severely artistic. It forms a quadrilateral, 215 mètres long, and 70 mètres wide; the principal front, which looks eastward, on the Corso Siccardi, being on one of the shorter diameters of the parallelogram. The elevation consists of a great arch, surmounted by an attic story, and two arcades, of three arches each, supported by coupled columns. The most elevated part of the façade is 21·65 mètres above the ground. In the lunette formed by the central arch, Professor E. Gamba has painted a fresco design, representing the Coronation of Italian art. The main entrance into the central hall is divided into two by a column, an arrangement which has encountered not a little criticism. In the middle of the terrace before the building is a statue by Vincenzo Vela, representing Minerva with a crown in her hand.

Signor Calderini, of Perugia, is the architect who gave the first design for the building to the committee for the exhibition. The great central gallery is divided on its sides into sixteen compartments. It is 130 mètres long. In the centre is a large octagonal chamber, destined for works in sculpture alone. Four large rooms are placed at the end of the gallery, and the octagon, the four end chambers, and the sixteen compartments, will be occupied by architectural designs. The sculpture gallery and the four saloons are illuminated from above; the lateral rooms have large windows on the sides. At the west end of the building a gallery is in progress, which is intended for the display of objects of industrial art. It surrounds on three sides an open court, in which is a *chiosque*, surrounded by flowering plants. Rooms are included in the building for the committee, the secretaries of the societies connected with the exhibition, the press, the post and telegraph, the attendants, the fire brigade, and the guards, as well as two larger spaces for the use of the purveyors of refreshment.

PROPOSED TUNNEL UNDER MONT BLANC.

THE French Government, if we may rely on a statement recently made to the "Society of Engineers and Industrial Persons of Turin," is seriously occupied in the consideration of a tunnel under Mont Blanc, and has commissioned M. de Lepinaye, inspector of railways, to draw up a comparative report as to the various passages through the Alps that are either completed or in prospect, stating the advantages and disadvantages of each, as to distance, gradients, and cost of construction.

According to this report, the distances between Paris and Piacenza are as follow, by the different routes indicated:—

	Kilomètres.
Mont Cenis route by Turin and Milan	992
" " by Turin and Alessandria	915
St. Gothard route by Basle and Milan	975
" " by the Jura-Gothard line	935
Simplon route ... by Novara and Mortara	905
" " by Milan	914
Mont Blanc route by Vercelli and Broni ...	886

Adding to the actual horizontal distance the proportionate lengths which are equivalent to the heights overcome by the gradients on the respective lines, the following are stated to be the results:—

From Paris to Piacenza the Mont Blanc route has an advantage of 40 kilomètres over the Simplon route, of 53 over the St. Gothard, and of 72 over the Mont Cenis routes.

From Paris to Milan the Mont Blanc route has the advantage respectively of 14, 23, and 86 kilomètres over the Simplon, the St. Gothard, and the Mont Cenis lines.

From Paris to Genoa the corresponding advantages of the Mont Blanc route are 75, 159, and 43 kilomètres over the before-cited three other lines.

With regard to cost, allowing the sum of 4,086 francs per mètre for the principal tunnel, and that of 400,000 francs per kilomètre for the line from Aosta to Courmayeur, and adding 18 millions for the headways and for interest on capital during construction, the total is brought out at 90 millions of francs for the trunk line from Aosta to Chamounix, effecting an economy of 30 millions of francs over the Simplon line. There is the further great advantage that the extreme length of the Mont Blanc tunnel is under 13,500 mètres, while the Simplon tunnel measures 18,500 mètres.

From the recent experience in the St. Gothard tunnel as to the illness caused among the workmen by the heat, it is considered by the advocates of the Mont Blanc line that it must be almost impossible to execute a blind bore, or tunnel without a shaft, of 18 kilomètres in length, at all events, without great improvements being effected in the present means of ventilation. The shorter length of the Mont Blanc tunnel presents a great advantage in this respect. It is calculated that the heat developed at the face of the work in proportion to the depth of the gallery beneath the surface, will not exceed 33° Centigrade (or a little over 90° Fahrenheit). Signor Garoia expresses the hope that the valley of Aosta, which has always been the gateway for the invaders of Italy, ancient as well as modern, may open a route for a peaceful and enriching traffic.

FROM THE BANKS OF THE SEINE.

THE Working-men's Congress, held during the last week here in Paris, cannot be said to have been wanting in the element of exciting interest. Entire liberty has been wisely accorded by the Government to these "revolutionary collectivists," as the members of the Congress term themselves. The idea was an excellent one, that of a Working-men's Congress; and very interesting and valuable would it have been to hear from the lips of a number of intelligent artisans their views on the existing state and working of the modern question of capital and labour; but, unfortunately, a revolutionary and murderous political element has been introduced into the discussion, and each day's doings have merely served to register the tame re-expression, in slightly altered terms, of the same unmeaning imprecations against the existing state of society, which all agree must be abolished, but as to the re-constitution of which no two are of the same opinion. The very first meeting, presided over by two "citizens" and a "*citoyenne*,"—for the female element has taken an important share in the congress,—declared itself unanimously "revolutionary collectivist, that is, resolved to take by force and divide the manufactories, the guilds, the machinery and tools, and the capital." Day after day has seen a series of delegates express their views, and tediously do they all coincide on the iniquity and exaction of the capitalist. Had these discussions possessed a cool and reasoned tone, much that was interesting and instructive might have been arrived at, for how is it possible to deny that the relations of capitalist and labourer are far from being in a satisfactory condition in France? Unfortunately, the question was not to be enlightened by such excited views, in which the continual repetition by delegate after delegate of the most violent revolutionary proposals became tame, even when there was no want of open reference to armed force, petroleum, and picrate of potassium. Throughout all this sad enunciation of the supposed sentiments of the French working-man, it is encouraging to feel how little these views can express those of the mass of the artisans of France. The Congress is attended by a very meagre number of representants of the working-men's "groups" of the country, and the large majority of the delegates are the agents of avowedly socialistic societies, or, as they are termed, in a somewhat more dignified manner, "clubs of socialistic study," many of the members hereof which have, we are afraid, little in common with the sturdy working-man. A further feature in the congress is the female element. Certainly in a working man's congress the all-important question of the rights of woman as a joint labourer, and therefore a large factor in the consideration of the social question, has its natural place; but in the purely political current into which every discussion has drifted the female element, particularly when presiding, seems strangely out of place. Politics, indeed, seem to have driven out all the other interests, although the questions of salary, masters and men, apprentices, education, general education, the number of working hours, the necessity for co-operative societies, and many other such practical subjects worthy the attention of a working-men's congress, were settled for discussion. One special feature of the whole meeting

has been the loyal and courageous protest of the delegate from Havre, M. Drouet, a sail-maker, who, having presented an excellent programme, divided into twenty-one heads, in which were formulated a number of appropriate questions for consideration, found this admirable document entirely rejected by the congress, on the score of the want in its tone of revolutionary violence. To rouse the enthusiasm of the delegates, the more skilful of their clumsy orators have been obliged from time to time "to lay it on pretty thick." Disgusted with the ultra-political tendency of the discussions, and the sanguinary and ferocious threats and proposals put forth against the hated "bourgeois" and the capitalist, M. Drouet expressed his warm indignation in a declaration which has won for him the respect of all thoughtful and well-intentioned persons. Stigmatising "the brutal theories and ridiculous Utopias" of his fellow-delegates, he roundly blamed those about him for their folly in believing that the French nation would ever in any numbers follow their advice. Claiming his privilege as a delegate, and therefore entitled to be the spokesman of those who elected him as their representant, M. Drouet nobly ended his protest by the following words, which deserve the attention of every workman and employer:—"You expect us to follow you—No, a thousand times no. It was our belief that we were about to assist at the development of practical theories conformable to sound reason, but you ask us to aid you to carry out unhealthy, absurd Utopias. Citizens, in the name of the workmen of Havre, and of all those who freely, without concealment, desire to arrive at true progress through right and justice, we repudiate your principles, and before quitting this tribune I consider it my duty to declare that I, Ernest Dronet, sail-maker, delegated from Havre to this Congress, protest by this declaration, and withdraw."

At the present moment, when the flood of passengers,—English and American,—between England and the Continent is setting in with its usual force, it is quite seasonable to hear of the recent visit of M. Léon Say to Dover to inspect the progress of the studies for the proposed sub-Channel tunnel between France and England, and the journey, almost on the same day, of the French Minister of Public Works to Sangatte, near Calais, where the French society, which is studying the tunnel difficulty, have sunk a well. From the report issued by the South Eastern Railway Company, it would appear that the geological strata are not only in exactly the same position, but are of the same thickness, on both sides of the Channel. Everything, therefore, points to the success of the project in a comparatively near future. As very opposite, we may bring to the knowledge of those interested in the question the work recently published by Prof. Hebert, "L'Histoire Géologique du Canal de la Manche." M. Hebert has devoted many years of deep research to the study of the successive modifications of what is known as the "basin of Paris,"—a vast extent of country comprised between the central plateau, Brittany, the Ardennes, and confined by the shores of the British Channel. The Professor is familiar with every feature of this district, and he has collected at the Sorbonne specimens of all the rocks, the remains of all the life of the past which has occupied the district. Aided by this evidence, M. Hebert has been able to form the history of the changes through which this important region of France has passed. The arm of the sea which at present extends between France and England, and which unites the Atlantic with the North Sea, has only (comparatively) recently assumed its now familiar aspect.

The lawsuit connected with the statues at the historic Château de Menars, said to belong to the State, has again come before the courts. As can be imagined, the case has brought forward some curious details,—not least interesting among these the insight into the peculation of the too-famous Poisson de Marigny, the relation of the Pompadour. Taken by him from the royal galleries, and placed in his château of Menars, a number of statues of more than usual merit are the subject of the present lawsuit, which is by no means yet terminated; the State claims its interest in these statues—a claim which, at the beginning of this century, was put forward by Pajon the sculptor, then curator of the national antiquities; but the property of Menars having passed through a variety of owners, difficulties have arisen in the arrangement of the question. Are these statues the property or not of the State? is the point which has to be settled, and which, from all appearances, will be a somewhat lengthy question to satisfactorily determine.

This dispute serves admirably to show the value of the commission formed six years' since to prepare an "Inventory of the Art-Treasures of France," already noticed in these pages. One by one the volumes of this excellent Government publication are appearing. Perhaps of all the attempts made within the last generation in favour of the arts, the most successful and the most durable, the most likely to lead to unexpected results, is the formation of this inventory. The idea once thrown out,—only in 1874,—was eagerly taken up, and the various prefects, mayors, and directors of provincial museums and learned societies, were communicated with, and their duties assigned. While the information was being collected, the Commission prepared a volume containing an inventory of the art-treasures of twenty-seven of the churches of Paris. The second volume, published not long since, contains monographs of the library of Versailles, the church of St. Sauveur at Chalons, and the hospital of the same interesting old town; the modest museum of Chalons has a chapter devoted to it, as also the museum of Orleans and that of Montpellier. These three monographs alone would suffice to show the intention of this inventory, the writers not confining themselves alone to a mere inventory, while at the same time they have not neglected to observe the conciseness necessary to each a work, nor yielded their claim to the right of criticism to which their knowledge of the treasures under their care has entitled them. The claims of more than one doubtful or ill-assigned object are in this manner corrected, and the work is by this means rendered invaluable. The third volume of the inventory has only very recently made its appearance. It is devoted to the civil monuments of Paris, and contains a series of curious monographs of the Institute, the National Archives, the New Opera-house, the Palais-Royal, the French Théâtre, the Fontaine, the Arc de l'Étoile, the Column of July, and the Place Vendôme. Already it will be seen what an interesting and considerable start has been made, and this is easily explained by the fact that the information existing had only to be gathered together, each curator knowing (he is superintended by a sub-commission) the contents of his museum, even when there exists no printed catalogue. The idea merited the success which it has met with.

MORTALITY IN MINES.

FAR too frequently the British public is startled by the report of an appalling disaster and the loss of many lives by an accident in some mine, oftenest a coal mine. Such a disaster has just taken place; and at the same time we have in the official reports of the Inspectors of Mines a series of facts published that show the comparative frequency of accidents in mines in the several mineral-yielding districts, and the extent of the loss in a year; and the teaching of these official statistics is that whilst the proportion of the fatal accidents in mines is being reduced from time to time, yet there is not the reduction that there should be in the losses from explosions of fire-damp, the most deadly of the enemies that our miners have to meet, and the one which is the chief cause of the loss of life that is from year to year tabulated.

Taking a series of years, we find that the truest test of the safety of our mines is not the number of accidents, nor even the number of lives lost, but the proportionate loss of life to the quantity of coal produced. During a series of years, the number of lives lost by accident in and about the mines classed under the Coal Mines Act has varied from 970 to 1,500, the number for last year being 973. During the years over which these figures extend the production of coal has been increasing by the opening out of additional pits and the greater output from some of the old ones. If, instead of looking at the number of deaths simply, we test over long periods the number in proportion either to the number of workpeople employed, or to the amount of coal produced, we shall find that the fatalities are fewer. In the ten years between 1850 and 1860 the proportionate loss of life was 1 to every 245 persons employed; in the succeeding ten years it fell to 1 to every 300; and in the subsequent years, not yet a full decade, the ratio has been still more satisfactory,—about 1 to 430.

And it is also satisfactory to find that the general opinion as to the extreme danger in coal-mining is not well founded,—for other employments have risks as great, and even greater,—the loss of life at sea being greater both in the Royal Navy and in the merchant service, whilst also in proportion to the number employed the mortality in the railway service is greater. It is in the loss of life in mines by explosions of fire-damp that the most unsatisfactory state of affairs is found in the mining mortality, for the average number of deaths per year is greater now than it was a score of years ago, and the proportion that these deaths bear to the production is not diminished. It is in the unequal incidence of these losses that there lies the cause of the very great disparity in the mortality of the several mining districts,—the mortality in Wales being thrice as high as that in the great coal-mining district of northern England.

Since the awful accident at Hartley Colliery, nearly a score of years ago, the north-eastern coal-mining district has been free from great fatalities of that nature; but Wales, Lancashire, and Scotland, and one or two other districts, have suffered at times severely. Some of the most eminent mining engineers entertain different opinions as to the causes of that great discrepancy in the relative danger of the respective districts; but it is generally believed that in great part it is due to natural causes,—to the different classes of coal mined, and their varying yield of inflammable gases; to the supposed increase of danger at certain depths of mines, and to other allied causes; but it is remarked by some of the Government inspectors that in certain districts there is not that strictness in regulations that there is in others. Thus, one of the inspectors reported that in his district last year causes, other than natural, of serious losses were, "the manner in which gunpowder is used; the custom of depending almost entirely on the colliers themselves to keep the working-places safe; and the want of discipline and definite instruction as to the examination and use of safety-lamps." And in another the inspector complains that the men in the mines do not avail themselves sufficiently of one of their permissive powers to make periodical examinations,—the use of which he thinks would tend to increase the safety of the mine; and another reports that out "of seven lives lost by explosions of gas, not less than six were brought about by carelessness." It is useless to make suggestions as to methods of minimising the danger in mining, for what suits one district does not necessarily meet the wants of another. But this much may be said, that when there is in any district a mortality above the average, and when there are serious losses of life, the inquiries that follow might legitimately be extended to the consideration of the question whether the method of working, or the regulations, are capable of being amended by the experience of those great districts whence large quantities of coal are extracted without very serious loss.

THE COAL SUPPLY OF LONDON.

ONE of the largest of the coal consumers of the world is the great metropolis, and though there are occasional interruptions to the growth, yet from year to year the tendency of the consumption is upwards, if not steadily so. From eight to ten million tons of coal are yearly brought into the metropolitan district, and though a portion of this is sent out, yet the consumption of coal within the metropolis is astonishingly large; and the growth of that consumption is one of the causes that have contributed to the increase of the output of coal in the kingdom, and which has added thirty million tons to the production of the kingdom within the last fourteen or fifteen years. One of the checks to the growth of the consumption of coal in London has taken place in the present year,—a temporary one, after a year of very marked growth,—so that the present is not an unfair indication of the extent of that consumption, and of the sources of that supply of fuel for the fires of the metropolis. It may, therefore, be interesting to ascertain from the official returns the quantity of coal brought into London, and that retained apparently for consumption. In the present year there appears a change, too, in the method of carrying the coal, and it is possible that other changes impend in the

future in this respect. During the first six months of 1880, there were brought into the metropolitan coal district not fewer than 4,789,000 tons of coal,—a quantity less by 100,000 tons than that brought in during the corresponding six months of last year. There are two great methods of importation of this coal into London,—by railway and by sea,—the amount brought in by canal being now so small that it may be dismissed with the remark that it rarely exceeds on the average 400 tons in the month. That small quantity is usually included in the returns with that of the great bulk,—that brought by the railways. Since the introduction of the railway system the quantity of the coal carried thus into the metropolis has grown until it far exceeds the quantity brought in over sea. In the first half of 1880, there were brought into London by railway 3,088,933 tons, and this amount even is much less than that brought in by that method in the previous year. On the other hand, there was an increase in the quantity brought in by vessels. During the first six months of 1880 there entered 2,586 ships' cargoes of coal,—the tonnage being 1,780,782 tons. We have thus the large quantity of over four and three-quarter million tons of coal entering the metropolitan district. But from this there is to be taken the railway-borne coal which merely passes in transit through the metropolitan district, as well as that sent out of the district either by canal, rail, or vessel. In these varied methods, 1,193,915 tons of coal were sent out of the limits of the metropolis during the first half of the present year, and in the remainder we have the apparent consumption of coal of the great city. That consumption, then, was rather over 3,500,000 tons in the six months,—an immense burning of fuel; for though no small part of it is used at the gas-works in the production of gas, yet the latter is becoming more and more a fuel as well as an illuminator, and the coke which is produced is also a fuel.

The sources of supply are only indicated in part; that railway-borne is told so far as the railways that bring it in are concerned, and the source whence that brought in by vessel comes is shown by the port from which it is sent. Taking the railway-borne coal, we find that the Midland Railway stands at the head of the companies which bring coal into the metropolis, its annual contribution being about one and three-quarter million tons, of which no small portion is derived from the coal-field of Derbyshire and South Yorkshire. Following this is the London and North Western Railway, the average quantity of coal brought into the metropolis by which is about 1,250,000 tons. The third place used to be occupied by the Great Northern Railway, but the increase of the great coal trade of Wales has enabled the Great Western to take rank immediately after the London and North Western, with a contribution of a million tons of coal in round numbers, and the Great Northern closely follows, though its coal is from an entirely different quarter—from Yorkshire and Derbyshire. The only other large contributor is the Great Eastern Railway, which brings its 600,000 tons yearly. In addition, slighter quantities are added by the London and South Western Railway, and by the South Eastern, and London, Chatham, and Dover, and thus the total of the railway-borne coal is brought up. Of the sea-borne coal, it is clear that the great bulk comes from the northern coalfield. From Newcastle-on-Tyne alone, one half of the sea-borne coal entering the metropolis is sent. Next follows Sunderland, which ships some 890,000 tons; and then, but at some distance, West Hartlepool, whence 350,000 tons are yearly sent to the metropolis. The little port of Seaham Harbour takes the fourth place, sending as much as 200,000 tons yearly, but Middlesbrough, Blyth, and other ports send small additions. The entire yearly contribution of Scotland is about 50,000 tons, and that of Wales 20,000 tons, these districts finding other modes of carriage or other markets. It is evident, however, that changes impend in the mode of conveyance of coal to the great city; there are now being constructed docks at other parts of the east coast, with the view to the supply of coal by other districts over sea to the metropolis, and with these there is a certainty of a reduction in the rate of carriage by rail, so that it is evident that there will be a struggle for the supply of the great coal-market both between the various districts and between the different methods of conveyance. It is impossible to indicate the method in which the coals sent to London are used except in outline. It is certain that two of the largest consuming sources are for steam-power and for the manufacture of gas. In comparison with that of the country as a whole, the consumption for the purposes of metallurgy is very small, and for manufacturing purposes it is less in proportion probably than in the Lancashire district, so that to the two methods of consumption that of the demand for household purposes will probably be next greatest. It is, however, clear that the consumption must increase: steam power is more and more used; and despite the electric light, the area for the use of gas is growing, both for purposes of heat and illumination, whilst the extension of the metropolis year by year enlarges the demand on the coal-pits of the kingdom, and large as has been the addition to the quantity of coal needed to feed the fires of London, it is certain that in the future that growth will continue, if not with an increased rapidity.

THE SANITARY MEETING AT THE MANSION HOUSE.

Is it possible to make sanitary subjects popular: that is to say, to get up that kind of interest in them which will induce people to flock to a meeting for considering such subjects just as they would to the benefit of a popular actor? There is no doubt a greater interest is felt in sanitation now than there ever has been in this country before, as far as we know; but we fear it is not so great as it sometimes appears, and we know it is not so great as it ought to be. People have theoretically recognised the fact that such subjects have to be considered, and they know that it would be thought foolish to refuse to listen to their consideration merely on the ground that they were not proper subjects for refined people to talk about,—which was the old feeling; and it is possible, as the Mansion House meeting on Tuesday showed, to get up a very fair meeting to hear a report on the subject. But we surmise that those who form the audiences at sanitary meetings are mostly part of a small band; that they are to a considerable extent the same audience at one meeting as at another. The real interest in the subject has not spread beyond a small circle.

It is desirable for the present, however, that hygiene should be popular, because it is only by its becoming a subject of popular interest that any great or rapid improvement can be made in regard to evils which it is so difficult to get at in detail, and which are so much under the control of individuals of all classes. It is not, he it admitted, a natural or even a healthy state of things that sanitation should be an object of popular interest and general conversation. As with the health of the individual, so with that of society. There is the least need to talk about it when it is in the best and soundest condition. A man in thoroughly good health does not think about his digestion, or whether this or that will agree with him,—it is a matter of course which goes on regularly in the order of nature. But let his digestion be impaired, and the subject becomes a matter of interest to him, and he is desirous to know what food is good for him, and what is not, and if he is very far gone, he will even discuss the subject with his friends as if it were necessarily an agreeable and interesting topic of conversation. Cure him of his dyspepsia, and he will cease to think about digestibilities and indigestibilities. At present we are in the condition of the dyspeptic man. Our sanitary stomach is out of order, and it becomes a matter of serious general interest to know what will agree with it and what will not,—what will cure us and what will not. The difference, however, between society and the individual is, that the latter much more easily knows what is the matter with him than the former. The individual has numistakable personal pain and discomfort which render it impossible for him to ignore the fact that he is in an unhealthy state. But of the members of a society only a comparatively few may actually suffer severely from an evil from which, nevertheless, they are all nearly equally in danger. Those who are not conscious of having suffered themselves from sewer-gas, or who have lost no beloved relative through its influence, are not immediately spurred on to inquire into the subject; and even those who have so suffered are often not aware of the real origin of the disease or death which has spoiled their lives or destroyed that of their friends. The position of many of the public in regard to the danger of ill-arranged or defective drainage is something like that of the sons of Duncan after the murder, who come in and ask innocently,—

> "What is amiss?"

and we have to answer them again in much the same words as Macbeth's,—

> "*You* are, and do not know it:
> The spring, the head, the fountain of your blood
> Is stopp'd; the very source of it is stopp'd";—

or if not stopped, at least poisoned. And until this is generally understood, it is well that sanitation should be talked about and popularised as much as possible. There are three classes of persons, at least, in connexion with house property, whose attention has to be awakened, and whose conscience must be acted on: the landlord who lets the house, the tenant who lives in it, and the workman who makes it. We wish there were not too often reason to add, and the architect who plans it; but we fear he cannot as yet be allowed to go scot-free: and when he does neglect the subject, his neglect is of course the most blameworthy of all, not only because he ought to feel bound to understand what are sanitary conditions, and provide for them, but because even when his education in this respect has been neglected he, at all events, knows where to go for information, which the landlord and tenant mostly do not. As to the unfortunate workman, he is perhaps more sinned against than sinning. It is some gauge of the deficiencies of his education when we find that even the foreman of a gang of gas-labourers did not know under what circumstances gas was explosive. How was he to know, poor man! No one had ever taken the trouble to tell him. We fear, however, it must be added that the average working-man, even if he had been purposely instructed as to what he ought to do, has not by any means developed that sense of responsibility which would induce him to do the right thing merely from a sense of duty and without being compelled to do it by an unremitting supervision. When we have developed in all these classes of persons the knowledge what precautions are necessary to make a house healthy, and the determination to carry out the conditions as a matter of course, then we may concede that such questions need no longer be matter of popular discussion. They are not in themselves of popular interest, provided they are going all right; but until they do so, it is necessary to endeavour to popularise them in order to get them attended to at all.

It was therefore a wise move for the committee of the Parkes Museum of Hygiene to give a public character to their first annual meeting. There was, we believe, some doubt in the minds of some of those connected with the institution as to whether it was desirable at this time of the year to attempt so public a celebration of the mere termination of the first business year of a museum which is as yet quite in its infancy and has attained no separate residence. But we are sure any of those who were doubtful on this head will agree that the result justified the attempt. The meeting at the Mansion House was a larger one than, under the circumstances, many persons expected, and now the idea of its being a public concern is fully established, and we can have no doubt that, on the next occasion, an even greater interest will be manifested by even a larger attendance: we hope, we may add, by a longer subscription list. In respect of pecuniary matters, certainly, the result of the invitation for subscriptions on the spot was not a brilliant success. One reason for a certain caution in subscribing we take to be the feeling of doubt as to the future home of the Parkes Museum, the present habitation of which is admittedly only temporary. It is on this account partly that we urge on the trustees of the Parkes Museum the advisability of putting into shape without delay some architectural scheme for a separate building at once attractive in appearance and convenient in its arrangement for classifying and exhibiting the objects. If such a building, and an appropriate site, were once determined on, it would probably be easier to get subscriptions from those who can afford to subscribe on a large scale. People require to have a definite object before them, and to know what is going to be done, before they will open their purses very liberally, even in better times than the present. We may perhaps have a suggestion to make just now about a site and about the form such a building might most suitably take. At present

we will only say that, both being essentially a matter connected with cheerful and bright associations, the building devoted to illustrating its conditions should also be bright and attractive in appearance,—the rather so as there is unfortunately too much reason for a prevalent feeling that "sanitary" places (and even in some cases "sanitary" persons) are by no means very bright or attractive in themselves, as far as we have yet gone. Sanitary books are made very dull, sanitary institutions very ugly, and sanitary inspectors—but, however, we must avoid remarks which might be translated by malicious people into personalities. In addition to architectural attractiveness, the proposed building might be made a practical illustration, externally as well as internally, of the materials and construction most fitted for promoting healthy conditions in crowded houses. It would be a small building comparatively to begin with, very likely, but it ought to be readily capable of extension, for we anticipate a large future, at all events, for the Parkes Museum of Hygiene. It concerns all, and appeals to all.

A FOREIGN ARCHÆOLOGICAL WORK.

IN these pages we have more than once had occasion to quote from our Parisian contemporary, the *Revue des Deux Mondes*, the archæological articles of Gaston Boissier. For many years the distinguished Academician has contributed to that solid publication a number of invaluable papers, the result of his studies and travels south of the Alps; and now he has gathered these communications together, and formed them into an octavo volume, which will be read, we do not doubt, by all interested in the artistic and classic history of Italy.* M. Gaston Boissier's work is of additional value, as laying before his readers the most recent discoveries and theories relative to the spots visited and described by him up to the close of 1879. Indeed, in his preface the author modestly expresses his fear that this very fact will soon render his work of but little interest when future research will have placed us more in possession of a knowledge of the life, the aspects, and the habits of the cities and people of antique days. This fear is, however, little founded when, on opening the book, one finds so much information that can never lose its interest or novelty, and described in that bright and inviting style which, familiar to all foreign archæologists, is additionally remarkable in M. Boissier, who is not professionally an archæologist, but an esteemed professor of Latin poetry at the Collège de France. Exceptionally familiar with the Roman society of antiquity, M. Boissier by necessity is an archæologist, to whom every inscription, every scrap of hedimmed hut still glowing wall-painting, every old stone and lizard-haunted ruin, speaks of the life of the Romans of the past, our intellectual ancestors. With M. Boissier the absorbing and special studies of the pure archæologist have not exercised their usual influence. He mingles with his learning the rarely-met charm of literary skill.

On this very point, the want with the pupils of the Villa Medici in their architectural restorations of the supporting evidence of the literary sources of information, in addition to those afforded by artistic study, M. Boissier is warm. "The French Academy is not sufficiently impressed with the fact that the restoration of an antique monument, in addition to being elegant and agreeable to the eye, must also be exact, and it can alone be so if the architect who undertakes it has first studied the evidences and information left us by antiquity concerning the monument which he restores." Such advice cannot too constantly be held before the architectural student of every country, though of course it possesses more meaning (as regards Classic architecture) in France than in England, where our young architects do not, like our neighbours, commence their career by several years' residence in Rome and Athens, occupied in restoring (on paper, happily) the ruins of the great buildings of Greece and Italy.

This want of the literary respect that should surround everything that belongs to the distant past has led more than one archæological investigator to destroy work which, being of a later period than that specially interesting him, has prevented inquiry into the foundations or origin of the building explored. More than one interesting monument has been in this manner disfigured. M. Boissier in his work, does not make any special mention of the Coliseum, but the Coliseum offers an instance of this archæological zeal. As we remember describing in these columns some two years since, this interesting monument, so intimately bound up with the history of early Christianity, is now a water-filled swamp, in which the frogs weirdly croak at nightfall to the carefully scraped walls of the arenas, once picturesque in their verdure and beautiful with a *flora* the delight of botanising visitors to Rome.

How far this destructive warmth may be carried is curiously proved by a recent communication to the *République Française*, and from which it would appear that at Athens the archæological explorations have led to even sadder results; in the course of eager inquiries has been demolished the Frank Tower which stood at the eastern angle of the Acropolis, on the side towards the sea, and which masked neither the Parthenon, the Propylæa, nor the temple of the Wingless Victory,—an old tower the artists loved almost as dearly as the choicer marbles of Ictinus's Temple, for the mellow Attic sun had gilded it with the same glow as its more classic brethren in ruinous misfortune. Yet this simple tower, rising proudly on its base, marked a date in the history of Athens and the world, the Crusades, the feudalism of the West borne to the East, the Latin empire of Byzantium. But the old tower has been demolished as ruthlessly as if it had been but a shepherd's hut. When, asks Atticus, the writer to whose article reference has been made, when will come the turn of the Venetian ramparts and the Turkish bastions? There, on those fortifications, built by some unknown barbarian Vauban, the Phil-Hellenes of Fabrier have pointed their cannon; but the bastion is posterior to Pericles, and its days are numbered. One trembles at the thought that under the Parthenon as it stands lie the remains of the temple which the Persians destroyed, but the archæologist who will carry fully out the cruel work of Morosini will, we suppose, be immortal.

To such abuses a remedy can probably alone be found in admitting a greater share of influence to the literary student, who must direct and check the archæologist. The men of letters who are able to generalise on the discoveries made have it in their power to interest public opinion in the work of the archæologist, and to form, direct, and restrain that opinion by the sentiment of moderation with which they are imbued; this position renders the man of letters one of the most invaluable aids to the archæologist.

M. Boissier does not raise a voice against what may be termed, somewhat paradoxically, the vandalism of the archæologists. As he threads the now tidy Forum, with its railed-in precipices, unshadowed by the trees which only a few years ago adorned it so naturally, no regret is expressed for the memory of the Forum of Piranesi's time, the image of which the strangers of those days bore home from the honest old engraver and printseller's shop. The destruction of the Forum which Byron saw and described, has, it is true, shown us the Forum of Classic times; and if the picturesque drover from the marshes no longer passes through the old "foro," goading his meek-eyed bulls, we can more easily picture in imagination the Forum of imperial and republican Rome. To all this old life, so bound up in the memory of the Roman resident of thirty years ago, and which now has almost disappeared, M. Boissier devotes no regret; the utmost expression akin to such a feeling is to be found on the first page of his book, in which he refers to the new neighbourhoods rising in modern Rome on the not-so-long-since deserted tract that lies between Sta. Maria Maggiore and the Porta San Lorenzo. Even in the days of Nero, when that emperor rebuilt Rome, it would appear that there were not a few who regretted the disappearance of the narrow, crooked, old streets where cool shade was always to be found.

Much as one would desire to learn more of Herculaneum, in which we know are buried such treasures of art, Herculaneum remains still to be explored, buried under its liquid mud, which has hardened into a natural cement. All our knowledge of Pompeii's sister city remains obscure, like its streets and its temples; at Pompeii the sun shines again on the well-worn pavement of the Forum, and in the courtyards of the houses once so full of gaiety. M. Boissier is a delightful guide through the now silent streets of Pompeii, which reveal to him, from the various indications they afford, the life of the inhabitants, honest provincials, retired tradespeople, and humble artisans, of whom classic literature has left us but very few traces. This is one of the peculiar features of the existence at Pompeii which shows us a "bourgeoisie" living in the midst of a refinement unknown to their descendants of the present day; and which, when compared with the same feature of the existence of the Italian merchant-princes of the past, is eminently calculated to encourage the efforts of our so-called "middle-class" movement towards a high ideal of refinement and taste.

At Pompeii much remains still to be learnt of the life of the humbler portion of the population; most of the excavations have brought to light the interior of the houses of the more easy portion of the community, but the researches, which will next be continued on the side towards Castellamare, outside the neighbourhood that gathers round the road to Naples, will, it is expected, yield much information respecting the habits of the populace of Pompeii.

By the aid of the indications so far gathered, by the aid of various mural paintings and *graffiti* scratched on the walls of the shops so far unearthed, M. Boissier very skilfully revives the popular life of the City of Ashes. The Pompeiians seem to have possessed, like their descendants the Neapolitans, an inexhaustible fund of gaiety, and again, like them, they encouraged a busy crowd of street-sellers, or *forenses*, vending a variety of wares, such as can almost exactly be found in the *piazze* of modern Naples, the different cries which Seneca speaks of as peculiar to his time being only changed in language. As a city of pleasure, Pompeii was amply supplied with wine-shops and hostelries, frequented largely by the smaller people; already we observe the pleasures of home supplied by the companionship of the "bar," which can here be exactly seen, its sole difference from the counterpart of to-day consisting in its being of marble. There are the holes for the various bottles, while for the market people and those who have no time to linger, the "bar" is placed outside in the street. Nor is accommodation wanting for those who may desire to pass their time happily; and the wall-paintings discovered represent the interior of these hostelries as being places "that isn't what they ough' to," as Birdofredom Sawin would say.

Traces are found in the inns of the passage of more than one traveller who has scratched on the walls the customary visitors' remarks.

These *graffiti* are by no means the least interesting of the many relics of the life of Pompeii, as among those which have been preserved have been found many curious details; one amusing inscription being a washing account; but invocations to love,—Venus was the patroness of the city,—occur the most frequently. Such inscriptions took the place, in Classic times, of the printed notices of to-day, and the play-bills of Pompeii have been thus preserved for us, side by side with the characteristic notice of apartments to let for the kalends of July, or a reward offered for a stolen or lost object.

From the gaiety of Pompeii we follow M. Boissier to the more sombre ruins of Hadrian's Villa, where will be found a marked contrast in the sober life there led in the days of its splendour. In his description of the long-since deserted port of Ostia, M. Boissier recalls the ever-interesting and mystic memories of the early struggles of Christianity, a study continued in the paragraphs devoted to Pozzuoli.

In his visit to the catacombs M. Boissier is accompanied as guide by the Cav. di Rossi, whose profound acquaintance with subterranean Rome is well known. The origin of the catacombs, the work of the Christians, their first existence as private property and under the protection of the civil law, occupy a chapter which will be read with interest by not a few. It would be difficult to say which portion of M. Boissier's work succeeds most in captivating the attention. All are almost equally interesting, described as they are in that style so familiar to the French literary and archæological student, and so agreeably free from the tone of pedantry and specialism that leads such works, when published in our country, to be read alone by a privileged few. When it is stated that the work is published in the same form, and at the same price as the most recent romance,—that is,

* Promenades Archæologiques. Rome et Pompéi. Par Gaston Boissier.

let it be recalled to readers in the habit of paying their 30s. for a three-volume novel, at little more than 2s.,—it will be seen that the publishers have no fear that the work will be alone read by a few would-be Dryasdusts.

It is much to be desired that the tone to be met with in such works on the Continent were more widely introduced into England. Art and archæology are not looked upon as special subjects, interesting only to a small number of professional men and their friends. Without losing its dignity, archæology is more popularised through the elegant diction and vivacity of relation of its professors; and hence their writings find a far larger public than such books do either in England or America.

BRISTOL AND GLOUCESTERSHIRE ARCHÆOLOGICAL SOCIETY.

THE fifth annual meeting of this Society was held last week in Stroud.

On the first day (Wednesday, the 21st) a meeting was held in the Subscription Rooms, when the President of the Local Committee (Mr. Caruthers Little) formally welcomed the members to the town and neighbourhood of Stroud, and Sir William Guise, president of the Council, having responded, took the chair, and called on Mr. P. Hallett, the general secretary, to read the annual report, which stated that the year's returns show 494 subscribing members. The income, including last year's balance, was 514*l.* 12*s.* 11*d.*; the expenditure, 312*l.* 1*s.* 6*d.*; and the balance, 202*l.* 12*s.* 5*d.* Besides this, the Society has 414*l.* 15*s.* in Consols, representing the composition fees of life members, to which sum the life subscriptions above mentioned will be added. Having acknowledged the presentation of various works and the gift of a picture of St. Briavel's Castle, by Mr. C. J. Thomas, for the intended museum, the report proceeded:—

"To this subject of the museum the Council is desirous at the present time of calling special and particular attention. The Society is now completing its first lustrum, and during this period it has done much that may be fairly viewed with satisfaction. Since its first year it has annually maintained, without special effort, a list of about 500 subscribing members. Its finances have continued sound, and instead of the common luxury of a funded debt, it has been able to achieve the less common luxury of a funded reserve. . . . . There is not only an entire absence of any museum of antiquities in the county belonging to the Society, but there is nothing in its possession that can fairly be called the commencement of such a museum, and in this important respect the Society compares most unfavourably with its neighbours. The end of each lustral period, in the days of antiquity, was a time of sacrificial purification, and the Council hopes that it will be only needful for the society to become conscious of this fault in its system in order to make this present fifth year of its existence a true lustrum in the ancient sense. Money can do something towards the work of expurgation, but money cannot do all, or nearly all. If a museum of antiquities in general can be purchased in the open market, a museum of Bristol and Gloucestershire antiquities is not to be thus acquired. Such a museum cannot be suddenly made; it must grow. It must be the result of numberless increments of addition and adaptation. It can only be a work of time, but there is a time when the work ought to begin. . . . . 'The establishment of a museum or museums' was laid down in the Society's original prospectus as one of the objects of its foundation. As stated in last year's report, the Council, after much consultation and inquiry, has determined upon the establishment of two centres for museum purposes, the one at Bristol, the other at Gloucester, with the condition, however, to donors, of absolute liberty of choice between them, and with the hope that this liberty will be largely exercised. . . . . In regard to the formal affairs of the Society, the Council has only the customary changes to report or to recommend. In the exercise of its duty of annual nomination of officers, it desires to nominate for re-election the president of the Council, the vice-presidents, and the secretaries, general, sectional, and local, at present in office. The following members of Council retire this year by rotation:—Messrs. Leigh, Kerslake, Blunt, Lucy, Swayne, Gael, and Baker. The nomination of their successors rests with the members of the annual meeting. The Council, during the year, has held six meetings, three at Bristol, two at Gloucester, and one at Stroud, and desires to express its acknowledgments to his Worship the Mayor of Gloucester, and to the authorities of the Museum and Library at Bristol, for the accommodation afforded to it at Bristol and Gloucester respectively, and also to the Cotswold Field Club for the friendly hospitality shown towards it, and through it to the Society at Stroud."

On the motion of Baron de Ferrieres, seconded by Mr. W. Leigh, of Woodchester, the report was adopted; and on the motion of Mr. Little, seconded by Mr. O. Bowley, the several members of the council were elected.

Sir William Guise proposed a vote of thanks to the retiring president, Mr. Gambier Parry, and introduced the president-elect, Mr. J. E. Dorington, in Mr. Parry's unavoidable absence.

The President delivered an address, in which he said the question might be asked, was not the archæologist too frequently attached to the investigation of very old times, and did he not neglect to hunt up and preserve the remembrance of relics of periods which, though only just passed away, would never recur again? Flourishing and thriving as that neighbourhood had been for many centuries, it was scarcely possible to conceive the state of the roads in the beginning of the present century. Such excursions as they proposed to make during the next two days would have been absolutely impossible on wheels a couple of centuries ago. In 1795 the road to Nailsworth was made, and, to show the state of the soil before then, if a spade had been stuck in the ground there at night it would have disappeared by sinking in the next morning, which demonstrated the state of the roads then. What had the English race been doing since the Romans maintained on their hills structures such as the Roman villa at Woodchester, not inferior to the most splendid residences now existing in the county? Roman war-chariots could not have been driven along the mountain-tracks which served their ancestors as roads two generations ago, and only during the last century had the English race developed any talent for building structures other than ecclesiastical and military.

After the proceedings in the Subscription Rooms were brought to a termination, the members and associates had an excursion, the first halting-place being Bownham House, where Mr. Lancaster entertained the party at luncheon. Afterwards a visit was paid to Rodborough and Minchinhampton commons, where the remains of pit-dwellings and the encampment were inspected. Then the party went to Minchinhampton Church.

An evening meeting was held in the Subscription Rooms at Stroud, when

Mr. C. Wethered read a paper on "The Domestic Architecture of the District," in the course of which he said:—It is true this immediate neighbourhood can boast of no mighty achievement of the past recorded in the lofty language of stone, no baronial halls rich in historical associations like the castles of Berkeley and Sudeley, but it possesses an invaluable work of art in that splendid remnant of an extinct civilisation, the Greco-Roman pavement at Woodchester. . . . . Let us pass at one leap to an epoch more than a thousand years further down the stream of history. In "the spacious times of great Elizabeth" there was no fairer portion of what was styled of yore "Merry England" than this. The manor-house and other abodes of similar grade, with their bays and oriels, "bosomed high in tufted trees," hamlet and homestead, extending far and wide on hillside, in vale and in combe, all nestling in their rural surroundings, formed one harmonious combination of the works of nature and of man. New comers into this neighbourhood could hardly be more impressed by the long sweep of the valleys and the flowing outlines of the hills than by that strong element of the picturesque lent to the landscape by our local domestic architecture. It conveys the same sentiment of human interest to Cotswold scenery as the wooden châlets impart to Swiss mountains. And even in these scientific days, there are not a few who willingly turn from contemplating the terrible processes of nature in the geological upheavals and subsidences on every side of us to read tales in stone that tell of men's past lives and labours. I am not taking account of erections of later years, so devoid as a rule of all real expression. I am referring to the remaining examples of that old Northern Gothic, which, if not wholly indigenous, took deep root in our soil, and flourished here for many generations, until, in fact, it was stifled by the disturbing influence of pseudo-Classical prejudice. The hand-weaving of woollen cloths, long the staple industry of this locality, is an inheritance from the same source as that to which Sheffield owes its reputation for cutlery. A strong Flemish feeling is also discernible in numerous carved oaken chests, chairs, and tables still existing among us, or scattered elsewhere. These household adornments display a much higher excellence of handicraftsmanship than what we see in articles of the like kind made to meet the demands of modern fashion. Owing mainly to the skill of our local masons and their seclusion from the chief centres of innovation, together with the excellent quality of the freestone, its traditions lingered much longer in the Gloucestershire valleys than elsewhere. Stroud possesses an object of antiquarian interest in its Townhall, dating, in the opinion of a distinguished authority—Mr. Parker, of Oxford—from the fifteenth century. Stripped of its recent additions, from an architectural point of view it is worthier of notice than the costly modern building of greater pretensions close by. It has scale and proportion, with a quiet dignity of its own. As especially domestic types of illustration I may take More Hall, near Randwick, said to have been founded by a nephew of the celebrated Sir Thomas More, and the Court House at Painswick. These are, in reality, nothing more than a grouping and blending on a wider scale to meet larger wants of the elements to be found in every adjacent cottage of the same date; bringing every tenement, however humble, into a kind of masonic relationship with the rest. Much of their attractiveness depends on the mode of fenestration, and on the steep declivity of their roofs; the windows being either a single opening, with boldly-chamfered framing, or of two or more lights divided by mullions, and frequently crossed by transomes. The dripstone above is still more effective when carried round as a string-course, by defining a height and marking a flooring, while it adds in its long line of shadow a frown to the front. The roof, the crowning of the edifice and the symbol of home, is always conspicuous from its size and pitch, having an angle of inclination seldom less than 60 degrees. Broken up into many gables, it imparts variety to the skyline and increases the play of light and shadow. Above all rise the bold stone chimney-heads, worked in the solid and often set on the diagonal, putting to shame those flimsy pot-and-pan cylinders stuck on yesterday and apt to be blown down to-day. Unity of local means and appliances is further preserved by roofing with stone tiles, a natural formation principally occurring, I believe, in the oolitic beds of Tetbury. From long exposure to the weather, the outer surfaces have acquired a tone of the warmest grey, softened by Nature's own touches of colour in moss and lichen. Many possess either a projecting or recessed porch, affording shelter, and suggesting the sentiment of rest. The Cotswold masons have left upon their hatched and chiselled stones that impress and strength of endeavour which clearly shows in lasting marks how "joy's soul lies in the doing." Much of what they built has been destroyed or defaced by the meddlesome hand of the spoiler, moved by that spirit of unrest which is one of the besetting sins of modern life. An arrest of continuity in the vernacular architecture of a people or race dulls and checks the æsthetic yearnings of the craftsman. Such an arrest occurred, though later here than elsewhere, as I have just said, when the blight of the Classic Renaissance swept over France and England. A century or more ago it led to the transformation of Stratford House, The Field, Steanbridge House, and many another neighbouring "haunt of ancient peace," into the state in which we now see them. Every one of their monotonous façades, with the inevitable portico, and windows of the same deadness of shape, size, and number on each side, is the borrowed dress for forms that were then ruthlessly disarrayed. Men then did their utmost to blot out the nobler features of the dwelling-houses in which their forefathers had lived and died. After all, archæology is but the registry and classification of material facts of the past, unless we can apply some of its teachings to the formation of a system of instruction which shall bear fruit in the arts of the future. Amid the confusions arising from the neglect of ancient principles in the industrial arts, it is cheering to find traces of true Gothic feeling in the productions of the stonemasons, carpenters, and smiths of the present day. We have followers of these honourable crafts in Stroud, who can read drawings and render results in a way quite worthy of their ancestors.

Mr. C. Playne followed with a paper on "Stroud Houses." He said the oldest building which he had found in that neighbourhood was a granary near the residence of their president (Mr. Dorington), and the oldest dwelling-place was Dennay, in the parish of Bisley, close to the Thames and Severn Canal. The next oldest was More Hall, near Stroud, and then came the Court House at Painswick, where Charles rested after his repulse at Gloucester. Next in point of age was the interesting old manor-house of Owlpen. One place deserving attention was Bradley, and as it was stated Shakspeare once lived at Dursley, not far from it, the place had been suggested as that the dramatist had in view as the residence of the worthy Justice Shallow. He came to the conclusion that they had in those old houses remains far more pleasing to the eye than most of those built at a sub-

sequent period. He recommended those who might build houses to put their initials on them and the date for the benefit of archæologists who might come 400 years hence.

A discussion took place relative to the old buildings in that part of Gloucestershire. The Rev. T. Keble called attention to the old manor-house at Bisley as one of the most interesting in the neighbourhood, and one of the most ancient, dating from the time of Edward IV. It belonged to Queen Elizabeth, and he believed she slept there on the occasion of her visit to Frocester. The President said that rather conflicted with a tradition that it was a house two miles distant, though he thought the probability was in favour of this house.

Mr. C. Playne subsequently read a paper on the "History of the Cloth Trade," which, he said, was a subject that could not well be omitted at such a gathering in the metropolis of the cloth manufacture. Having given some particulars relating to the early records of the mystery of cloth-making, in which he alluded, *en passant*, to the efforts of Thomas Blanket, who set up looms in Bristol, he went on to speak of the statute of staples or fairs passed in 1357, by which wool was enacted to be sold at ten towns in England, of which Bristol was one. The devices practised by wool-merchants were alluded to, one writer saying that they concealed their right of knowledge by well-studied fraud. In the seventeenth century it was provided by law that all bodies buried should have woollen shrouds, in order to protect the trade, and the clergyman had to certify that a corpse buried was shrouded in wool. Leaving the general history of the trade, the reader spoke of the local history, and the rise of the manufacture in the district of Stroud. Since the reign of Elizabeth cloth was made at Minchinhampton, and Fuller spoke of the excellence of the streams at Stroud for the manufacture, and the advantage of the Cotswold Hills for the growth of woollen sheep. From 1800 to 1824 was the most prosperous time in Gloucestershire for the cloth trade.

The Rev. R. N. Clutterbuck followed with a paper on "Clothiers' Tronblee," and

Canon Scarth read a paper on "The Staunton Font," Sir John Maclean making a few remarks on the same subject.

Dr. Bird next read a paper on the ancient races of the Cotswold Hills, in which he narrated the result of an investigation of barrows that had been opened. He said around Stroud they had many instances of the practice of cremation, and where they found that they might be sure there were traces of the Assyrian immigration.

On Thursday, the 22nd, a party of more than 200 ladies and gentlemen started at ten o'clock in breaks, &c., to view the Roman pavement at Woodchester. A section of the pavement had been opened, and this was examined with great interest, and a paper on the subject was read by Mr. J. D. T. Niblett. This Roman mosaic pavement was discovered in 1695. The last time it was opened was in 1853. In 1793 the whole design was discovered, and appeared to be the remains of a Roman mansion. When this building was erected cannot be ascertained; but Roman generals erected public works in the neighbourhood in the reign of Claudius, A.D. 61. The clearance recently effected has been due to the exertions of the Rev. F. Smith, the newly-appointed rector of Woodchester, aided by a small grant from the Bristol and Gloucestershire Archæological Society. No perfect idea of the beauty and interest of the pavements can be conveyed in print; but, according to present arrangements, the pavement will remain open for public inspection until the 5th prox., after which it is proposed to re-cover it again with earth; but it is hoped that funds may be forthcoming to erect a protecting building to ensure its being always open for public inspection.

The party then passed on to Owlpen House, the residence of Mr. T. A. Stoughton, where they found luncheon awaiting them. Here, during a heavy storm, Mr. E. Witcbell read a paper on Flint Implements. A tumulus at Uley Bury was afterwards visited and examined, and the party proceeded to Selsley Hill, where a large number of remains of pit-dwellings are to be seen, and the Rev. A. S. Page, the vicar, read a paper on the subject.

In the evening a *conversazione* was held in the Subscriptions-rooms at Stroud, when the museum formed a subject of much interest. The first paper read was on the history of the parish of Bisley, by the Rev. W. H. Lowder, who restored Bisley Church a few years ago. He gave an interesting account of the early history of the parish. A paper by Mr. Middleton, on Leonard Stanley Church, showing that it was an old college of canons, was read by the Rev. W. Bazeley. Mr. Bazeley also read a paper on "The Berkeleys of Leonard Stanley." Mr. C. Playne showed a drawing of Frocester barn, of which he gave some account. The last paper was on "The Great Orphan Will Book, Bristol," by the Rev. T. P. Watley, from which some extracts were read by Sir John Maclean. Mr. Powell, Q.C., also contributed a paper on "The Murder of Edward II.," but this was taken as read. It may be remembered that two years ago M. Germain, a French *savant*, found in the archives of Hérault a copy of a letter purporting to have been written by Manneli Fieschi, Papal notary at Avignon, to Edward III., the substance of which is that Edward II., upon being told that Gurney and others were coming to kill him, escaped from Berkeley Castle by killing the porter; that the knights put the corpse of the porter into a coffin and buried it, as if it had been the body of the king; and that the king escaped to an Italian hermitage, where he remained in strict seclusion until his death, ten years after his escape from Berkeley. This letter was published in full in *Macmillan's Magazine*. Mr. Powell has arrived at this conclusion: "On the whole it seems to me, speaking in professional terms, that those who contend that the king was not murdered have made out a sufficient case to go to the jury, and as you occupy that position to-night, I leave the question for your determination."

On Friday, the 23rd, the concluding meeting of the Society was held in Stroud, when Sir John Maclean proposed, and Mr. Leigh seconded, that next year's meeting be held at Chepstow, and this was unanimously carried.

Sir William Guise moved, "That it is desirable to preserve the Woodchester pavement *in situ*, and that the Council be instructed to take steps to secure that object." Dr. Paina seconded this, and it was carried.

Votes of thanks were passed to all who had assisted the society with contributions and personal help.

A large number of the members afterwards proceeded to Painswick, where they visited the site of the old camp, and then inspected the Court House, an ancient dwelling. Next they went to Cranham, where they were entertained to lunch by the president, after which a tumulus was opened in a field occupied by Mr. Dancer, and some exceedingly interesting remains discovered. Thence the party proceeded to Bisley, and under the guidance of the Rev. W. H. Lowder examined the church and other objects of interest. Next they visited Lypiatt Park, the residence of the president, and said to be the house where the Gunpowder Plot was hatched; several points of interest between there and Stroud were examined on the return journey. The meeting has been favoured with fine weather with very slight exception, and has been thoroughly successful.

NEW WORKSHOPS OF THE LONDON, TILBURY, AND SOUTHEND RAILWAY.

FIVE years since, when a lease of the above line expired, and the company took it into their own hands, they did not own a single locomotive, or carriage, or wagon. Since that time the company have acquired all the locomotive power and rolling stock necessary for the working of their large and constantly-increasing traffic. They have, in addition, completed a fully-equipped railway factory at Plaistow, for making and repairing their engines and rolling stock.

In laying out the works, Mr. A. L. Stride, the company's manager and engineer, was under serious difficulties from the absolute limits within which he had to erect his buildings; his boundaries were, to the west the main sewer of the metropolitan system, which crosses over the line, and on the east the highway, which also crosses over the railway. The fan-shaped piece of land, about three acres in extent, that was available has been turned to excellent account. The south side of the land has the Plaistow station and platform, then the lines of the Tilbury and Southend Railway; next, a central double platform on which are six covered waiting places with seats; beyond that are the two lines of the North London Railway, and outside of them the boundary that incloses the new buildings and sidings.

The principal buildings, accommodated to the shape of the ground, are in two main blocks, each with three gables, the central gables rising above the wings. The building materials are white and red brick, the surfaces relieved with rusticated pilasters at the corners and between the bays.

The building nearest the line is 207 ft. long, and is divided into three divisions, each 41 ft. wide. It has a side elevation of seventeen bays, the windows being 8 ft. 3 in. by 6 ft. 9 in. The first division in this building is a running shed, with room to accommodate eight locomotives. The second division is an erecting shop, with an overhead traveller running upon oak beams, 13 in. square, resting on strong corbels. The third division has, to the front, a machine-tool and fitting shop, 97 ft. long, with shafting and belting all through, and furnished with lathes, planing, boring, slotting, shaping, and other machines. Adjoining this is a smithy, 56 ft. long; it has fifteen fires blown by a fan, and has in the middle of the floor a half-ton stroke steam-hammer. The remainder of this division is appropriated to the copper-smiths' shop, 24 ft. 6 in. long. Each of the three shops last named is 42 ft. wide. Power to drive the machine tools will be supplied by a vertical engine of 9-horse power, by Craven, of Manchester. The boiler-house, and a handsome octagonal chimney-shaft, 70 ft. high, are separate, but in close proximity to the fitting-shop.

The second principal building, externally a counterpart of the other, is also divided longitudinally into three, but with wide arched openings in the walls. It is 168 ft. long, and gives three carriage and wagon shops, each 41 ft. wide, and served by two lines of rails in each division.

The roofs have light, well-braced and tied principals of wrought-iron. They are boarded, and covered with Welsh slates. Each of the six bays of roofing has a wide belt, glazed on the system introduced by Mr. Edgcumbe Rendle, of Westminster. Mr. Stride reports of the glazing that under severe trial it has proved abundantly strong, and quite impervious to rain and wind.

Between the two principal buildings, near the front, a 42 ft. turntable has been laid down, in the rear of which is a tall, strongly-built structure, for stores in the ground-floor portion, and on the top a water-tank with a capacity for 25,000 gallons. The tank has two divisions, one to contain the water drawn by the company from their own ground, the other to take the water supplied by the East London Waterworks Company.

The only remaining building calling for notice is a detached block providing light and convenient offices and rooms for manager, draughtsmen, clerks, and others connected with the works.

The line is worked on the absolute block system, and an important item in the new works at Plaistow is a signal cabin with twenty-eight levers, embracing the latest improvements for points and signals, and in electrical distance-signal repeaters.

MONUMENT TO MERCATOR, DUISBURG.

OUR readers will remember from their school-days (although most of them may have carried it about with them as an unsolved riddle) what they have read on one of the first leaves of their atlas, "Map of the World after Mercator's Projection." These words indicate the eminent services rendered by a great man. But although this has been done since atlases were first introduced; although the name of the inventor has been handed down from generation to generation, and not in works hidden away, but plainly before all eyes; although, besides, his invention is used by thousands day after day,—notwithstanding all these facts, the man had been almost wholly forgotten; familiarity with his life and his fortunes had been almost entirely lost; his deserts were awarded, even with the consent of his German countrymen, to foreigners; and he himself, when attention was again drawn to the importance of the services he had rendered to geographical science, was claimed by a foreign nation.

In presence of such a state of things, the unveiling of a statue of Mercator in the course of last year at Duisburg on the Rhine, by which has been paid a debt of honour long owing to

a great man, is of especial significance. By this act, the German nation has come to its own.

Gerhard Kremer, called Mercator, was born on March 5, 1512. His parents lived in the duchy of Jülich, probably at Gangelt (district of Aachen), and there young Gerhard dwelt until his sixteenth year, and had his education. But he was born in Rupelmonde (Belgium), where his parents happened to be on a visit to his father's brother, Gishert, who was vicar there. On account of this accident, Rupelmonde has claimed Mercator as a Fleming, and even went the length of erecting, in 1869, a monument to him, as the "Beroemden Wasenaar." Yet he himself, in the "Fabula Galliae et Germaniae" (1585), in the dedication to Duke Johann Wilhelm, of Jülich-Cleve, set the matter at rest. The Flemings, as we shall see presently, can scarcely think of him without a certain sense of shame.

Mercator went to the University of Louvain in 1530, and he continued there also after he had become baccalaureate. He at first devoted himself diligently to humanistic studies, but changed suddenly to mathematics, especially mathematic geography. Besides cultivating the sciences, he practised, as customary at that time, mechanical work, making spheres, astrolabes, astronomical rings, &c., of brass. He soon began also to engrave maps, which met with much success; in 1541 he completed, after a labour of eighteen months, a larger piece of work, a globe, which he dedicated to the Imperial Chancellor Granvella. Through the latter he was introduced to the Emperor Charles V., and received from him,—who, it is well known, took great interest in mechanical art work,—various orders. He was so successful in such labours that his productions were looked upon in the sixteenth century as the best of their kind.

Although he had attained some eminence by his work, and was besides extremely peaceable and cautious, he fell a victim to the spirit of persecution of the time, and to the Inquisition. In 1544 his uncle Gishert died. In order to arrange matters of inheritance, Mercator went to Rupelmonde; there he was denounced as a heretic, and thrown into prison. Notwithstanding all machinations, no cause for prosecution could be discovered, and after more than three months of severe imprisonment he was set at liberty. For this favourable result he was more especially indebted, saying nothing of his own caution (he had never publicly and openly seceded from the old church), to the exertions of the University of Louvain, which, by liberating one of its members, was anxious to preserve intact its own privileges; and it may be in consequence of this issue that Mercator stayed on in Louvain a few years longer. How serious the matter was, however, may be inferred from the fact that, of his fellow-accused, two were burnt, one was beheaded, and two (women) were buried alive.

Residence in Belgium becoming more and more unsafe, and religious persecution more violent, Mercator at last left the country with his wife and six children, and took up his residence in Duisburg, formerly a free town of the German Empire, but mortgaged for several centuries to Cleve, yet at that time still enjoying great privileges. We may assume that Mercator, like other eminent men of that period, was induced to choose the duchy of Cleve as his place of residence on account of the religious liberty prevailing there. The sciences were especially cultivated, and there was also a scheme on foot for establishing a university, the required privileges having been already granted by the Emperor and the Pope; but the plan was not carried out until a hundred years later, during the reign of the Great Elector of Bradenburg, when the duchy of Cleve had been acquired by the latter. As a preliminary step to the university, the magistrate of Duisburg established in 1559 a gymnasium. Mercator took a very active part in its foundation. For several years he taught at the school, but he was ultimately obliged by increasing work to discontinue his teaching. He remained, however, in the town until his death, which took place on December 2, 1594,—an esteemed citizen. His descendants continued to reside there, occupying an honourable position. On that account the town is looked upon in Germany, and rightly, as the second home of the family, voluntarily chosen by them.

While still in Louvain, Mercator made the first discovery which handed down his name to posterity. This was the establishment of the deviation of the magnetic needle, its cause, and the position of the magnetic pole. He mentions this fact in a letter written to Cardinal Granvella, the celebrated minister of Charles V. and Phillip II, one of the most accomplished diplomatists of his time. That letter was discovered and first published by Dr. Breusing.

The deviation of the magnetic needle had been noticed by Columbus, but its existence was not definitively established until the close of the next century, by Mercator. This service rendered to geographical science has hitherto been ascribed to a Spaniard, Martin Cortes, who speaks in his "Art of Navigation," published in 1555 at Sevilla, of the magnetic points of attraction on the earth's surface. It is supposed that Cortes obtained a knowledge of Mercator's discovery through Granvella or Charles V.

The second work of Mercator's which created a sensation belongs to the year 1569. In August of that year he completed his great map of the world for the use of navigators. From it dates the reform of cartography, which latter has to record no work of like importance, and with it a new epoch in navigation began. This discovery was equalled in significance only by two others in navigation, the ship's compass and the sextant. The work of Mercator possesses the rare advantage of combining theory with a practical instruction for sailors. The directions contained in Mercator's "Sailing" are followed to the present day; only, as Breusing remarks, nearly all authors of sailing directions are using Mercator's rules without being aware of the fact that they give them almost verbally. Mercator's original method of projection was not the only one proceeding from him; a second, ascribed later to De l'Isle, and a third, attributed to Bonne, are in reality his. But even his most important work was claimed for another, for our countryman Wright, who thirty years later published some tables enabling everybody, even those possessing no mathematical knowledge, to construct charts. As late as 1805 a German described Wright as the "inventor of the true construction of the charts commonly called Mercator's." It was left to a Frenchman, D'Avezac, in a work published by him in 1863, to restore to the Germans the credit due to a German.

Not long after his second great work, Mercator planned the issue of atlases, intended for everyday use, but resting on exact information. He was forestalled in the execution by Abraham Oertel, likewise a German, who published in 1570 his "Theatrum Orbis Terrarum." But this work is founded partly upon Mercator's earlier maps, and was, moreover, greatly furthered by the disinterested assistance rendered by the latter. It has no claim to independent value.

Mercator continued to labour on his collection of maps and charts, notwithstanding former preliminary work, for another quarter of a century; and each map marks a step in advance in geographical science. At his death, in 1594, the work was not quite finished. His only surviving son completed it, and published it, along with the Cosmography of his father, in 1595, under the title chosen by the elder Mercator, "Atlas." The meaning of this designation is not quite clear, but apparently it has no reference to the supporter of the heavens. The excellence of the "Atlas" may be surmised from the fact that a few years after its first appearance all rival works had disappeared.

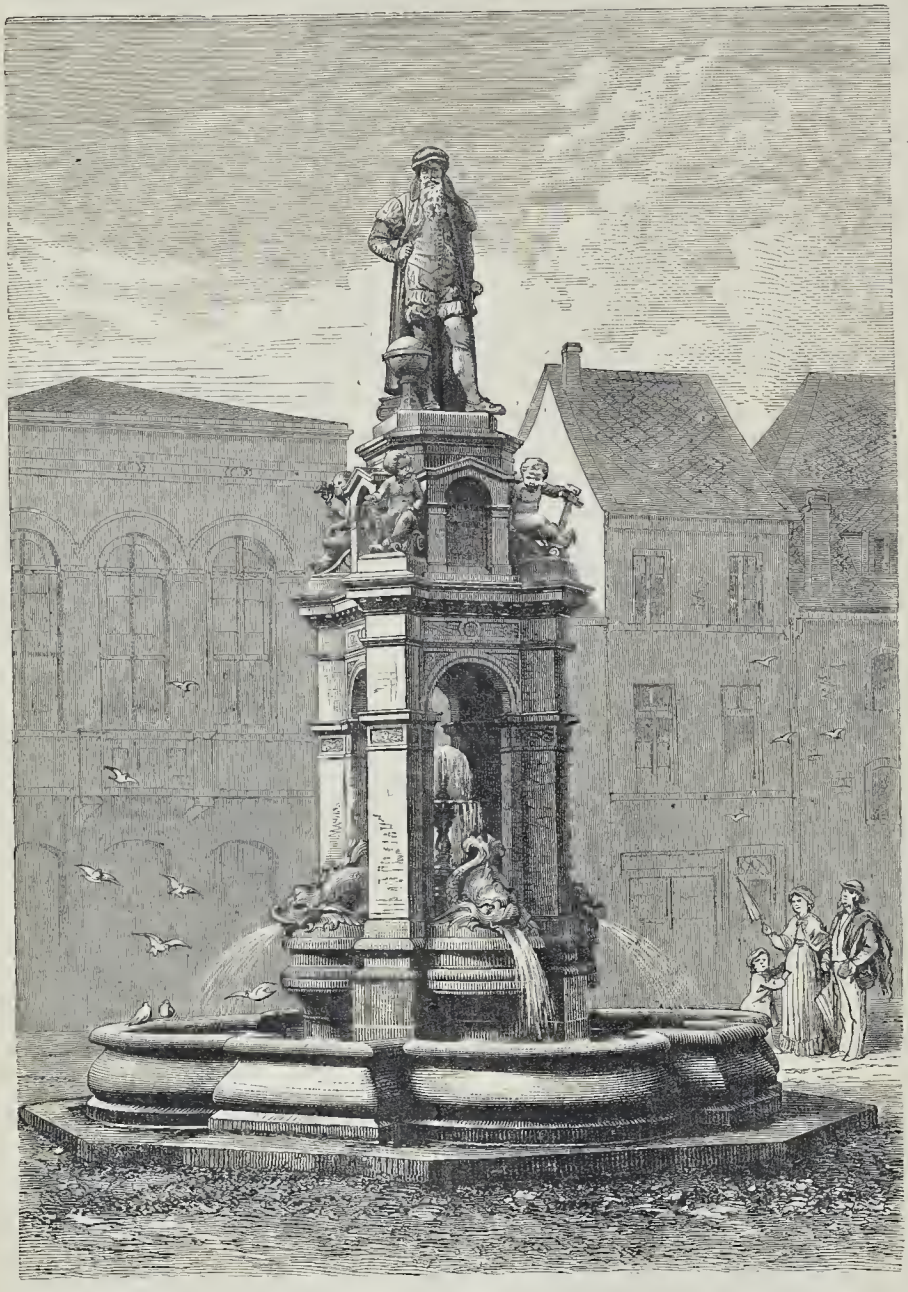
Apart from the publications mentioned, which have ensured to his name an undying memory, Mercator issued a large number of others, which created a sensation at the time, but which we need not mention here. This much is certain, that the effect of his works has continued to make itself felt up to our time, and that the most important were matured in Duisburg, which he had selected as the sphere of his activity, and which on that account was bound to renew and perpetuate his memory. As early as March, 1869, therefore, a committee was formed at the invitation of Dr. Breusing for erecting a monument to Mercator in Duisburg. In Rupelmonde a similar movement had been started three years earlier. Moreover, a biography of Mercator was published there, in 1869, by Dr. van Raemdonck, a Belgian, to which Professor Köhnen, of Duisburg, contributed valuable information, derived from local archives. The idea met with general approval; some 600*l.* was subscribed, and the foundation-stone was laid in August, 1869. But the Franco-German War diverted attention, and public interest was not aroused again until the town architect, Herr Schülke, took up the matter again energetically. He drew up the plan, towards the execution of which the Art-Union of Düsseldorf contributed a considerable sum, the funds collected up to that time proving insufficient. The monument was entrusted to the sculptor Reiss, of Düsseldorf; the erection was undertaken by Herren Kaufhold & Berndt, of the same city; and on September 2nd of last year the unveiling took place on the Burgplatz.

Mercator is represented in the dress of his time, as it is found also in some excellent busts of him; the cloak being carried down to the feet, in order to impart to the figure a quieter effect. The head is very noble, full of expression, and lifelike. The furrowed forehead, shaded by the baretta, the thoughtful face looking down upon the beholder below, the flowing beard, and curly hair impart to the portrait a venerable, yet manly character. The monument rises from a basin and has arched openings in the lower part, within which are water-spouts in the form of dolphins. At the upper part, at its four corners, are juvenile figures representative of Science and Navigation, Commerce and Industry. It is 28 ft. high, and in the style of the Renaissance of the time in which Mercator lived. The material is white Trier sandstone; the base being of basaltic lava, the basin of bronze. We present to our readers a faithful illustration of the monument.

THE SOCIETY OF ENGINEERS.

ON Wednesday, the 21st, a number of the members of the Society of Engineers visited the Signal Works of Messrs. Saxby & Farmer, in Canterbury-road, Kilburn. The party included Mr. Joseph Bernays, president of the Society; Messrs. Charles Horsley, J. Church, and P. F. Nursey, members of the Council; Mr. A. Williams, honorary secretary and treasurer, Mr. B. Reed, secretary; and others. Conducted by Mr. Farmer and by Mr. C. Hodgson, the manager of the works, they visited the museum attached to the works, in which are models of all the chief inventions in signals, locking and block, and interlocking-block signal apparatus, brought out by Messrs. Saxby & Farmer, from whose works have emanated some of the most important appliances for conducting safely the great traffic of modern railways. Here Mr. Farmer explained the model of the first arrangement patented in 1856 for connecting and interlocking points and signals, and by means of other models showed the development of the principle of signal control of all points, crossings, and level crossings, to the most recent arrangement by which not only may a train, the driver of which has disregarded a danger signal, be diverted into a clear line from which a goods train may have been shunted across his own main line, but by which, in case of necessity, a signalman at one station may set the signals of a distant signalman at danger, and hold them there in spite of that signalman. The apparatus thus procures absolute mechanical interlocking, by which any trains or obstructions may be covered. Every possible contingency seems to be provided for. These arrangements are gradually coming into use, though more rapidly in Belgium than in this country. The society afterwards dined together at the Guildhall Tavern, Gresham-street.

Royal Dramatic College.—At the Auction Mart, Messrs. Farebrother, Lye, & Palmer have made another unsuccessful attempt to dispose of the Royal Dramatic College, which is situate at Maybury, near Woking, Surrey. The foundation-stone of the great hall was laid by the late Prince Consort, and the building was inaugurated by the Prince of Wales. The sale was by direction of the trustees (Lord William Lennox and Messrs. Benjamin Webster and Anson) under an order from the Charity Commissioners. There are five pensioners in the building at the present time. The pleasure-gardens and grounds surrounding the building extend over ten acres, and the whole is opposite the South-Western Railway, being about twenty-five miles from London. The estate was put up at 3,000*l.*, and reached by slow degrees 4,500*l.*, when the auctioneer intimated that he had instructions from the Charity Commissioners not to sell it under 5,000*l.*, private tenders being invited. It has been since stated that the building is sold, Mr. Alfred Chabot being the purchaser.



MONUMENT TO GERHARD KREMER, CALLED "MERCATOR," DUISBURG ON THE RHINE.

HERR REISS, DÜSSELDORF, SCULPTOR.

Wyman & Sons, Printers, Fetter Lane, E.C.

Whiteman & Bass *Photo-Litho* 236, High Holborn

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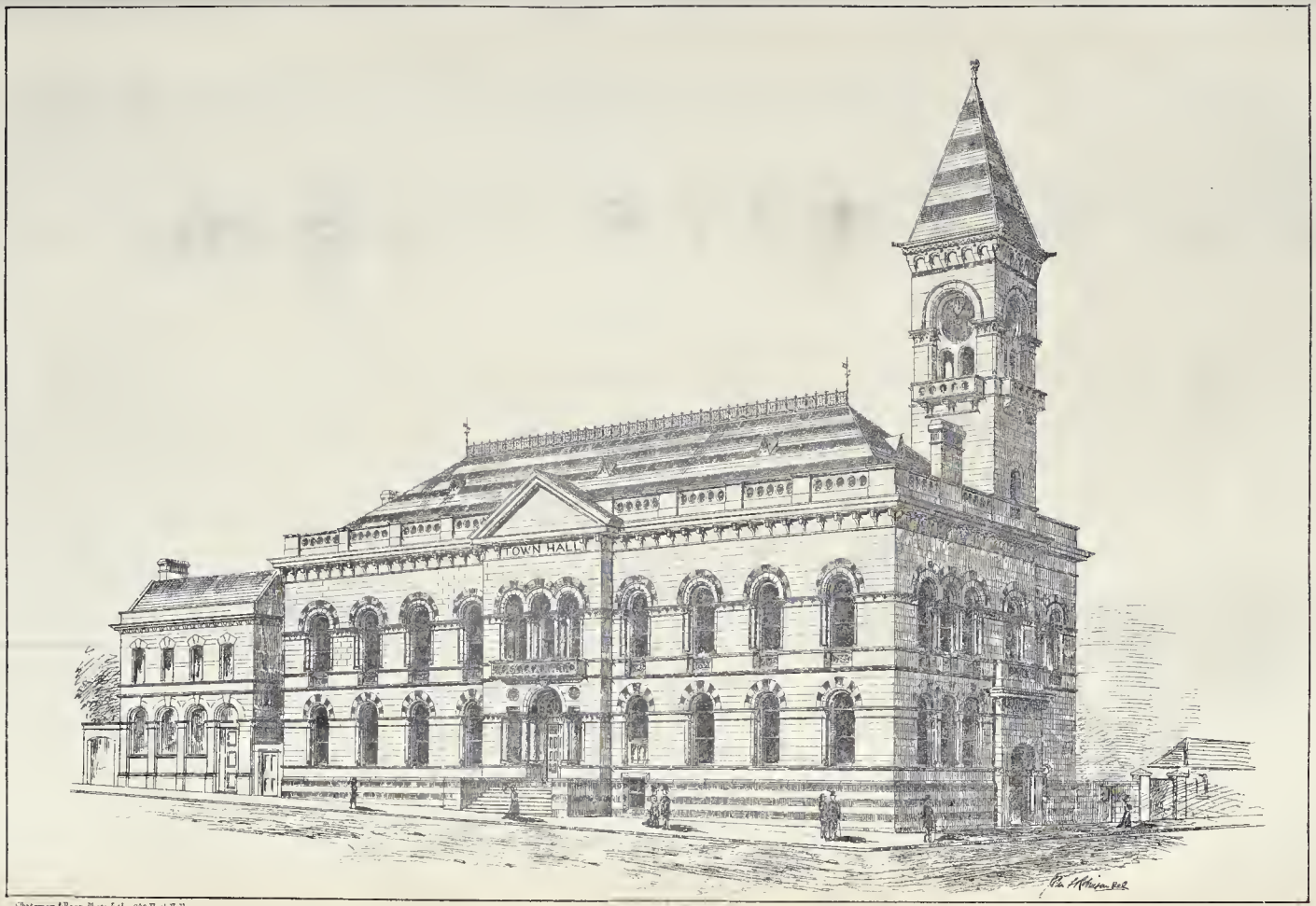
SULZFELD, GERMANY.



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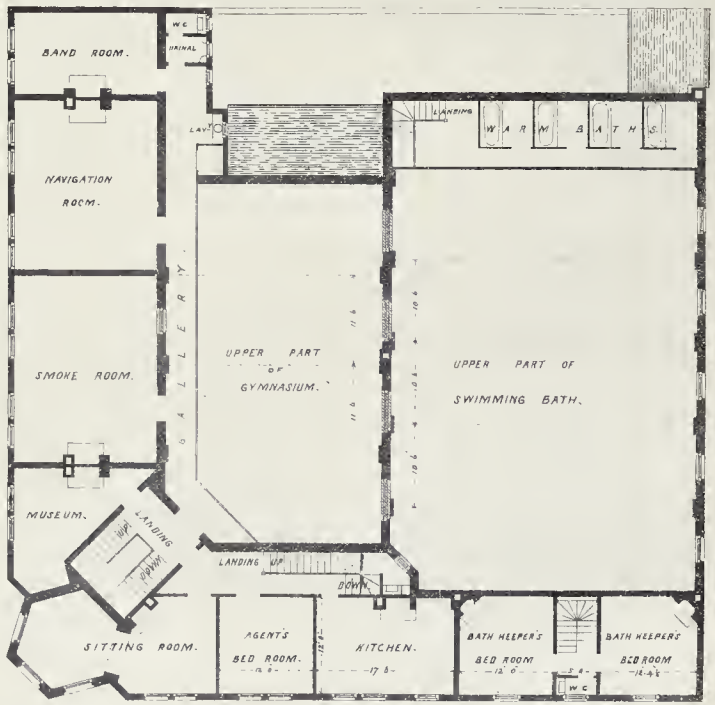
TOWN-HALL AND COURT-HOUSE, KINGSTOWN, CO. DUBLIN.—MR. JOHN L. ROBINSON, ARCHITECT.

GROUND FLOOR PLAN.



FIRST FLOOR PLAN.

SCALE OF FEET.

Whiteman & Price, Photo-Litho, 23a High Holborn

Wyman & Sons, Printers, 74 Queen St.

FISHER-LADS' INSTITUTE, GREAT GRIMSBY.

SULZFELD.

THE "dwarf cities," or fortified villages, of Germany, which played no insignificant part in the history of the Fatherland during the Middle Ages, and by combination, or sometimes even alone, resisted the oppression and tyranny of the most powerful nobles, are rapidly disappearing or changing their character. Modern improvement and centralisation have robbed them of all power, and even of life, and from having remained for the last two centuries mere collections of tumble-down tenements inhabited by agricultural labourers and small shop-keepers, they are now being gradually dismantled. First, a "curtain wall" is thrown down, then go the gates, and in a few more years the quaint old towers are pulled down, the old houses are plastered over and whitewashed, the Rath-haus and church thoroughly restored, and the place rises up like a phœnix from the ashes of the past. But, alas! the new phœnix is a miserable bird; however, as they say, a "live dog is better than a dead lion," and possibly to those that inhabit these villages the rebuilt houses may be more agreeable than the old ones, and the brand new gravel walk round the town may to them be an improvement. How fortunate now are those happy people who are born entirely without an appreciation of the beautiful in art,—people, for instance, who can see more to admire in a Bayswater villa than in a Nuremberg house! Such happy individuals would find little to admire in Sulzfeld, but those who are so unhappy as to admire the picturesque relics of the past would find much to interest them in this curious little town, which retains all its Mediæval fortifications. Like Winchelsea, and several other ancient towns both in England and on the Continent, Sulzfeld is very regularly planned, with perfectly straight streets crossing each other at right angles; the gates are exactly in the centre of the walls and the towers occur at regular intervals. The plan would be a perfectly rectangular oblong were it not that a rock which rises somewhat abruptly on the east side prevented that wall from being carried out in a straight line.

The church and town-hall are near the centre of the little town. The church has suffered from modernisation, but possesses a graceful slate-covered spire. The town-hall (or Rathhaus) is in a style resembling our Elizabethan. It presents a noble lofty gable towards the little market-square, and is really a very dignified-looking structure for such a mere village. It was erected by Bishop Julius of Würzburg (*ob.* 1573). The towers at the angles of the town-walls have peculiar roofs, covered with tiles. The towers themselves as well as the walls were all covered with a coating of plaster over the rubble, and were probably ornamented with coloured decorations, similar to those which we have on a previous occasion noticed at Ingolstadt and Landshut. It is most important both for the cause of archæology and also for the study of Mediæval history that careful drawings and records should be made of such places as Sulzfeld, for when they are destroyed or rebuilt it will be simply impossible for a future generation to realise what they were like, and much of Mediæval history will be unintelligible to readers. For instance, there is a little historical fact connected with Sulzfeld. "In the year 1461 the Margrave Albert Achilles, with his whole army, laid siege to Sulzfeld and hoped to take it without much loss. He was, however, mistaken in his calculations, and had to draw off his men to Kitzingen, taking the dead and the wounded in two wagons."* Now it will be of interest to future historians to know what kind of fortifications could defend a town against the army of a Margrave in the fifteenth century, and yet it will be simply impossible for him to realise what they were like, and thus it is to the interest of the historian as well as the archæologist and artist that such works should be illustrated in a journal like the *Builder*, although they may not offer much in the way of suggestions to the practical architect or contractor.

The Exhibition of the Society of British Artists.—The Council of the Society of British Artists, Suffolk-street, Pall-mall East, have made arrangements to open the exhibition free on Bank Holiday, Monday next, August 2.

* Handbuch für Reisende auf dem Maine. Von S. Häale und K. von Spruner. 1843

FISHER LADS' INSTITUTE, GREAT GRIMSBY.

THE want of a suitable building wherein to provide for the accommodation of the 2,000 lads engaged in the large fish trade at Grimsby had long been felt, and owing to the generous gift of a site near the docks by Colonel Tomline, an influential committee was formed, with Mr. W. H. Daubney as chairman, Mr. J. K. Riggall as treasurer, and Mr. Orby Bradley as secretary, to whose energy the success of the scheme is largely due, and the building we illustrate has been erected, and was formally opened by the Earl of Yarborough, on Monday last. The earl was accompanied by the Countess of Yarborough; Mr. Edward Heneage, M.P., and High Sheriff of Lincolnshire; Sir Edward and Lady Watkin, Mr. H. Josse, and a numerous and distinguished company of the local gentry. A grand bazaar was then held in the various rooms, towards removing the remaining debt on the building.

The site is at the junction of Oswald and Tomline streets, and has also a frontage to a new street in the rear. The entrance is at the angle, leading into an octagonal hall and lobby. There is a large and lofty lecture-hall and gymnasium, 48 ft. by 28 ft., with an open-timbered queen-post roof, wrought and painted, out of which open various large and lofty rooms, viz., a library, 20 ft. by 18 ft.; reading-room, 24 ft. by 18 ft.; refreshment-room, 25 ft. by 16 ft., all for the use of the lads, and under the general control of a resident superintendent.

Adjoining the lecture-hall is a handsome swimming-bath, 38 ft. 6 in. by 63 ft., with an open roof. The bath is lined with glazed tiles, and there are four private baths above the dressing-rooms, an entrance for which is provided from Tomline-street, where is also a bath-attendant's house. In rear are the engine-house and well for supplying the baths, with offices, &c. On the first floor, reached by the main staircase and by a gallery projecting over into the lecture-hall, are a series of rooms to be used for the various classes for instruction in navigation, &c., and there is a good residence for the agent over the coffee-room. Above, on the attic story, are dormitories for the occasional use of boys who may not have homes elsewhere. The lantern above the entrance is to be used as a "look-out," whence a good view is obtained of the Humber and North Sea. The building is of red bricks, with white and blue bands, stone only being used for sills, &c. The roofs are of blue slate, with green bands. All the finishings are of a very plain but suitable character, and the whole block is pronounced to be a very convenient arrangement for all the present and future requirements for the social comfort of the fisher lads. The architect is Mr. Charles Bell, F.R.I.B.A., of London and Great Grimsby, and the builders are Messrs. Riggall, Hewin, & Topham, of Grimsby. The contract was 2,900*l.*, and the fittings, furnishing, engine, &c., will amount to about 700*l.* more.

KINGSTOWN TOWN-HALL, IRELAND.

THIS new building, which stands at the end of Crofton-road, opposite to the railway station, has been thrown open for use. It contains municipal offices, a public hall, and a commodious court-house, where the county chairman will sit periodically, together with accommodation for the holding of the police-court. Some particulars with respect to the building may not at the present moment prove uninteresting. So long ago as 1866 the Town Commissioners, feeling the want of such accommodation as that which the new building provides, advertised for plans and specifications, but the difficulties which were thrown in the way of procuring a suitable site caused the scheme to lapse for a time. In 1874 it was revived, and in August of that year, the difficulties with regard to the site having been obviated, the plans sent in by Mr. J. L. Robinson, 198, Great Brunswick-street, Dublin, were selected, and tenders advertised for. The position is most excellent,—central, prominent, and convenient. The amount of the contracts and extras was about 14,000*l.*; but it is estimated that the entire building, when furnished, will cost at least 16,000*l.*

The architecture is after the Italian style. The main frontage is on the Royal Marine-road, where the façade measures 130 ft. The main entrance is situated in the centre of this front. Passing through the doorway, the hall, 16 ft. wide by 22 ft. long, is reached. The bottom story, 16 ft. 2 in. high, contains the court-house, which is 39 ft. by 30 ft., with rooms for witnesses, barristers' rooms, clerk of the peace's offices, the jury-room, the judges' retiring-room, closets, lavatory, &c. On the left-hand side of the main entrance, on the same story, are offices for the town clerk, the town surveyor, the rate-collector, and the sanitary inspector.

The next story is 22 ft. high. It is approached by a grand staircase, and contains the assembly-room, a lofty apartment, 70 ft. 6 in. long by 41 ft. 6 in. wide, with moulded roof and cornices. The interior fittings of the assembly-room will consist of a platform of pitch pine and American walnut, for the accommodation of performers. The board-room, in which the town commissioners will hold their meetings, is also situated on the second story. Its size is 30 ft. by 39 ft. The walls are covered to a height of 6 ft. with a panelling of pitch pine and American walnut, richly moulded. The furniture of the board-room has been designed by the architect, and will be of massive oak, in keeping with the rest of the building. The assembly-room will, of course, be devoted to public meetings, concerts, and entertainments which may be held in the township.

The second story contains, in addition to the rooms mentioned, the town clerk's office, a commissioners' retiring-room, and some clerks' apartments, the latter being exceedingly well planned and comfortable. The entire of the corridors will be furnished with fancy tesselated tiling.

The entire height of the building is 50 ft. from the floor balustrade. A tower, 120 ft. high, surmounts the court-house entrance in Crofton-road, in which there will be a clock, situated at a height of 80 ft. above the ground. The commissioners have entered into a contract for the erection of the clock with Messrs. Chancellor, of Sackville-street.

The windows of the building are all circular-headed, and those of the principal stories are constructed with nook-shafts in angles, with carved capitals, moulded arches, and hood-moulds. Polished Aberdeen granite columns ornament the windows over the main entrance in Royal Marine-road and the board-room windows.

The building is capped by a cornice, supported by granite brackets, with a pierced parapet over; the roof, high-pitched, covered with slates in bands, and decorated with a metal cresting. The materials which were used in the construction of the building are local chiselled granite ashlar for the main walls, with Bath stone cornices and arches. Various descriptions of stone have been introduced by the architect where their colour serves to emphasise the leading lines in the architecture.

The contract has been carried out by Messrs. Meade & Son, Great Brunswick-street, in a way to give satisfaction.

PERMANENT ART GALLERY AND MUSEUM FOR BIRMINGHAM.

MESSRS. R. and G. TANGYE, of the eminent engineering firm of Tangye, Brothers, & Holman, whose extensive works are situate in Birmingham, recently offered to contribute the munificent sum of 10,000*l.* towards the purchase of examples of art for exhibition in a public art-gallery in Birmingham on condition that the Town Council should make provision for a permanent art-gallery on a scale commensurate with the necessities of the town. We now understand that an arrangement is likely to be arrived at by which the town will be enabled to accept the generous offer of Messrs. Tangye, and to enjoy the use of the valuable collections of works of art and art manufactures which it already possesses. The General Purposes Committee and the Art Gallery Committee of the Town Council have met and conferred upon a proposal by which that portion of the site of the Municipal Buildings which is at present unoccupied will be devoted to the erection of buildings of which the basement and ground-floor will be used by the Gas Committee, and the upper portion will be available for art-galleries and a museum on a scale worthy of the town and of the subject. It is stated that a plan by which this desirable object can be effected without burdening either the special Free Libraries rate or the general rates of the borough, will be suggested to the Town Council at its meeting next Tuesday.

THE PARKES MUSEUM OF HYGIENE.

THE first public annual meeting of the friends and supporters of this Museum was held on Tuesday afternoon in the Egyptian Hall of the Mansion House, the Right Hon. Sir Francis Wyatt Truscott, Lord Mayor, in the chair. There was a large attendance, including, among many others, Earl Fortescue, Sir William Jenner, Mr. Erichsen, F.R.S. (President of the Royal College of Surgeons), Sir Joseph Fayrer, Mr. Sheriff Bayley, Mr. Erasmus Wilson, Mr. George Palmer, M.P., Mr. Edwin Chadwick, C.B., Mr. Horace Jones (City Architect), the Master of the Clothworkers' Company, Mr. R. Rawlinson, Mr. Chatfeild Clarke, Mr. H. H. Statham, Miss Muller and Miss Richardson (members of the London School Board), Dr. Wilson Fox, Mr. Berkeley Hill, Dr. G. V. Poore, Dr. Corfield, Mr. Talfourd Ely, Mr. Mark Judge, &c.

The Lord Mayor, in opening the proceedings, expressed the great pleasure it gave him to allow the meeting to be held in the Mansion House, and to be the means of introducing an institution of such value and importance to the notice of the citizens of London.

An astounding list of letters from well-known and eminent persons was read, expressing regret that they were unable to be present on that occasion, and all expressing deep concern in the maintenance of the Institution. From amongst these we would especially notice one from the President of the Royal Institute of British Architects, Mr. Whichcord, desiring it should be understood that the Institute felt the deepest interest in all institutions tending to spread abroad the truths of sanitary science.

Dr. G. V. Poore, hon. sec., then read the following report of the executive committee:—

"The Parkes Museum was formally opened to the public on the 28th of June, 1879, by the Right Hon. Sir Richard Cross, M.P., the Home Secretary, who was accompanied on the occasion by other members of the late Government, a large and influential company being present. The Executive Committee are happy to be able to state that the first year of real work so brilliantly inaugurated has been one with which, in many respects, they have a right to feel satisfied. The experience of this first year has taught them that the Museum supplies a real want, and that the efforts which have already been expended in establishing it have not been thrown away. The Museum has been open free to the public on three days in each week, and since the 1st of January, 1880, the number of visitors, of whom a record has been kept, has been 2,166. This result must be regarded as decidedly satisfactory when it is borne in mind that the Museum is situated on the top floor of a building which is somewhat removed from the great centres of traffic, that it is as yet but imperfectly known to the public, and that the Executive Committee have not felt themselves justified in spending any large sum in continuously advertising its existence. They have at least the satisfaction of knowing that the success which has hitherto been attained is solely attributable to the fact that the Museum is found to be useful to a considerable section of the public. During the past winter a series of demonstrations were given on Saturday afternoons by members of the Executive Committee. The first series, by Professor Corfield, Dr. Steele, and the Honorary Secretary, was given for the benefit of members of the Working Men's Club and Institute Union, and comprised the subjects of House Drainage, Ventilation, Lighting and Warming, Food, and the Management of the Sick-room. The second series, by Professor Corfield and Mr. Rogers Field, was given to members of the Institution of Builders' Foremen and Clerks of Works, and comprised the subjects of Ventilation and House Drainage. Both series were numerously attended. Dr. Ralfe, one of the lecturers on Hygiene appointed by the Society for the Extension of University Education, made application for the admission of his class to the Museum, an application which was at once acceded to. Dr. Steele more than once brought a party of nurses from Guy's Hospital and exhibited to them the large collection of apparatus for use in the sick-room which is to be found in the Museum. The Committee are further informed by Dr. Corfield, the Professor of Hygiene at University College, that the Museum has been of great service to him in imparting a practical knowledge of sanitary science to his class. His Cantor Lectures, also, at the Society of Arts, were largely illustrated by articles borrowed from the Museum. Thus it will be seen that the institution has been made use of not only by the casual visitor, but also for the purpose of affording systematic instruction to persons who are peculiarly interested in special subjects. The Committee wish it to be understood that they will gladly entertain applications from persons engaged in tuition who may wish to bring their pupils to the Museum for the purpose of practical instruction. Her Majesty the Queen, our patron and a munificent contributor, has been graciously pleased to accept a copy of the first edition of the illustrated catalogue, as has also His Royal Highness Prince Leopold. A considerable amount of encouraging support has been afforded to the Museum during the past year. His Grace the Duke of Northumberland, the President of the Sanitary Institute of Great Britain, honoured the inaugural meeting with his presence, and spoke most approvingly of the objects of the Museum; and the Baroness Burdett-Coutts has lent us the weight of her great influence by becoming a patron. The Clothworkers' Company have made a second donation of fifty guineas, and the Company of Drapers have given a similar amount, while the Merchant Taylors' Company have given ten guineas. The Committee trust that the generous example of these worshipful companies may be followed by others of the ancient City guilds and the wealthy citizens of London, and that a recognition will be made of the fact that sanitary science is, of all sciences, the one in which technical instruction is most needed, and that a thoroughly practical knowledge of the laws of health must inevitably increase the welfare, the prosperity, and the happiness of this great country. The different sections of the Museum have been considerably enriched during the past year. Contributions to the library continue to be made by the various departments of the Government which take cognisance of sanitary matters. The National Board of Health of the United States of America has undertaken to furnish the Museum with its weekly bulletin, and the President and Council of the Epidemiological Society have presented upwards of 200 volumes of books, some of which are of great interest and value. The Food Collection is still receiving the thought and attention of Mr. Twining, of Twickenham, and the Committee have been glad to leave the arrangement of this section entirely in the hands of that gentleman, whose knowledge of the subject and whose genius for organisation are a sufficient guarantee that, when completed, the food collection of the Parkes Museum will leave nothing to be desired. The Museum of Economic Botany at Kew has sent nearly 1,000 specimens of food products of great value, all of which will be utilised by Mr. Twining in his arrangement. The sections of Architecture, Engineering, Furnishing, Preservation, and Relief have all steadily increased in size during the past year, the only section of the Museum which has shown no tendency to expend being that devoted to Clothing, notwithstanding that the subject, in our variable and often trying climate, is one of prime importance. No changes have taken place in the executive staff during the year, excepting the resignation by Dr. Gowers of the post of Joint Honorary Secretary; but as he still retains his seat at the Committee, the Museum will not be deprived of his valuable advice and aid. Although the area which the Museum at present occupies is considerable, the Committee are beginning to feel that the space is too small, and must at no great distance of time become altogether inadequate. On the other hand, the calls upon the space in University College are so numerous that evidence is not wanting that the Council of that college will not improbably be obliged to discontinue the hospitality which they have hitherto shown to the Museum, a hospitality which they have always warned us must be temporary, and not permanent. The provision of a new home for the Museum has, it may be said, already become a necessity, and there can be no doubt that the removal of the collection to a building specially designed for it in some central position would prove a great benefit to the Museum and a great boon to the public. The sum required to effect the transference of the Museum from its present temporary home to a permanent and a suitable one will doubtless be large, but the Committee trust that the goodness of their cause and the great utility of their undertaking will commend itself to the philanthropic and the wealthy. Lastly, as to the financial position of the Museum. Since the spring of 1876 to the present time 1,285*l.* has been subscribed. Of this 641*l.* has been expended in museum fittings, in paying the salary of a curator, and in other unavoidable expenditure. 600*l.* has been invested, which yields an income of something less than 24*l.* per annum; and the treasurer has 65*l.* in hand. The Committee wish to dwell upon the fact that the Museum is free in every respect. No charge is made to visitors at any time. No charge is made for space, suitability being the only condition for the acceptance of any object. Thus it will be seen that the Museum is entirely dependent upon voluntary contributions. The Executive Committee are determined that the institution shall remain a true museum, and not become a mere show-room for manufacturers and patentees. To achieve this object, a permanent home for the Museum must be found, and a sufficient sum be provided to meet the annual expenditure. In a building of its own, in a central position, the Museum would be one of the most useful institutions in the metropolis; and, while perpetuating the memory of a man who will always be recognised as one of the great benefactors of the human race, would greatly facilitate the dissemination of a knowledge of the laws of health, so important to all classes and both sexes. The Committee, therefore, confidently appeal to the public for the necessary funds."

The Right Hon. Earl Fortescue then moved,—

"That the first annual report, which has been read, affords conclusive evidence that the Parkes Museum of Hygiene is meeting a great educational want, and is eminently worthy of public support."

In the course of his remarks his lordship observed that after labouring for between thirty and forty years in the cause of sanitary reform, he felt that that cause was worthy of greater zeal and greater sacrifices than he had ever been privileged to make on its behalf, and it was well deserving of the support of every lady and gentleman present, individually and collectively, because it concerned the economical, physical, moral, and religious welfare of the community. Experience had fully shown that dirt, disease, and crime were found to be concurrent. In the cause of sanitary reform, the Museum on behalf of which he was speaking, and which bore the name of a noble and beneficent man who rendered great services scientifically and practically in the promotion of hygiene, was calculated to do great good, for in it were shown and exemplified not only the general laws of sanitation, but the improvements and advances which were made from time to time by the professor of hygiene, and by the engineer, the architect, the surgeon, and the chemist. The lectures and demonstrations given to workmen and students from time to time would gradually tend to a wider dissemination of the laws of health. On these and other grounds he had much pleasure in moving the resolution.

Mr. George Palmer, M.P., in seconding the motion, expressed his gratification in seeing the meeting so largely attended by ladies, for it was unquestionable that the ladies, if acquainted with the laws of health and the principles of sanitary science, could (especially when, as district visitors in connexion with parochial and other organisations, they came much into contact with large masses of the population) do much good in educating the people in the laws of health, and they would be thus greatly facilitating the work of the various sanitary authorities throughout the country.

The President of the Royal College of Surgeons, Mr. Erichsen, F.R.S., in supporting the motion, observed that it had been truly said by Lord Fortescue that a museum such as that which they were assembled to support should be looked upon with a view to the preservation as well as the restoration of health. There was one aspect in which the usefulness of the Museum in aiding in the restoration of health might be looked upon with great hope of benefit, for the Museum was one designed not only for the advantage of the general public, but for the information of managers and surgeons of hospitals and other institutions intended for the cure of disease and the alleviation of physical suffering. It was the undoubted duty of all who had any voice in the management of such institutions to study the laws of health and the appliances whereby health could be preserved to its possessors and restored to those who had,—from accident or other causes,—been for a time deprived of its blessings, with a view to the application in such institutions of those laws and appliances. If there was one point that had been more incontestably estab-

blished than another of late years in surgical practice, it was that the recovery of a wounded person was less dependent upon the surgical skill with which he was treated than upon the hygienic conditions by which he was surrounded whilst under treatment. Indeed, the highest surgical skill might be rendered absolutely nugatory by the absence of proper hygienic conditions. It had been shown beyond the possibility of a doubt that in all large establishments for the reception of wounded people,—whether they were struck down on the battle-field or were the victims of the numerous accidents which occurred in civil life,—that the recovery of the patients was dependent almost entirely upon the hygienic conditions by which they were surrounded subsequently to the receipt of their injuries. There were establishments (happily rare in this country) in which, until within recent periods, it was an exceptional thing for a patient to recover after an amputation; and in one large hospital on the Continent, it was publicly stated six years ago by its surgeon that 80 per cent. of the patients who had undergone surgical operations were killed by pyæmia, gangrene, or some other disease the result of bad hygienic conditions. It was well known that, given certain favouring conditions, what might be called solely "hospital diseases" would be generated within the walls of hospitals, but the generation of such diseases was entirely preventable by the adoption of proper sanitary precautions. It was, therefore, the duty of all who had the control and management of hospitals and kindred establishments to see that the hygienic conditions and sanitary appliances were as perfect as they could be made, for the poor patients themselves had a right to expect that they should not be exposed to danger in the places, above all others, to which they were taken for succour and relief. From the point of view of a surgeon, therefore, he regarded the lessons capable of being taught by and in the Parkes Museum as fraught with incalculable value.

Mr. Erasmus Wilson, F.R.S., also supported the motion at some length, pointing out that such scourges as ringworm were entirely preventable by proper attention to the laws of hygiene.

The motion having been carried unanimously, Professor Berkeley Hill, treasurer, read a list of subscriptions.

Sir William Jenner, F.R.S., moved the following resolution:—

"That the best thanks of this meeting be accorded to the Right Hon. the Lord Mayor for granting the use of the Egyptian Hall for the first public annual meeting of the Parkes Museum, and for having presided on the occasion."

He referred to the history of the formation of the Museum, which was, he observed, established as a memorial of one of the most amiable and self-denying men who had ever lived. Professor Parkes was eminently a lover of his race, and, as was well known, he devoted many of his best years to the subject of hygiene. Those who knew him in life sought to perpetuate his memory in some practical form when he was dead. They loved him too well to require to see his picture before them. Scholarships were suggested, but scholarships, though to some extent useful, would not have accomplished the end in view, and which he, good man, could have wished. So it was ultimately decided to establish a museum which should spread abroad a knowledge of hygiene; but it was felt that merely to get together a collection of appliances and materials without explaining them and expounding the principles on which they were based would be almost useless, and therefore it was decided that part of the scheme of the Museum should be the delivery of lectures to working men not only that *their* homes might be made healthy, but that the homes of those for whom they worked might be healthy. It was too often forgotten that by the neglect of sanitary laws the mansions of the rich might be as unhealthy as some of the cottage-dwellings of the poor. Only a few days ago a lady, desirous of taking a town mansion as a residence for herself and her invalid husband, wisely took the precaution of having it examined by a competent person as to its sanitary condition, with the following results as summarised by her:—

"*One of the Finest Mansions in London.*—The waste-pipes of all the baths descend into the soil-pipe unventilated. The closets are valve-closets in the best parts of the house, but the closet-rooms throughout are unventilated, except in one instance. The main cistern on roof supplies the water-closets and drinking water, and has an overflow-pipe directly connected with the drain."

That, he was sorry to say, was but a type of the sanitary condition of many of the largest houses in London, and it was with a view of remedying such a state of things that the Parkes Museum was established. Now, as Chairman of the Executive Committee, he appealed for funds for carrying on the Museum, and that with increased efficiency and usefulness. He was not pleading for a charity, unless for that charity which should properly begin at home, although it should not end there,—for sanitary science would benefit everybody who chose to profit by its teachings. It was through the violation of sanitary laws that so many people were continually liable to complaints and disorders, which, while not absolutely incapacitating them for work, subjected them to chronic out-of-healthiness. The breathing of foul air was one great predisposing cause of such unhealthiness, and the Parkes Museum would teach those who cared to learn how foul air might be avoided. The great bulk of the workmen engaged in plumbing and other work connected with house-building were, he believed, anxious to do their work well and in such a way as to conduce to the health of the public, but, unfortunately, they were too often sadly ill-informed in the principles of sanitation, and did their work unthinkingly according to the old methods. Having cited from his own experience one or two instances of the ignorance and carelessness of sanitary laws shown by plumbers, and condemning the lead D-trap as a "Double D" trap,—"a disseminator of disease and a dealer-out of death,"—Sir William appealed to the wealthy citizens of London,—for their own health's sake as well as for the sake of the health of others,—to support the Parkes Museum of Hygiene in a manner commensurate with its great claims.

Mr. George Godwin said he had much pleasure in seconding the resolution, thanking, as it did, the Lord Mayor for the readiness with which on the present, as on numberless other occasions, he had hastened to do good. The present mayoralty,—as all who had had occasion to watch it knew,—had been a brilliant one, and the record of the meeting which was then assembled would certainly not be the least interesting item in the history of it. Assuming for a moment that the public had now, thanks to the labours of a small band of men, —several of whom were upon that platform, Mr. Chadwick, Mr. Robert Rawlinson, Lord Ebrington that was, and Lord Fortescue that is,—arrived at such a state of mind as to see the advantage of healthy homes, they would naturally ask how they were to obtain them, and what they ought to be. These questions would be answered by study of the contents of the Parkes Museum of Hygiene. And this might be expected to remove some of the ignorance which had existed, and did exist, as shown in the want of ventilation in our houses, want of knowledge of the best means of providing it; the state of the drains, and the execution of the plumbing-work. He had a house in his mind at that moment, a house of 400*l.* a year, wherein the soil-pipe was full of holes, admitting sewer-gas to the rooms, and so placed that this could not be remedied without an amount of destruction that deterred the owner from attempting it. The waste of water, again, and of gas, through want of knowledge, was immense. Quite lately, in the small town of Penzance, by simply inspecting and revising some of the details of the taps and other water fittings, 100,000 gallons of water per day had been saved,—and that in a portion only of the town,—without any diminution in the supply to the inhabitants. Then, again, the Parkes Museum was likely to be instrumental in dispelling some of the ignorance which had lately resulted, and would continue to result, in gas explosions. How could we wonder that gas explosions occurred when it was found that, at the inquest on the men killed by the Tottenham-court-road disaster, the foreman of the men declared on oath that he had not the slightest idea that a compound of atmospheric air and coal-gas would produce an explosive mixture? The moral of all that had been said was that the public and the Government were bound to aid such an establishment as the Parkes Museum of Hygiene. The disadvantages under which the Museum at present suffered must be removed. It was necessary that it should have a habitation of its own, centrally situate, and easily accessible by being on the ground floor, and to which every patentee and inventor of sanitary appliances and materials should be invited to lend, if not to give, his productions, and so aid in getting rid of the ignorance which was the mother of disease and death.

Sir Joseph Fayrer, in supporting the motion, said it was gratifying to see that the principles of sanitary science were now taught in our medical schools and at our universities.

The motion having been carried by acclamation,

The Lord Mayor, in reply, said he felt he had done right in acceding to the request that he should allow the meeting to be held in the Mansion House, and he hoped that the result of it would be to establish the Parkes Museum so firmly in public favour that it would soon be housed in a building not only its own, but one worthy of its object.

We may, perhaps, usefully add that the Museum is open free on Tuesdays, Thursdays, and Saturdays, from ten to two.

THE NATIONAL ASSOCIATION OF MASTER BUILDERS.

THE half-yearly meeting of the National Association of Master Builders of Great Britain commenced in Bristol on Tuesday last, and was attended by from 140 to 150 delegates from all parts of the kingdom. The chair was taken by Mr. Stanley G. Bird, of London, in the absence of Mr. Thomas Clay, of Manchester, the president. The following were the delegates appointed to attend the meeting:—

Manchester—Thomas Clay, William Southern, Robert Neill, jun., John Elms, Geo. Napier, Thomas Darnborough, Wm. Clark. Croydon—C. Bowyer, J. W. Hobbs. Leeds—Wm. Nicholson, C. Myers, E. Wray. Liverpool—Edwd. Hughes, Wm. Callaghan, William Litt, J. C. White (president), Jas. Leslie and John Wannop (vice-presidents), Chas. Tomkinson (treasurer). Liverpool Builders' and Property Owners' Association—Jas. Thomas, Robt. H. Bullin, Owen Owens (secretary). London—Stanley G. Bird, J. Coles, G. H. Trollope. Crewe—A. P. Cotterill, James Woods, Joseph Latham.—Matthews. St. Helens—Wm. Harris, Wm. Belshaw. Birmingham—W. H. Parton, C. W. Barker, Walter Clulee (secretary). Wakefield—Fawcett John Summers. Leicester—S. Barfield, E. B. Piper, Thomas Mason. Lancaster—Christopher Baynes, Charles Calvert, John Kitchen. Nottingham—Robert Bennett. Warrington—William Gibson. Wolverhampton—G. Higham, H. E. Barnado (secretary). Wigan—C. B. Holmes, Wm. Winnard, A. Wigans. Huddersfield—Wm. Radcliffe, Samuel Sykes. Lincoln—Wm. Sims, Wm. Kirk, H. S. Close. Widnes—Jas. W. Carlisle, Jonas Foster, W. H. Kershaw. Derby—J. Walker, S. Tukler. Kidderminster—B. Thompson, Thos. Vale. Bolton—Mr. Dickinson, Mr. Cuerdon, Mr. Radcliffe. Bradford—John Beanland. Edinburgh—John Sutherland, Thos. Bonnor. Glasgow—Robert Anderson. Dundee—Alex. Mackay. Walsall—James Rowley, James Adkins. Hull—A. W. Stanley, R. Bever, Richard Hodson, W. Knox (secretary). Doncaster—Wm. Johnson, John Ashton. Warrington—R. W. Collin, John E. Wright. Bradford—Wm. Moulson, Wm. Holdsworth. Walsall—Moore, Alfred Lynesse. Worcester—J. S. Wood (chairman), John Kendrick (vice-chairman), John Grisman.

The following Bristol members also attended:—

Messrs. John Thorn, J. Eastabrook, J. Perkins, A. Krauss, J. Wilkins, W. Church, G. Humphreys, W. H. Phillips, G. S. Nipper, Thos. R. Lewis, C. H. Foley, S. Robertson, J. R. Shorland, W. R. Thomas, and W. Benson (solicitor). The Mayor (Mr. H. Taylor) was also amongst those present.

At the commencement of the proceedings on Tuesday, the Chairman said he very much regretted having to take the chair, and he was quite sure they would agree with him when he mentioned that it was owing to the illness of the President, Mr. Clay. Their President came to Bristol intending to take part in the business of the meeting, but he had been taken suddenly ill. Before commencing the proceedings he begged to tender to the Mayor of Bristol their thanks for the kindly welcome given by the city of Bristol to the association.

The Mayor, who was received with applause, said he had great pleasure in being present and in giving the association a hearty welcome to Bristol. He was very glad to see them, more particularly as they were engaged in a business with which he was to some extent connected. He regretted the absence of the President, and hoped that their proceedings would not suffer in consequence. He need hardly dilate upon the necessity and importance of such a society. They found labour combining for its own ends, and it was necessary for the employers to combine also for their own protection. The objects of the society were good, and he trusted that the association would continue for many years.

The Secretary (Mr. Knox) read the minutes of the last meeting at Sheffield, and then the report of the Council. They had obtained particulars from ninety-eight of the principal towns of the kingdom with reference to the rate of wages paid. The depression of trade still con-

tinued, and the large supply of labour had a tendency to bring down prices. In Bristol many men were to be obtained at less than the recognised rate. The Council recommended, as regarded apprentices, that the employers should put themselves into communication with the masters of schools in their respective districts, with the view of obtaining boys of good education, as that would be the means of raising the standard of the operatives in the building trade. The Council had taken action with reference to the liability of employers for injuries caused to their workpeople by negligence, and many amendments had been proposed to the Bill. The Council hoped that if the Bill were carried the amendments would be adopted. The finances were in a satisfactory condition. There was a balance in favour of the association of 329*l.* 8s. 10d.

The report and accounts were adopted.

It was resolved that the next meeting should be held at Manchester.

A discussion took place as to the liability of builders to pay for the use of roads, and it was pointed out that it was only in cases of extraordinary use that they were called on to pay.

Mr. Hatherley considered it was but fair that if they used a road more than in the ordinary way they should pay for it.

The Chairman then introduced the subject of the Employers' Liability Bill. He said the Government adopted Mr. Brassey's Bill, and, like much of the legislation that had gone on lately, there was a good deal of slap-dash about it. Mr. Cladstone found that the Bill was quite impracticable, that it was not a fair Bill, and that he could not carry it. He, therefore, withdrew the Bill and took it into a committee of the House. The Government then re-considered the matter, and brought in a second Bill, and it was called the Employers' Liability Bill, as amended in committee. He read the Bill, and pointed out that the principal and important clause was the following, making an employer liable,—

"By reason of the negligence of any person in the service of the employer to whose orders or directions the workman at the time of the injury was bound to conform or did conform; or by reason of the act or omission of any person in the service of the employer done or made in obedience to the rules or bye-laws of the employer, or in obedience to particular instructions given by any person delegated with the authority of the employer in that behalf."

The builders had a great many objections to the Bill. It really made them liable for the acts of one-fourth of the men in their employ, and in some trades for those of every other man. There were various amendments proposed, and they hoped to be able to carry some of them, so as to make the Bill more fair. They hoped to get the insurance clause passed, although there would be very great difficulty in working it as far as the builders were concerned. It would cut the ground from under the feet of the trade unions; for although they ostensibly obtained their funds for sick benefit, they used them for the purposes of strikes. He hoped they would limit the liability to 150*l.* At present they would be liable to the extent of 300*l.* The Council would watch the progress of the Bill.

Mr. Leslie thought the liability should be reduced to 100*l.* He moved a vote of thanks to the Council for their action in the matter. The motion was carried unanimously.

Mr. E. Hughes, of Liverpool, read a paper on the measurement of work and the mode of taking out quantities. A vote of thanks was passed to him.

In the evening the Mayor entertained the members of the society at dinner in the Mansion House.

On Wednesday the members visited Chepstow and Tintern Abbey.

Lincoln.—The new Wesleyan Mission Chapel, at the corner of Derby-street, St. Catherine's, Lincoln, has been opened. Mr. Charles Bell, of London, is the architect. The trustees have decided to confine themselves for the present to the adoption of a portion of the plans, viz., that for the school, and to use the building for religious services, as well as Sunday-school work proper, until the entire block of buildings is completed. The building, the contract for which was entrusted to Messrs. Cowan & Lansdown, builders, Lincoln, contains a large room, 46 ft. by 34 ft., with four class-rooms. The cost of this building, including land, has been about 1,200*l.*

FEDERATION OF BUILDING TRADE EMPLOYÉS.

ATTEMPTS have been made on several occasions during the past few years to federate the whole of the trade unions of the United Kingdom, but each attempt has failed. The cause of these failures is mainly to be ascribed to the diversity of interest and customs existing in the many and varied branches of industry which form the trade-union movement in the country. It would now appear that there is a prospect of successful federation in the several branches of the building trade. A conference, which had been sitting for four days at the office of the Bricklayers' Society in Stamford-street, London, closed its deliberations on Friday, the 23rd inst. It was attended by representatives from the Almalgamated Carpenters and Joiners, the National Association of Plasterers, the London District Association of Plasterers, the House Decorators and Painters, and the Operative Bricklayers' Society. It is reported that the masons will shortly join the movement. It is understood that the contribution will be about 6d. per annum per member, with 1s. per member entrance-fee. The following is the preamble agreed to before the Conference closed its sitting:—

1. That the objects of this Federation shall be to promote a knowledge of the principles and advantages of trade unionism amongst the operatives engaged in the building trades.

2. To secure unity of action amongst the organisations established in the building trades.

3. To endeavour to obtain, as far as is practicable, in each town or city a uniformity of working-hours in the different trades.

4 To render assistance to any trade in the Federation desirous of resisting an aggression on the part of their employers, or of endeavouring to improve their social position.

Name of Federation.—The National Federation of Building Trade Associations.

A sub-committee was appointed to inquire into and report upon the most desirable place for central offices and other details connected with the organisation.

THE NEW BOOTLE DOCKS.

THE new Bootle Docks are likely to be completed and opened at the close of the current year. The works were commenced in October of 1873. The scheme, of which we get particulars from the *Bootle Times*, consisted of an enlargement and alteration to the form of the present Canada Basin, with a double entrance, 65 ft. wide, on its north side, leading into a half-tide dock of 18 acres. This dock is formed somewhat in the shape of the letter L, and from its eastern extremity, or the top of the letter, there runs a branch dock of three acres, and two graving-docks of 950 ft. in length each. These are sub-divided by intermediate gates into lengths of 500 ft. and 450 ft. respectively, and are provided with powerful pumping machinery of the turbine type. This half-tide dock also communicates, by means of a passage 50 ft. in width, with the Brocklebank Dock. In its north-west angle a double passage, 60 ft. in width, leads into the steam-dock, that is to say, a dock suitable for the largest class of steamers which frequent this port. The form of this dock is somewhat peculiar, the design being particularly adapted to the trade in question, which requires a minimum of water-space combined with a maximum of quayage. The main body of the dock, 1,600 ft. in length and 500 ft. in width, runs parallel to the river, and at right angles to this portion run three branches in an inland or easterly direction, averaging about 1,350 ft. in length by 300 ft. in width. The total area of the dock, with its branches, is 13 acres, and the lineal quayage is equal to 11,000 ft. All the quays of this dock will be flanked by sheds 95 ft. in width, and on the west quay of the half-tide dock, called the Langton Dock, there is a shed 1,200 ft. in length and 80 ft. in width, as well as one of 900 ft. in length and 95 ft. span, which is now being erected on the north quay of the Langton Branch. On the north side of, and leading out of the Steam Dock by a passage 50 ft. wide, is another dock of 18 acres, capable of affording accommodation to any trade which it may be found desirable to locate there. As yet, however, little beyond the formation of the passage by which it is entered has been done towards its construction. The most interesting features in the design and construction of these works are doubtless connected with the construction of the main entrances and the alterations to, and extension of, the Canada Basin. In order to maintain the approaches and the sills of these entrances free from the silty matter with which the waters of the Mersey are heavily laden, a gigantic system of sluicing has been carried out, which presents many entirely novel features, and is probably quite unique in the history of hydraulic engineering. As an instance of its magnitude, the dimensions of the feeding culverts may be mentioned. The largest of these are 15 ft. by 13 ft., and 12 ft. by 12 ft., while at a level of 15 ft. below the level of low water of spring-tides as many as four lines of pipes, 3 ft. in diameter, have been laid, which will enable the sluicing-power to be brought to bear on all portions of the basin, no matter how distant from the side walls. This work can only be carried on at low water of spring tides, and the great depths at which the work has to be laid, as well as its inconvenient position, naturally makes it very costly and tedious. For the last two years or more, the night tide work in connexion with this basin has been carried on by the aid of the electric light, and eight powerful lamps, giving an aggregate illuminating power equal to 48,000 candles, are now used with the most advantageous results. The available depth of water in the main entrances and principal passages between the various docks on high water of a spring-tide will be 33 ft. The aggregate area of the water-space comprised in the scheme is 82 acres, and the total lineal quayage is equal to 20,000 ft. The Parliamentary estimate for the scheme was 2,691,000*l.* The water was admitted into the Langton Half-tide Dock and branch early in March, 1879, and the Langton Graving Docks were formally opened to the public a fortnight ago, and it is intended to open the remainder of the work, with the exception of the dock to the extreme north, by the end of the present year. An idea of the magnitude of this undertaking may be derived from the following statistics of the excavations involved and materials employed in the construction of the works. Over 4½ million cubic yards of material have been excavated, and 450,000 tons of gravel or shingle, 75,000 tons of Portland cement employed in the concrete work, and 6½ millions of bricks used in the erection of the sheds and other buildings.

The works have been carried out by the Mersey Docks and Harbour Board's experienced engineer-in-chief, Mr. G. F. Lyster.

REBUILDING AND REPAIR OF METROPOLITAN BRIDGES.

APPOINTMENT OF AN ASSISTANT-ENGINEER.

At the meeting of the Metropolitan Board of Works on the 23rd inst., an important report from the Engineer, Sir Joseph Bazalgette, was submitted as to the works which are, in his judgment, urgently necessary for the repair and maintenance of the bridges vested in the Board under the Metropolitan Toll Bridges Act, 1877. The first recommendation was that the necessary works for deepening the foundations of Waterloo Bridge be forthwith carried out as recommended in the report of the engineer, at an estimated cost of 40,000*l.*; that notice be sent the Thames Conservators that the Board are about to execute the proposed works, and that a sketch-plan of the same be forwarded to the Conservators.

Mr. Selway, the chairman of the Bridges Committee, in moving that this be adopted, said it was pointed out by their own and other engineers, when negotiations were going on for the purchase of Waterloo Bridge, that the foundations of the piers had been weakened by the scour of the river. At the present moment no damage had occurred to the structure, but should the foundations not be attended to, and a settlement take place, nothing could restore it, and a permanent disfigurement of that noble structure would be the result. The evil was going on day by day, and the state of the piers would get worse, therefore the sooner something was done the better. The Board was now asked only to authorise the committee to take the necessary preliminary steps.

The report was adopted.

The next recommendation of the committee was that application be made to Parliament in the next session for powers to enable the Board to deepen the channel and enlarge the span of Vauxhall Bridge, at an estimated cost of 45,000*l.*

Mr. Selway explained that the piers of the

idge were weak, and the openings narrow: a tide was very strong at times, and accidents ere liable to occur.

The recommendation was agreed to.

The next item in the report was a recommendation that application be made to Parliament the next session for powers to rebuild Battersea Bridge, at an estimated cost of 250,000*l.*

Mr. Selway said he assumed every member of e Board was acquaintad with Battersea idge. It was a timber bridge, a narrow idge, and (he thought a voice said) a disaceful bridga. It had been patched up many ues, and the piles in the ground were no doubt ore or less decayed. It was absolntely necesry to have a proper bridge and suitable proaches.

Mr. Elt said that when he read the whole port of the committee, and found it was proaed to expend sums that would amount to mething like three-quarters of a million, it most took his breath away. He thought when e ratepayers knew of the proposition, their y of having free bridges would be somewhat mped. The question was, Was it necessary have these works carriad ont? Would the idges have been repaired to such an extent, rebuilt, had the Board not purchased them? e agreed that something was necessary to be ue to Waterloo and Vauxhall bridges, but he uld not see the necessity for the other prosed works.

Mr. Richardson pointed out that, according the Act of Parliament, it was the duty of the oard to maintain the bridges.

Mr. Munro supported the report most cordially, ough the district he represented (the East of ndon) possessed no bridge accommodation natever. The freeing of the bridges had imsed upon his ratepaying constituants a rate of . in tha pound, but that they cheerfully paid r tha good of the metropolis. Perhaps the oard might think he was speaking with a sense favours to come. Possibly he was, but not r a year or so. When he did come to the oard, he hoped it would be remembered how e East End of London had approved of the ridges Committee's reports.

Mr. Freeman observad that the Board had at esent no power to build bridges, and all they kad to do now was to obtain that power from rliament.

The report was then adopted.

The next recommendation was, that applicaon ba made to Parliament in the next Session r powers to enable the Board to rebuild utney Bridge, and improve the approaches ereto, at an estimated cost of 300,000*l.*

Mr. Selway pointed ont that the bridga was iginally built, according to the little book ritten hy Mr. T. E. Jones [and lately noticed the *Builder*], clerk to the Fulham District oard, to allow the King a short out to Richond; but now both aides of the river were owded with houses, so that a better bridge as necessary.

Mr. Lammin pointed out that, at the earliest, new bridge could not be construoted till 1882, it he would say that since the present bridge ad been freed, the traffic had increased enorously, the omnihnses and all kinds of vehioles assing over it; therefore the traffic was very reat, and the wear and tear would necessitate considerable annual expense.

The report was adopted.

The following other recommendations of the ridges Committee were adopted without dission:—

That works of repair and painting be done to andsworth Bridge at an estimated cost of 000*l.*, the whole of the works to be included one contract, and that an advertisement be ued inviting tenders for the execution of the orks, such tenders to be opened at the last eeting of the Board before the recess.

That application be made to Parliament in e next session for powers to enable the Board rebuild Deptford-creek Bridge, at an estiated cost of 20,000*l.*

That the necessary repairs to the supports of e roadway of Deptford-creek Bridge be forthith carried out nnder a general contract at cost not exceeding 200*l.*

The Bridges Committee also reported on the ference hy the Board of the 9th of July, 1880 o. 13), relative to the steps to he taken for rrying out the order of the Board as to the ppointment of a person to act under the Engier, to superintend the work that may be cessary to repair and maintain the bridges nder the control of the Board; and recommending that Mr. Edward Bazalgette, assistant in the Engineer's department, be appointed, during the pleasure of the Board, as assistant engineer for metropolitan bridges over the Thames and its tributaries under the control of tha Board, at a salary of 500*l.* per annum.

The recommendation was adopted.

CYPRUS.

SINCE Cyprus ceased to be a battle-field for party warfare little has been said about it, and tha general public take little or no interest in the matter. We have before us tha first report of her Majesty's High Commissioner, Major-General Biddulph, with various subsidiary raports, whioh all appear to ahow satisfactory progresa. We condense a few observations from the first named:—

During the twelve months which succeeded tha British occupation the rainfall in the great central plain, called the Messaria, was very small, and certainly did not exceed 6 in. The consequence was that tha wheat and barley harvest of 1879 was exceedingly short. The prospects were so bad in the spring that the people held their corn, and large quantities were imported from foreign parts. The importance of an adequate rainfall in the Messaria may he shown hy the fact that whereas tha tithes of 1878 were sold for T.£. 82,000, over T.£. 42,000 of this sum was paid for the tithes of the five nahiehs, which are situated in the plain, leaving only T.£. 40,000 as the price of the eleven remaining nahiehs. During 1879 the tithes of Papho have largely exceeded the yield of the previous year, and the abnormal yield of carobs has removed all distress from the Limassol district; hut notwithstanding this increase, the failure of the crops in the Messaria has caused the total net yield to fall to T.£. 45,000. This fact shows the importance of a good water supply; and when it is considered that irrigated land bears two crops annually, whereas non-irrigated land is only cultivated alternate years, and even then often fails, it cannot be doubted that a good system of irrigation would at least treble the production of the corn and cotton-growing lands.

In those places where thara are perennial streams, the water is a frequent source of quarrelling and litigation amongst the people. Those who dwell near the source have no remorse as to wasting it, and thus curtailing the supply to those who live lower down. Very little attempt is made to store the rainfall in tanks, and where thera is no natural source of water, no great effort has been made to supply the want by digging wells, except in tha neighbourhood of villages for the personal wants of the inhabitants and the use of thair gardens. Captain Inglis'a report shows the necessity of something being done in the Famagusta district, where, at some seasons, the crops are destroyed hy too much water, and at others hy the want of it. It is a matter which is beset by considerable engineering difficulties; it is hoped that we shall he able to procure a scheme for overcoming them, by which not only will the prosperity of the people be increased, but also the health of the district he improved.

The failure of the harvest has caused great demand to be made for seed corn, and over 6,000*l.* have been spent by the Government for that purpose. It was the custom of the Turkish Government to lend seed corn to the people when needed, and they did it from the stores of tithe corn which they had collected. It may be doubted whether the policy of purchasing corn for that purpose is a good one, and whether it would not be better to meet the wants of those who are really needy, by remitting a portion of the taxes due from them, leaving them to use the money in the purchase of seed in the open market. But the question is an exceedingly difficult one.

The planting and preservation of trees has engaged the attention and care of this Government. Great pains have been taken to plant the eucalyptus, and considerable expense incurred for the purpose both hy fencing it to preserve it from cattle, and owing to the necessity of its being constantly watered for the first two years. A large plantation at Famagusta has been entirely destroyed during the last few days by the excessive cold, which for intensity and duration has been unequalled at that place during the last forty years. With a view to encourage the importation of timber, and to save as much as possible the remaining forests, the import duties on all timber, whether manufactured or otherwise, and on all fuel of every description, has been entirely removed.

A considerable increase in the prosperity of the country may be anticipated from the opening up of roads. Upon our arrival here there was only one carriageable road in tha island, viz., from Larnaca to Nicosia. No cart could pass from the central plain over the southern range of mountains by any other route, and none could pass at all over the northern range. A number of roads have been made fit for carts to travel on during the year 1879. A very great improvement in tha wine may be looked for when the manufacturers cease to put it into tarred skins to convey it to the place of export; and the use of barrels will become practicable when roads are made. Tha road-making has also afforded much employment to the population; and I am informed that the poorer classes are much better off than formerly. The number of summonses for small debts has certainly greatly decreased in the courts; at the rate of no less than 40 per cent. in the Nicosia district during the last six months, notwithstanding the had harvest.

The state of education in Cyprus must be considered to be at a low standard if judged by modern ideas. Tha majority of the agricultural population have received little or no education. In many villages not a single person can read or write, and the education of the women is almost entirely neglected. School statistics are being collected, and I hope shortly to be able to submit a report on this important subject. Meanwhile a great desire has been expressed hy the inhabitants, both Christian and Mahometan, of the larger towns that the English Government should aid them in establishing good schools, and especially that the English language should be taught in them.

It is satisfactory to be able to say that the year 1879 has been extremely healthy. So much has been said and written with regard to the climate that it is only necessary to say that the year 1878 was, hy all accounts, exceptionally unhealthy both to the English and to the natives of tha island. The year 1879 was just the reverse, and although the more plentiful rain of the present winter augurs well for the harvest of 1880, the inhabitants confidently affirm that an abundant harvest will not this year be accompanied, as it often is, by an unhealthy season, as the extreme and unusual cold, such as has been experienced this winter, has always in previous cases been the forerunner of a healthy summer.

The Public Works Department has been entirely managed hy officers of tha Royal Engineers, and they have laboured hard at the necessary works, often with a very inadequate staff to assist them.

A Report hy Lieut. Sinclair on the Public Works executed in the district of Larnaca gives some interesting information. After describing what has been done, the Report says,—

"New roads, the most important of engineering works, have already been mentioned. Next to them ranks irrigation. Any money spent on the execution of lines of wells for this purpose would be well repaid, but this is a matter for private rather than Government enterprise. The condition of the aqueduct supplying Larnaca with water has attracted serious attention. The aqueduct is at present thoroughly out of repair, and the water polluted before being delivered in the town. A scheme for remedying this great defect has been prepared, and the cost (3,000*l.*) provided for hy the municipality of Larnaca; but unfortunately the rights vested in the heirs of the Pasha, who gave the aqueduct to the town, subject to certain restriction, have hitherto prevented the execution of this urgently needed work. The supply of water at the source is abundant and pure.

With regard to the general execution of public works in the district, it may he remarked that while some serious difficulties exist, there are other points which offer advantages not often to he met with. One difficulty and source of the expense is the want of tools and stores. Skilled labour would also have been difficult to obtain had not a large invasion of Maltese carpenters, smiths, masons, &c., occurred simultaneously with that of the English troops. Where roads do not exist, and the tracks are rough and steep, transport is a very costly item of expenditure. Donkeys, mules, hullocks, and camels of excellent quality, and in large numbers are, however, always forthcoming, and perform prodigies of strength and endurance. Wood is

very scarce and expensive, and its place in building is largely supplied by stone arches, in the construction of which the native masons are well skilled. Another difficulty, most serious to the engineer, is the total absence of any heavy rainfall since 1877. Engineering works, for want of experience of the possible rainfall and its action, have been reduced to works of theoretical calculation, where they should be the result of practical experience. The great advantage which we have in the execution of works in this country is the hardy, docile, and enduring qualities of the peasantry. Though at first lazy and dilatory, from their ancestral habits, they soon changed into diligent and active workmen, as they became accustomed to the use of pick and shovel, and the energetic superintendence of English overseers. They now accomplish a good day's task of nine working hours, in a manner that would put to the blush many an English navvy, subsisting almost entirely on black bread, olives, fruit, onions, and water, and perfectly content to work; the men at 9d. to 1s.; women (who are most industrious and hardy) at 9d.; and boys at 6d. Skilled native labour (masons and carpenters) may be had at 2s. to 3s. per diem. Maltese carpenters, masons, and smiths at 4s. A pony or mule can be hired at 2s. 6d. a day, a donkey at 1s. 6d. (with attendant), and a pair of bullocks, with a strong Arab or country cart, at 3s. 6d. These facilities have enabled me to perform large movements of earth (to give an example of the relative cost of work here and in England) at an average cost of 4¼d. per cubic yard, which in England would cost, worked in the same manner, 1s. 9d."

SUN SYMBOLS.

A PAPER on "The Indian Swastika and its Western Counterparts," by Mr. Edward Thomas, F.R.S., has been reprinted in pamphlet form from the *Numismatic Chronicle*, and will be found interesting. Mr. Thomas says so many learned and enthusiastic scholars have attempted in times past to explain the origin and purport of the so-termed Mystic Cross, the counterpart of the Indian *Swastika* that it is with some diffidence that he now ventures to propose a more simple and less enigmatical solution of this much-discussed problem. As far as he has been able to trace or connect the various manifestations of this emblem, they one and all resolve themselves into the primitive conception of solar motion, which was intuitively associated with the rolling or wheel-like projection of the sun through the upper or visible arc of the heavens, as understood and accepted in the crude astronomy of the ancients. The earliest phase of astronomical science we are at present in a position to refer to, with the still extant aid of indigenous diagrams, is the Chaldæan. The representation of the sun in this system commences with a simple ring or outline circle, which is speedily advanced towards the impression of onward revolving motion by the insertion of a cross or four wheel-like spokes within the circumference of the normal ring. These crosshars are subsequently elaborated into new patterns and delineations, which will be noticed afterwards. As the original Chaldæan emblem of the sun was typified by a single ring, so the Indian mind adopted a similar definition, which remains to this day as the ostensible device or caste-mark of the modern *Sauras*, or sun-worshippers. The tendency of devotional exercises in India, indeed, seems from the first to have lain in the direction of mystic diagrams and crypto symbols, rather than in the production of personified statues of the gods, in which it must be confessed that, unlike the Greeks, the Hindus did not attain a very high style of art.

Mr. Thomas gives two plates of examples showing the development of the idea, and without reproducing these it is scarcely possible to give a complete account of his views. There are abundant examples of the primitive belief in the three positions of the sun: almost all the old pillars at Amarávati are ornamented with a triple *lotus* pattern, consisting of a semicircle or half-flower at the foot, in its uprising stage, succeeded by a central front-face flower, in the full maturity of the sun's emblem, surmounted on the capital by a duplicate half-flower reversed, the upper semicircle being omitted, which seems to denote the subsiding sun. In these instances, too, we find a remarkable exemplification of the hesitating or delayed disappearance of the after-glow in a pillar of a similar character in the Nassik caves, copied by Mr. West, where the fading light of the sun is exhibited in the form of a secondary or *retreated* repetition of the outline of the half-circle above the normal definition of the setting sun. One section of plate ii. is devoted to reproductions of Chaldæan and Assyrian forms of the sun, in order to exhibit their identities and contrasts with the symbols of the Indian system. Mr. Thomas has evidently devoted much time and learning to the investigation.

ART-UNION OF LONDON.

THE following are the remaining works selected by the principal prizeholders:—

From the Royal Academy.—In a Welsh Valley, F. W. Hulme, 150*l.*; Drawing Beer for the Gamekeeper, E. Opie, 60*l.*; A Hop-garden, A. Verey, 50*l.*; Rhu More, Loch Alsh, Ross-shire, J. Nesbit, 45*l.*; A River Scene in North Wales, G. Wells, 45*l.*; The Firstling of the Flock, E. Newman Dowsard, 40*l.*; The Abbot's House, Malmesbury, F. H. Eastwood, 40*l.*; The Limpid Stream, A. De Breanski, 35*l.*; Edge of the Marsh, W. J. Slater, 30*l.*; Summer in Kent, J. L. Picksring, 21*l.*; Written Love, T. B. Kennington, 20*l.*

From the Society of British Artists.—Stitching Time, C. A. Smith, 45*l.*; Rivals, J. C. Waite, 45*l.*; In the Tyrol, Early Morning, W. Telbin, 42*l.*; A Misty Day, Birnam Beeches, H. Caffieri, 35*l.*; Just Caught, Thos. Earl, 30*l.*; A Frosty Day, near Shiplake Lock, on the Thames, W. Gosling, 30*l.*; An English Pastoral, A. Paulton, 30*l.*; Fading Light, A. F. Grace, 25*l.*; Fading Day, Jno. Bromley, 20*l.*; Holly Bushes, Burnham, Bucks, H. Caffieri, 20*l.*; Waning Day, J. E. Grace, 20*l.*; Summer (marhls hnst), F. Junck, 20*l.*; Pasture Land, Essex, W. Luker, 20*l.*; "Begone, Dull Care," D. Passmore, 20*l.*; On the Edge of the Common, B. D. Symond, 20*l.*; St. Giovanni Paolo, Venice, Alfred Pollentine, 15*l.* 15*s.*; The Lyc Rock, Tintagel, Cornwall, A. B. Collier, 15*l.*; "The Lesson," Miss E. Gilbert. 15*l.*; "Anna" (Italian Girl), Jules Ravel, 15*l.*; A Calm Day in Venice, C. Thornley, 15*l.*; Winter Evening, G. A. Williams, 15*l.*

From the Crystal Palace Picture Gallery.—The Sledr Valley, N. Wales, J. Godet, 35*l.*; Evening, Coast of Cornwall, T. S. Croxford, 25*l.*; Fishsr Children, L. Thomson, 25*l.*

From the Royal Albert Hall.—A Wiltshire Farmhouse, S. Lewis, 75*l.*; On the Torrent Walk, Dolgelly, R. Harwood, 50*l.*; Warwick Castle, W. C. Way, 45*l.*; The Thames from Richmond Hill, C. Potten, 35*l.*; Trumps Mill, Surrey, M. A. Langdals, 25*l.*

From the Society of Painters in Water-Colours.—Cornish Coast, Chas. Davidson, 23*l.*; St. Barnabas, Venice, Wm. Callow, 15*l.*

From the Institute of Painters in Water-Colours.—Coming Ashore, J. H. Mole, 47*l.* 5*s.*; On the Ghent Canal, near Ostend, W.W. May, 25*l.*; Montelsons, Southern Italy, Chas. Vacher, 25*l.*; View of the Meavy from Yelverton, South Devon, P. Mitchell, 20*l.*; An Old Forge in the Lake Country, H. C. Fidgeon, 15*l.*

From the Exhibition in Black and White.—Only a Penny, A. M. Rossi, 15*l.*

NEW CEMETERY AND CHAPELS, EVERTON.

THE Bishop of Liverpool (Dr. Ryle) has consecrated the Church of England portion of the new cemetery. It is fifty-four statute acres in extent, and the land cost 12,000*l.*, and the ground has been laid out and the chapels erected from the designs of Messrs. T. D. Barry & Son, architects, Liverpool, Mr. John Atkinson acting as clerk of the works.

Three chapels are provided,—one for the use of the Church of England, one for the use of Nonconformists, and another for the use of Roman Catholics. They are nearly alike in form, size, and arrangement, the principal difference being in the treatment of the towers. They contain in plan:—Nave 43 ft. 9 in. by 23 ft. 6 in.; chancel, 15 ft. 1 in. by 15 ft. 1 in.; vestry, 13 ft. 5 in. by 9 ft. 9 in.; aisle for coffins, screened off from the nave by an ornamental glazed screen, 21 ft. 6 in. by 16 ft. 3 in.; waiting-room, 18 ft. 8 in. by 15 ft. 1 in.; and tower at the front angle of the nave. Each vestry has a small yard, and under each vestry is a warming chamber, from which the chapels are warmed by a hot-water apparatus. The chapels for the Church of England and Nonconformist portions of the cemetery are placed on a terrace facing the entrance in Higher-lane; while the chapel for the Roman Catholic portion is near the other entrace in Long-lane. There are entrances to the chapels from the front of the nave and from the side of the tower, with an exit-door for the coffins without going through the chapel. The chapels are in the Gothic style of the Geometric period, which has been fully carried out in the character of its tracery, the richness of its mouldings, and the light and shade so characteristic of that period. The towers are 14 ft. 6 in. square and 50 ft. high, divided into three stages, the upper being a well-developed belfry. Above is a stone parapet with sunk and cusped panels, and the whole is surmounted by a spire 65 ft. high to the top of the vane. The treatment of the spires and pinnacles at the bases is different in each chapel. In the principal front of each nave is a four-light window, deeply moulded and filled in with rich tracery, the jambs and mullions having floriated caps and moulded bases. The end window of each chancel is of three lights, similar in character to those last described; and the side windows of each nave are also of similar style in two lights. The waiting-room windows are of two lights, in unison with the others. The windows throughout have received special attention, and their design, proportion, and workmanship assist in no small degree the successful effect of the chapels. The walls have been built with red sandstone, taken from a quarry within the cemetery, from which also a good deal of the dressed stone was taken, but the greater part of this work has been executed in red sandstone from quarries at Runcorn and Kirkdale. The chapels have been faced with stone parpoints, pitch-faced, squared, and coursed. The stone used internally in the arches, jambs, and columns of chancels and coffin-rooms is from the quarries at Quarelle, near Bridgend, Glamorganshire, of a very delicate green stone colour, which contrasts well with the other stone. The walls are plastered internally. The whole of the roofs, benches, screens, and reading-desks are of the best pitch-pine, the roofs, which are open at the apex, being of hammer-beam construction, with circular ribs. Ample ventilation has been provided in the roofs by opening and closing shutters, additional ventilation being provided in the windows. The windows are glazed with toned rolled cathedral glass, of various colours, in geometric and floral patterns, which are very effective and in good keeping with the general design. The floors of passages of the naves and also those of the towers and coffin-rooms, are of tiles in ornamental patterns; those of the chancels are also of tiles of rich pattern. The slating is executed in Westmoreland green slates, with red ridges.

Within the grounds facing the central approach road is a building containing the offices of the Board. At the west side of these offices is an ornamental drinking-fountain, the gift of Mr. John Houlding, chairman of the Works Committee.

At the Higher-lane entrance suitable lodges have been erected for the superintendent and the gardener, and at the Long-lane entrance stands the registrar's lodge. The three lodges are in keeping with the general style of the other buildings. A stable-yard, with stabling for four horses, large coach-house, loft, &c., are also provided, besides a number of smaller buildings for implements, tools, potting plants, &c., and there is besides a large conservatory for rearing and propagating flowers. A yard is provided for executing masons' work, monuments, &c., under the direction of the Board. The back fences of the cemetery are of plain character, built from the red sandstone found on the site, and are no less than 2,500 yards in length.

The contractor for the whole of the surface work, drainage, road-making, fence-walls, chapels, lodges, offices, &c., is Mr. Isaac Anwell, of Liverpool. The conservatory was designed by Mr. Webster, of Wavertree, the heating being done by Mr. Kneale, and the ornamental iron-work, gates, and palisading by Messrs. Charles Smith & Co., Birmingham. The joiners' work has been done by Messrs. Nicholson & Ayre, Liverpool, and the slating by Mr. Jones, of Mount Pleasant, Liverpool. The trees, shrubs, and planting have been superintended by Messrs. Skirving & Son, Liverpool; the clock has been placed by Mr. Condliff, Liverpool; the drinking-fountain by Mr. Pilling, Walton; the whole of the carving by Mr. John Clark, Liverpool; the heating of chapel by Messrs. Tessimond & Kissack, Liverpool; the water supply, fire-hose and fittings, by Mr. Bucknall, Liverpool; the glazing by Messrs. Jelly & Hughes, Liverpool; the plumbing in the chapels is by Messrs. B. J. Catlow, Liverpool; the tiling by Messrs. Cbantrell & Son, Liverpool; and the fire-proof chamber, door fittings, and shelves, swing gates, &c., by Messrs. Bennett Brothers, Liverpool.

Exhibition of Gas and Electricity.—The Philosophical Society of Glasgow are arranging for an exhibition of apparatus for the utilisation of gas, electricity, &c., to be held in the Burgbank Drill-hall and grounds, Great Western-road, Glasgow, from Tuesday, the 28th of September, till Monday, the 25th of October. Some particulars will be found in our advertising columns.

APPROACHING CONGRESS OF THE SOCIAL SCIENCE ASSOCIATION.

THE following are the special questions in the departments more especially interesting to our readers to be discussed at the Edinburgh Congress, October 6th to 13th:—

Health Department.—1. What are the best areas for sanitary purposes, and how far should there be a revision of the mode of electing and continuing the services of the officers under the Public Health Acts?—2. What is the best mode of amending the present laws with reference to existing buildings, and also of improving their sanitary condition so as to render them more healthy, having due regard to economical considerations?—3. What are the means which should be adopted for the prevention of the pollution of streams, without undue interference with industrial operations, and for the preservation of pure sources of water supply?

Economy and Trade Department.—1. What legislative measures are required to leave the occupier of the soil freer than at present to increase his production of food; and by what measures of his own can the farmer best meet foreign competition?—2. What should be the course of legislation with regard to local government and the incidence of local taxation?—3. For purposes of taxation, what is the most scientific and practical definition of the word "income"?

Art Department.—1. Ought there to be a school of dramatic art subsidised by private subscription or endowment, or by the State?—2. How far would the revival of the old system of "Master and Pupils" be of advantage, and tend to promote the growth of historical art in the country, and the fitting use of painting and sculpture in our public buildings?—3. How can the musical education of the middle classes be improved?

SALE OF BUILDING SITE IN PARK-LANE, MAYFAIR.

ON Tuesday Messrs. Driver & Co. offered for sale at the Auction Mart, by direction of the Ecclesiastical Commissioners, a freehold building site in Park-lane, Mayfair, possessing a frontage of 93 ft. to Park-lane, and comprising an area of about 2,100 square feet. The site is close to Piccadilly, adjoining the residence of Sir William Miller, and is at present occupied by portions of the Rose and Crown public-house, three houses and shops in Park-lane, and the Park-lane entrance to Mercer's Horse Repository. It was explained in the particulars that the entire premises were leased for a long term of years, which expired last Lady-day, since which time they had been temporarily let (with the exception of the Park-lane entrance to Mercer's Horse Repository) at rents amounting in the whole to 425*l.* a year, with power of resuming possession at six months' notice from any quarter-day. It was added that as regarded the Park-lane entrance to Mercer's Repository, the purchaser could enclose or build upon it, being entitled to possession on completion of the purchase, and in that case the repository would no longer have an entrance from Park-lane. The auctioneer, in submitting the property, observed that he did not know what those present might consider it was worth, but his estimate was that it was worth from 8*l.* to 10*l.* per foot, which would give something like 20,000*l.* The biddings commenced with an offer of 10,000*l.*, after which there was a pause of several minutes, no advance being made, on which the auctioneer observed that if there was no further offer, the bid of 10,000*l.* would be both the first and the last, as the property would no longer remain on the vendors' hands, but sold for the sum which had been offered. After this intimation, the biddings were spiritedly resumed by advances of 50*l.* each, and the property was ultimately sold for 12,500*l.*

SALE OF MODERN BUILDINGS IN CHARTERHOUSE-STREET.

THE spacious and costly buildings recently erected in Charterhouse-street, between the Holborn Viaduct and Farringdon-street, known by the name of Ely House, were sold by auction, at the Mart, on Monday last, by Messrs. Farber, Price, & Farber, under an order of the Court of Chancery. The premises have a frontage to Charterhouse-street of 50 ft., the depth being about 122 ft., occupying a total area of 6,220 ft. They contain four lofty floors, and are erected with white Suffolk brick, and Portland stone dressings, the façade on the principal floor being ornamented by polished red and grey granite. The interior is arranged for subdivision, and contains several lofty show-rooms and suites of offices, the floor and mural decorations being elaborate and costly. The premises are held on lease from the Corporation for an unexpired term of seventy-five years from Christmas last, at the ground-rent of 536*l.* per annum, and are at present let on leases to several tenants, at a rental of 1,705*l.*, the owner paying rates, insurance, rectory stipend, and gas. The highest bid was 7,000*l.*, at which sum the auctioneer declared the property to be sold, after opening the document containing the amount fixed by the Court of Chancery. The opinion expressed in the sale-room was to the effect that the property was sold cheap, and that two years ago it would have realised something like 10,000*l.*

SALES OF BUILDING LAND AT HENDON, FINCHLEY, WILLESDEN, SUDBURY, LEYTON, AND FOREST GATE.

ON Friday, the 23rd inst., Messrs. Baker & Son offered for sale, at the Auction Mart, two freehold building estates in the parishes of Hendon and Finchley, possessing extensive frontages to the Finchley-road at Temple, Fortune, and other good roads, the whole comprising about 45 acres. The property was divided into six lots, varying from 3 acres to 10 acres each. Several of the lots were sold, realising about 600*l.* an acre. At the same time and place Messrs. Baker & Son also offered the Wembly Dairy Farm Estate, comprising about 100 acres of freehold land, situate at Stonebridge and Sudbury, in the parish of Harrow, and possessing nearly a mile of frontage to the Harrow-road. It was described as unusually well adapted for building purposes, for a resale in plots, or as affording fine sites for private residences and grounds. It was divided into thirteen lots, three of which were sold at about 250*l.* an acre. These were the first lot, containing 6 acres, sold for 1,500*l.*; and lots twelve and thirteen, containing 16 acres, and which were sold together, realising 4,100*l.*, the total proceeds of the sale amounting to 5,600*l.*

On Monday evening Messrs. Baker & Son offered, at the Victoria Tavern, Willesden-lane, Kilburn, sixty-one plots of freehold building land, fronting on Queen's-road, Harrow-road, forming the first portion of the West Stonebridge Estate, at Willesden, close to the Harrow-road Station of the Midland Railway, and to the Willesden Junction Station of the London and North Western Railway. A portion of the property was set apart for shops, the remainder of the plots being for small dwellings, for which it was stated there was a great demand in the district. With the exception of the shop-plots, which were larger, the several plots have a frontage of 16 ft., and an average depth of from 90 ft. to 100 ft. With two or three exceptions, the whole of the plots were sold, the shop-plots realising from 96*l.* to 100*l.* each, and those for private dwellings from 45*l.* to 50*l.* each.

On Monday evening Mr. F. M. Whittingham also sold, at the Swan Hotel, Stratford, thirty-eight plots of freehold building land at Leyton, having frontages to the high road and Huxley-road, and close to the Leyton Station of the Great Eastern Railway. The several plots have each a frontage of 20 ft., with a depth ranging from 50 ft. to 80 ft. The different plots realised about 2*l.* per foot frontage, and an aggregate sum of 1,391*l.* Mr. Whittingham next sold four plots of building-land on the Forest Gate Estate. They have a frontage of 25 ft. each, with a depth of 195 ft. Each lot was sold for 126*l.* realising an aggregate sum of 504*l.*

BUSINESS PREMISES.

THE new premises taken by Mr. J. W. Benson for the extension of his present steam-factory and shops in Ludgate-hill are those lately occupied by the Prudential Assurance Company, Nos. 62 and 64, Ludgate-hill. To meet the necessary requirements, the two buildings have been re-arranged to form one, the alterations, including some very heavy underpinning of the whole of the two structures, being carried out by the builders, Messrs. Patman & Fotheringham, under the directions of Mr. C. J. Phipps, F.S.A., architect. The whole of the shop-front and window-fittings formed a separate contract, which has been executed by Messrs. Clark & Co., of Rathbone-place, from designs of the architect. The frontage, 40 ft. in length, by placing the entrance in the centre, gives two large windows of three bays each for display of Messrs. Benson's specialities. In the construction of the shop-front are several novelties. As a rule, London shop-fronts, with the windows made either in mahogany or soft wood stained black of the stereotyped form, show in great contrast to the Continental store or *magasin* in Paris. The well-known Bazaar du Voyage facing the new Opera-house, for example, is constructed in polished marble,—a material which, with but few exceptions, is unused in London. Here, in the present case, the architect has selected and used some very beautiful specimens of Devonshire marble for the pilasters and columns forming the entrance to the shop. The shafts for these columns are in one length of 10 ft., with moulded bases of dark green marble from Irish quarries. The capitals and enriched bands are some good specimens of bronzed metal-work, and show in strong relief. The window-cills are also of polished Devonshire marble to match the columns and pilasters, while the sashes are formed by cast-iron fluted columns with cast-iron moulded arches, which are filled in with marble panels, on which are carved specimens of flowers and foliage, partly gilded. The floor of the entrance to the shop is paved with white Sicilian marble; and, instead of the ordinary plain soffit, the lobby ceiling is domed, with groins executed in mahogany. The side-windows, formed with moulded arches, are made to receive the astronomical clocks and calendars. The window-casings are in polished mahogany, partly hung and partly sliding, fitted with specially-constructed lighting and ventilating apparatus, the temperature being maintained in an ingenious manner, suggested by Sir H. Bessemer. The shop-front is closed with seven of Clark's patent noiseless self-coiling steel shutters. Their patent self-rolling sun-blinds are also fitted to the building. The work has been executed with great rapidity.

CURIOUS DEFENCE TO AN ACTION.

ARCHITECT OR BUILDER?

LAST week, at the Lambeth County Court, Mr. Stevens, an architect and surveyor, of Brixton, brought an action against Mr. Holland for the sum of 5*l.* 18s. 6d. for professional services rendered. The original defendant was Mrs. Rogers, a widow, but had recently married the present defendant. The plaintiff's case was that he was instructed by Mrs. Rogers to prepare plans for the extension of the Minerva Collar Factory, Charlotte-row, Walworth, and for the alteration of certain houses in Clapham, at different periods; and these instructions he carried out, and having done so, he could not obtain payment. In answer to the claim, the defendant said he was instructed by his wife to state that the plaintiff was a builder and not an architect, and that she had given him an order to build two houses for her in conjunction with a Mr. Hopkinson. Under these circumstances the defendant said he did not think he had any right to pay for the preparation of the plans for which the plaintiff claimed. In reply to this the plaintiff explained that the defendant was referring to a different person altogether. There happened to be a Mr. Stevens, a carpenter, who once resided near his office, and Mrs. Holland had confused the two. His honour characterised the defence as not very creditable, and gave judgment for the full amount claimed, with costs.

LOCAL BOARDS AND OWNERS OF PROPERTY.

THE TOTTENHAM LOCAL BOARD OF HEALTH *v.* ROWELL.

THIS was an appeal (in the Court of Appeal), on July 24th, before Lords Justices James, Brett, and Cotton, from a decision of Vice-Chancellor Malins. The action was brought by the Tottenham Local Board to enforce a charge upon the property of the defendant for 25*l.*, and interest from February, 1873, the amount of a rate levied upon the inhabitants under the powers of the Local Government Act for the plaintiffs providing sewers and repairing the roads and footways.

The works were done in the year 1865, but the expenses incurred by the Board were not, until the 31st of January, 1873, duly apportioned by the surveyor of the Board, and the demand for payment of the assessment was made in the following month. The objection raised by the defendant was on the ground that the mode of recovering payment, as directed by the various Acts of Parliament, was in the first instance by personal action, by summary proceedings before the justices, or in the County Court within six months, and no such proceedings having been taken to recover the money, the plaintiffs were precluded by lapse of time and unjustifiable delay from now coming to this Court to enforce a charge on the land. The Vice-Chancellor decided that the power to charge the land of a defaulting ratepayer under those Acts was substidiary to the other summary proceedings specified in the Acts, and that the Board, not having taken any of those proceedings within six months, were precluded, after a lapse of so many years, from claiming a charge upon the land. The action was, therefore, dismissed with costs.

Their lordships, after great fluctuation of opinion,

came to the conclusion that the expenses incurred by the Board under the powers of their Act for works done in providing sewers and repairing the roads and footways were capable of being made an independent charge on the property improved, and each charge might be enforced even after the summary remedy against the owner and occupier was lost. The power to enforce the charge was not forfeited by lapse of time. The effect of deciding against the plaintiffs would be to throw all these expenses upon the general rates instead of upon the owners of property facing the improvements. Their lordships could not agree with the decision of the Vice-Chancellor, and the appeal must be allowed.

IS A ROAD A STREET?

MAYOR OF ACCRINGTON *v.* NUTTER.

THIS was a case in the House of Lords, which involved an important question under the Public Health Act, 1848.

In the year 1871 the appellants raised the level of a road in Accrington, which was subject to a turnpike trust, and in so doing damaged the respondent's house, which abutted on the road. The question raised by the present appeal was whether the appellants were liable to pay damages to the respondent for the injury done to his house. The Court of Appeal held the defendant liable, on the ground that the road in question was a "street" within the meaning of Section 68 of the Public Health Act, 1848, and as such was vested in the appellants.

The case was argued some weeks since, when their lordships took time to consider their judgment.

Lord Penzance was of opinion that the Court of Appeal was right. It was quite possible for a turnpike-road near a town to become a street, and there was no reason why the provisions of the Public Health Act, 1848, should not apply to such a street.

Lord Blackburn also thought the judgment should be affirmed. Looking to the sanitary objects of the Act, there was quite as much reason for vesting in a local Board a road which was subject to a turnpike trust as one that was not. The street in question was, in his opinion, vested in the appellants by Section 68, and they were, therefore, liable for the damage done to the respondent's house.

Lord Watson and the Lord Chancellor concurring, the appeal was dismissed with costs.

LAMBETH PALACE LIBRARY.

NEW REGULATIONS.

THE following regulations have been approved by the Ecclesiastical Commissioners, in pursuance of an order in Council, June, 1880:—

1. With the exception of the periods named in Regulation No. 2, the library is open to the public on Mondays, Wednesdays, Thursdays, and Fridays, from ten a.m. to four p.m.,—during the forenoon of Tuesdays, throughout the year, and from April to July (both months inclusive), until five p.m.

2. The library is closed during the week commencing with Easter Day, and during seven days computed from Christmas Day, and for a period of six weeks from about the 1st day of September in every year.

3. Extracts from the MSS. or printed books are allowed to be made freely, but in case of a transcript being desired of a whole MS. or printed book, the consent of the Archbishop must be previously obtained.

4. Permission to copy illuminated MSS. and rare engravings can only be obtained on submission of the applicant's name to the Archbishop.

5. MSS. are only lent out by an order signed by the Archbishop, and with a bond of 50*l.* or 100*l.* for their return within six months or on demand.

Rules for Lending Books.

6. Except under special permission, the loan of books will be restricted to the clergy and laity of the diocese of Canterbury, and to persons residing within the parish of Lambeth, the borough of Southwark, and the city and liberties of Westminster.

7. All applications for the loan of books must be countersigned by a beneficed clergyman, who must certify to his personal knowledge of the applicant.

8. Every one desirous to borrow must obtain from the librarian the prescribed forms, and all applications for the removal of books must be made to the librarian in person, or by some trustworthy representative, authorised in writing by the applicant, to receive them. . . .

11. Works of reference, books of prints, works of an earlier date than 1600 A.D., pamphlets, and such books as in the discretion of the librarian cannot easily be replaced, can only be consulted in the library.

ARCHITECT AND CONTRACTOR.

SIR,—Your correspondent "B's" narrative of his sufferings would be distressing but that I feel sure, if he were properly advised, a means would be found to extricate him from his difficulties, or prove him to be in error.

As it is purely a matter of the failure of a Portland cement concrete, and as his case furthermore greatly resembles one on which I was consulted only a short time back, I may, perhaps, be allowed to offer some remarks.

The legal wording of the specification and the contract must, as you very justly say, have considerable effect in determining the verdict, but, in equity, it is simply ridiculous to say that Mr. C. has the power to condemn good work executed with good material; for, if such were the case, an architect could ruin every contractor who worked under him, no matter how honestly the work was done, and the contractor would have no redress. The architect furthermore would not without reason give himself the extra labour which such proceedings would inevitably entail. It must therefore be assumed that the floor as laid by B was faulty, or Mr. C. could have had no object in condemning it. But Mr. C. may, perhaps, have been in error in asserting that the failure was due to an admixture of lime with the cement, and on this error B may be attempting to make out his case.

Bad cement, bad sand, bad water, bad workmanship, are only a tithe of the causes to which the failure of the concrete may be due; and I think B would have acted more wisely if he had, as you suggest, obtained good legal and expert advice, instead of attempting to secure sympathy by only half stating his case in your valuable journal.

HENRY FAIJA, Assoc. M. Inst. C.E.

PAYMENT FOR QUANTITIES BY BUILDERS.

SIR,—I very carefully read the letter in your issue of a few weeks since (p. 57, *ante*) under the above heading, but cannot see that the writer advanced anything new. Almost all architects and builders agree that quantities should be supplied for all but very small buildings, and the general run of builders would regard with dismay the proposal that quantities should be taken off in the office of the architect instead of by an experienced surveyor who is constantly engaged in the work. As regards the use of the papyrograph or any other modern invention, I may state that I have tried several, and proved that they cannot be compared with good lithography for clearness and correctness, while the actual cost of lithography is really not great, even including the printer's large profit; but the amount in the summary is often increased to include something for the architect, instead of the amount put down* "for copies of drawings, &c.," so many pounds.

Taking off quantities is really hard work, and not so well paid for as people imagine, very few surveyors getting more than 1 or 1½ per cent. to cover time and expenses, after handing over to the architect his share of the commission;* and this amount may be still further reduced if the surveyor is obliged to pay the architect's managing clerk some small commission, which appears to be the case in some instances, as reported on page 57 of your issue of the 10th inst. The case referred to, "Wyatt *v.* Batstone," ought certainly to have been settled out of court, or, in plain words, the soiled linen washed at home. OBSERVER.

HISTORY OF STAINED CLASS.

SIR,—I have to thank you for a very interesting and painstaking criticism of the "History of Design in Painted Glass." May I ask permission to explain in your columns my meaning more fully upon a few points?

In answer to your remark, "He speaks with great admiration of figure-designs which . . . would not (ordinarily speaking) excite admiration." My admiration of them is great, only when considering the conditions of their production. One admires them as works of their period, and as designs for a new and difficult material, not as compared with such works as those produced in other arts and in other periods by Phidias or by Raffaelle. When I speak of their dignity, my intention is to use the phrase somewhat in the sense implied by the reviewer in his concluding remarks. This feeling of dignity is irrespective of the drawing as drawing, but it is evident that the artist approached his work with reverence for it and for his subject, without levity and without the intention of "knocking it off." My remarks imply that before the year 1,400, and that is the perfect advent of the Decorated style, the levity and facility shown in late thirteenth-century work did not produce any better drawing.

Regarding the example of the head from Lincoln, quoted by your reviewer as of a very fine type, I quite agree with him; then this is, we may suppose, of about the year 1220 A.D., and long before 1400.

Concerning "pot metal" and "enamel," I use the first term to include all metals coloured in the pot, and I include ruby because the "flash" upon it is of such consistency and durability that it may well rank with them. By "enamels" are meant coloured or opaque pigments, mixed with a flux, and burned upon or into the surface of the glass. I am unaware of any old glass called "enamelled," having colours upon its surface which have not been burned.

N. H. J. WESTLAKE.

P.S. The mosaic ornament and grisaille patterns which your reviewer desiderates are treated of in the third part, which is in the press.

* We must hold the writer of this letter responsible for proof of this statement if questioned.

STAINED GLASS.

Gloucester.—Messrs. Camm, Brothers, of Birmingham, have lately fixed a stained window in St. John's Church, Gloucester. The window is in the Italian style, the centre light having for its subject "Christ blessing little children." The Saviour, in the midst of a group, and having taken a child upon his lap, is in the act of blessing a girl kneeling before him. In the background are several of the apostles. The two side-lights have, on the left, the "Nativity," with the emblems of the time and place, the star, ox, and ass, in the background. The Virgin Mary is seated with the "Holy Babe," while Joseph meditates upon the scene. On the right is portrayed the Baptism of the Saviour in the River Jordan. The window, it should be stated, is in memory of Robert Raikes and the Rev. Thomas Stock, both of Gloucester.

Cambridge.—The large east window of Corpus Christi College Chapel, Cambridge, has just been filled with stained glass. The subject represented is our Lord's Crucifixion, occupying the whole of the window, and the work was designed and executed by Messrs. Heaton, Butler, & Bayne, of Garrick-street, London.

Winchester.—The windows of the County Hall are now all filled with stained glass illustrating incidents in the history of the city. The windows are by Messrs. Hardman, of Birmingham, and are arranged heraldically, so as to perpetuate and illustrate the memories of county notables, who range from the mystic Arthur down to the worthy Hampshire man of Stuart times, Chaloner Chute, of the Vine. The design and decoration of the hall will be a memorial alike of the worthies thus recorded in armorial blazon and of the antiquarian erudition of Mr. Melville Portal, who has found time amidst cares of county administration to arrange this decorative work, and prepare a book on "Hampshire Worthies," which will, it is stated, soon see the light. The window which completes the series has lately been completed. It may be called the Restoration window, for the chief shields are those of the leaders who joined heartily in the Restoration. The quatrefoil head has the crowned head of Charles II., and the shields are arranged in the following order:—That of James I. stands first, and that of Lancelot Andrewes, bishop of the diocese, stands next in order. The shield of Charles I. follows. The shields of Sir Wm. Ogle, John Paulet, of Basing Honour memory, and Chaloner Chute, Speaker of the House of Commons during the Commonwealth, recall various scenes in those troublous times of the Commonwealth, of the close of which we are reminded by the shield of Richard Cromwell. The shield of Anthony Ashley Cooper, Earl of Shaftesbury, commemorates one of the illustrious men who aided Charles II. with advice on his return from Holland, and who was one of the famous Cabal ministry. The last shield enshrines the memory of Thomas Ken, Bishop of Bath and Wells, whose "Evening Hymn" is so well known.

DRINKING FOUNTAINS.

St. Paul's Churchyard.—The fountain which Messrs. John Freeman & Sons are preparing for erection in St. Paul's-churchyard will (says the *City Press*) be an octagon in plan, 20 ft. diameter, standing upon a circular raised platform of two steps, 34 ft. in diameter. On four sides of the octagon basin there will be shell-shaped drinking-fountains. The water will be thrown into a centre tazza from four bronze lions' heads, and thence will flow into the large octagon basin. The whole work, which is from the designs of Mr. F. C. Penrose, architect to the Dean and Chapter, will be formed of granite from the Lamorna quarries of Messrs. Freeman, the exposed surfaces being polished. Messrs. Freeman's quarries, which are situated in Cornwall and Devon, give employment to about 1,000 men, and produce blocks of great magnitude.

Winchester.—The new drinking-fountain out

de Westgate is nearly completed. The donor Mr. Lancelot Littlehales, and the carver and ason is Mr. S. Newman. Mr. S. J. Newman, Northampton, is the architect.

BUILDERS' BENEVOLENT INSTITUTION.

The thirty-third annual meeting of this Institution was held at Willis's Rooms, St. James's, on hursday afternoon, the president, Mr. F. J. ove, in the chair.

The report for the past year stated that if eans should be found to make an addition to ie annuities now given [30*l.* to men and 24*l.* to omen], the comfort of the pensioners (many f whom had no other means whatever) would e materially promoted. The committee had onfidence that increased funds would be supplied by the powerful interest which the Institution represented, if it were decided to increase ie pensions. The committee express their hanks to Mr. F. W. Keeble, the hon. secretary f the annual ball, and to the stewards who ssisted him, in making that gathering a success, nd warmly acknowledge their indebtedness to Ir. F. J. Dove, the retiring president, for the nergetic manner in which he has served the nstitution during the past year. During the ear ten pensioners [an exceptionally large number] have been elected on the funds of the nstitution, and two widows of pensioners have een added to the list without election. Seven ensioners died during the year.

The balance-sheet (audited by Messrs. J. H. Hunter, J. Cruttenden, and R. J. Ward) showed he receipts to be 3,221*l.* 19s. 2d. (including 46*l.* 10s. 7d. balance brought forward from last ear). The annual subscriptions amounted to 86*l.* 10s.; the donations to 861*l.* 12s.; the ividends on funded property to 632*l.* 7s. 5d.; nd the profit on the ball was 94*l.* 19s. 2d. The xpenditure included 1,316*l.* 6s. 6d. paid to ensioners; and the burial-money for pensioners, 35*l.* 1s. 6d. After deducting expenses f management, there remained a balance of 88*l.* 1s. 4d. at the bankers'.

On the motion of Mr. George Plucknett, econded by Mr. Richard Head, it was resolved, fter considerable discussion, to increase the ensions of the men to 39*l.* a year, and those of he women to 27*l.* a year. It was stated that here were now twenty-two men and thirty-one women receiving annuities from the Institution, nd that the committee hoped in a few years' ime to increase the amount of the pensions to 50*l.* per annum for the men, and 30*l.* per annum or the women. To enable them to do this, increased subscriptions would be needed. In connexion with this point it was announced that Mr. George Codwin had offered to subscribe 10*l.* a year for ten years if nineteen other persons could be found to do the same thing, so as o increase the income of the Institution by 200*l.* a year during the next ten years. Thanks were voted for the offer, and the hope was expressed that it would be responded to.

It was resolved to alter section 2 of Rule III., so as to allow applicants for pensions to be in receipt of an income of 50*l.* per annum [independently of the amount of the pension], instead of 30*l.* as at present.

The report and balance-sheet were adopted, and votes of thanks were accorded to the President for the efficient way in which he had performed the duties of his office during the past year; to the vice-presidents; to the trustees (Mr. George Plucknett, Sir S. Morton Peto, Alderman Sir J. C. Lawrence, M.P., and Mr. C. T. Lucas); to the committee; to the auditors; and to the honorary solicitors.

The Treasurer (Mr. George Plucknett) was re-elected, as were the members of the committee who retired by rotation, and the auditors. Mr. Howard Colls was also elected a member of the committee.

Mr. Thomas F. Rider was unanimously elected President of the Institution for the ensuing year, and it was announced that under his presidency the annual dinner will be held at the Freemasons' Tavern on Thursday, November 11th.

Sir Thomas Bouch.—The solicitors of Sir Thomas Bouch, the designer of the Tay Bridge, have obtained from Col. Yolland and Mr. Barlow, two of the members of the court of inquiry, a statement that Mr. Rothery was not warranted in representing their opinions as concurring with his own in matters not referred to in their report.

EXCURSION BY THE ARCHITECTURAL ASSOCIATION.

It has been decided to visit some of the cities in the plain of Lombardy, for study, this autumn. This district, being a clay country, is rich in terra-cotta work, as well as in stone and marble structures. It contains many interesting churches by Bramante and others. Also mural decoration of all periods. It is proposed to devote the latter half of September to the excursion, leaving London on the 15th. Each gentleman will be expected to draw the particular work arranged and allotted to him by the secretary. By this subdivision a large mass of information will be collected. The itinerary includes Turin, Milan, Bergamo, Brescia, Cremona, Mantua, Pavia, and Certosa.

PITCH PINE.

Sir,—Will you please to insert the following? Upon suggesting the use of pitch pine for window-cills to a well-known builder, whose houses are always carried out in a first-class manner, he sends me this reply:—

"I once had a very high estimate of pitch pine, but lately, from what I have seen, my opinion of it is wholly changed. I believe, myself, that yellow deal cills will in the end be found more enduring by very many years. Pitch pine, kept dry, is perhaps an enduring wood (I have grave doubts even as to that), but between wind and weather I think it is almost the worst wood a builder has to use."

I should like to know what other members of the profession can say about it.

An Architect.

BRICKMAKING.

Sir,—Can any of your readers tell me of a good book on Brickmaking, which gives good and trustworthy information about the process, machines, &c.? I have a book by E. Dobson, but it is thirty years old, and, therefore, of very little use.

Brickmaker.

CHURCH-BUILDING NEWS.

Bermondsey.—The new Church of St. Crispin, Southwark Park-road, was consecrated on the 6th inst. by the Bishop of Rochester. The edifice has cost, inclusive of purchase of site, building of parsonage, and an endowment of 5,000*l.*, something like 16,000*l.*, of which sum Major-General Sir F. Fitzwygram and his family subscribed 11,500*l.* The building's chief external characteristic is its evident substantiality, but the interior is not without features of architectural beauty. The style is Gothic, and the material red brick and stone dressings. Inside, the walls have red brick facings, and the stone piers and arches stand out in bold relief on both sides of the building. Seating accommodation has been erected for 600 worshippers, the seats being composed of deal, stained and varnished. The windows are glazed with cathedral glass of varied hues, and the ceiling and chancel are groined in wood. For the rest, it may be stated that the reredos is formed of Caen stone, and the tablets behind the altar, which is plain, are of gilded copper plates. The organ is by Walker, and there are two vestries,—one for the use of the clergy, and the other for the choir. The tower and spire remain to be completed, at an estimated cost of 900*l.* Mr. W. Shephard, of Bermondsey New-road, is the builder, Messrs. Coe & Robinson, of Furnival's Inn, being the architects.

Dartmouth.—A parish meeting has been held at Dartmouth for the purpose of considering two schemes for the repair and improvement of St. Saviour's Church, which has been permitted to lapse into a state of dilapidation. Mr. Thomas Lidstone, diocesan surveyor, presented a report, and estimated the carrying out of the necessary work at 4,356*l.* Plans were also presented by Mr. Edward Ashworth, of Exeter, with an estimate of 3,878*l.* Mr. Lidstone, having been requested to examine and report upon the condition of the fabric, stated that the walls and much of the timber of the structure were sound, but thorough repair was necessary throughout the church, the windows, roof, walls, ceiling, seats, warming and lighting apparatus, tower, and bells especially requiring improvement and alteration, whilst a new vestry was needed. The galleries and churchyard would not be dealt with at present. Mr. Ashworth proposed, according to his plans, to clear away the west gallery, and all the cradlework that runs up from the westward, to place the organ in the north chancel aisle, to restore the roofs and tower, to reseat the church, to renew the windows, to provide hot-water heating apparatus, to re-light the church, and to remove the altar-piece to the west end of the church against the northern wall, and to substitute for it a reredos. The meeting resolved to carry out the work in accordance with Mr. Ashworth's plans, which, however, that gentleman wrote to say would cost 200*l.* more than he had at first stated.

Salcombe.—A meeting of the parishioners of Salcombe, Devon, has been held to consider the question of the enlargement of the church, which was built thirty-seven years ago. The matter was placed in the hands of Mr. J. D. Sedding, of London, who had prepared plans which provided for the execution of the work in three sections. The first part was the adding of chancel and vestries, the second adding to the western end, and the third the adding of a north chancel aisle, with a gallery over for the children. If the whole scheme be carried out the church will be capable of seating 600 people. If it were found impossible to carry it out all at once, the church could be first extended in an easterly direction by the erection of a chancel and north transept, which would give an addition of thirty-one sittings, whilst a gallery over would accommodate seventy-two children. If the church were extended in a westerly direction sixty-one sittings could be added. There were 266 sittings at present, and if the plan was carried out in its entirety it would give 370. It was resolved to take means to carry out the plans laid before the meeting. The cost of the proposed works is estimated at from 2,000*l.* to 2,500*l.*

Nuthurst.—The Bishop of Worcester has lately consecrated St. Thomas's church, which has been erected in the new parish of Nuthurst, cum-Hockley Heath, near Knowle. The site for the church was given by the Rev. T. J. Morris, the Vicar of Hampton-in-Arden, who has also provided a piece of land upon which to erect a parsonage. The total cost of the church, exclusive of the site, has been about 2,200*l.* The church comprises a nave 53 ft. long by 24 ft. 9 in. wide, a well-proportioned chancel, a south porch, an organ-chamber and choir vestry also on the south side, the heating-chamber being situated beneath the vestry. A tower, crowned with a belfry and spire, rises at the angle formed by the nave and chancel on the north side. The steeple, from the ground to the weathercock which surmounts the final stone, is 81 ft. 6 in. high.

VARIORUM.

"Science for All," for August, says:—"Any one passing not long ago along the main street of a busy town in the West Riding of Yorkshire, might have observed a very curious fact,—the lower halves of several large plate-glass windows were rent from side to side. A single glance was sufficient to show that the cracks were not produced by the stray missiles of certain street Arabs, for they had not that radiating or star-like arrangement which is generally seen in such cases, but, instead, consisted of one large rent proceeding from one side to the other, with one or two minor cracks branching therefrom. To account for this curious and highly inconvenient phenomenon was a sore puzzle to many of the good folks about; some there were, however, more knowing than the rest, who arrived at a sensible and satisfactory explanation, thereby proving what is perhaps demonstrated every day, nay, every hour,—that science is only, to use the words of Huxley, trained and organised common sense. It was midsummer. The windows of the shops where these cracks were to be seen faced the south, and were therefore exposed to the full glare of the sun's light and heat. The lower halves of the windows,—i.e., the cracked parts,—were painted, on the inside, of a dun colour, and by two in the afternoon had become quite hot to the touch, whereas the upper and unpainted halves were only slightly warmed. Herein lay the secret. The glazier fixed the windows as if they had been small panes, where the amount of expansion is very minute indeed, and they were fixed in a rigid framework that would not give way. The painter, on his part, in his ignorance of certain principles, put on a colour which led to the glass being strongly heated in the sun's rays. This followed: the plate-glass was heated, and it expanded; the frame of the

window tried to resist that expansion, and in the struggle the weaker had to give way, not doing so, however, until it was irremediably injured."——"Picturesque Europe" says a word about the Town-hall of Ypres:—"It is certainly one of the architectural wonders of the world, with the vast roof, the enormous length, the tower of vast bulk, the rich details of the arches, the air of solemn decay. And all this is contrasted with the sort of little obscure country town in the centre of which it rises. We wonder how it is that such a monument could be found in such a place, and look up to it with a sense of awe and mystery. It alone is worth a pilgrimage from London. Yet the average traveller, guide-book in hand, hurries by to see the regular catalogued shows, which are not so nearly worth his attention. But this is too often the case. Thus, within ten miles' walk of Ostend, is a little fortified town, Nieuport, lying in a rich champagne country, with its fosse, and walls, and gates, in which there is a gem of a little town, all decayed and rusted, and a strange old church with a remarkably picturesque tower, the combination infinitely beautiful in itself, and giving a sense of gratification the more welcome because it is unexpected; yet few know of Nieuport, and in the guide-books it is dismissed with an unappreciative line or two. All the 'eights' are for those who 'run' along the beaten track, and who have barely time to read as they run."——"The Technical Educator," for the coming month, gives some hints on carpet patterns:—"Carpet patterns may with advantage have a geometrical formation, for this gives to the mind an idea of order or arrangement. When the pattern has not a geometrical basis, a general evenness of surface should be preserved. Carpets are better not formed into 'panels,' as though they were works of wood or stone, but should have a general 'all over' effect, without any great accentuation of particular parts. The Indian and Persian carpets meet this requirement. While a carpet should present a general appearance of evenness, parts may yet be slightly 'pronounced,' or emphasied, so as to give to the mind the idea of centres from which the pattern radiates. A carpet should, in some respects, resemble a bank richly covered with flowers; thus, when seen from a distance, the effect should be that of a general 'bloom' of colour. When viewed from a nearer point it should present certain features of somewhat special interest; and when looked at closely new beauties should make their appearance. As a floor is a flat surface, no ornamental covering placed on it should make it appear otherwise. A carpet, having to serve as a background to furniture, should be of a somewhat neutral character. Every carpet, however small, should have a border, which is as necessary to it as a frame is to a picture."

Miscellanea.

New Artisans' Dwellings Schemes.—At the last meeting of the Metropolitan Board of Works, the Works and General Purposes Committee reported that, having regard to the improvements remaining to be carried out under the provisions of the Metropolitan Street Improvements Act, 1877, and in connexion with the several artisans' dwellings schemes, it is not, in the opinion of this committee, desirable that any application should be made to Parliament in the next Session for powers to undertake additional street improvements; but that this opinion does not apply to any application which may be necessary for the widening of any portion of the Victoria Embankment; and recommending that the following Vestries and District Boards who have applied for the carrying out of street improvements be informed accordingly, viz., the Strand District Board, the Vestry of Clerkenwell, the Vestry of Islington, the Vestry of Newington, the Holborn District Board, the Vestry of Bermondsey, the Limehouse District Board. Mr. E. Dresser-Rogers moved the adoption of the report, and observed that the committee had been very carefully into the question, and he thought the Board would agree that, when there are so many great improvements now in hand, it would be inadvisable to go to Parliament with further schemes. The question had been carefully gone into by the committee, and the proposed improvements did not press. The report was adopted.

Land Drainage.—Mr. Mechi strongly recommends drain-ventilation. The late Josiah Parkes used to have bricked recesses or boxes at intervals, into which the inch-pipe discharged the water, the outlet-pipe being 3 in. below it, so that air was always present, and the flow more rapid through these small conduits; the vent or air-pipe was thus always open. Some years after I drained my land, Mr. Mechi says, the outlets which opened into the open ditches were led into a larger pipe or receiver, and the ditches filled up. The drains became gradually less active, and we ascertained that it arose from the air not passing into the months of the drains so freely as it used to do. I remember a singular instance of benefit derived from having ventilating openings at the beginning as well as at the end of the drains. It was recorded in print that no rain had fallen until some time after the field had been drained, but nevertheless the crop was wonderfully improved, and it was attributed, very justly, to the drying of the soil by subterranean aëration. The engineer who effected this always admitted air at both ends of the pipes. How wrong it is to allow vegetation to accumulate around or over the outlet, and thus impede free circulation of air. This is why I strongly recommend iron pipes as outlets, 6 ft. or 9 ft. long, most of their length being firmly imbedded in the soil; their outside nozzles projecting are undisturbable. Is is a great economy, because of its immobility and indestructibility. Earthen and brick outlets are frequently injured or overgrown, and the drainage spoiled.

The "Chalet" Company, Limited.—This company, which has been formed for providing public lavatories, retiring-rooms, and toilet accommodation in the thoroughfares, squares, parks, gardens, and other open spaces of the metropolis, and of the chief towns and cities throughout the United Kingdom, of an ornamental character, in the form of a Swiss châlet, is now taking shape. The châlet is constructed of iron, wood, and brick, and unobjectionable in appearance. The dimensions are necessarily subject to modification according to the site available. The lower portion is a framework of wood panelled to an elevation of 6 ft., above which, encircling the entire structure, are arranged glass panels of varied colours. For years past the urgent necessity for such places of convenience has been admitted by all classes, and the time has now come when this problem is to be practically solved by the present enterprise, which, instead of dipping into the ratepayers' pockets, will actually yield a revenue to the parish and at the same time leave the official mind entirely free from all embarrassment and responsibility of organisation and management. There is abundant testimony from medical men and others to prove that the want is not imaginary, but that it is really a great and growing one, which calls for the prompt and careful consideration of those whose business it is to make provision for it.

"Male Cork" Facings for Damp Walls.—The lightness and isolating properties of ordinary cork are well known; but, according to the *Echo Forestier*, people are less acquainted with the male cork (*liège mâle*), which is the first formed about the tree, and which has been little used on account of its innumerable ruggosities. It is, however, well adapted for the facing of damp walls, on which it should be nailed, so that the rough face is always outwards; plaster is then added on this side. This treatment has given excellent results, and it has been possible to paint or paper walls so treated, the dampness of which had previously been combated in vain. It is suggested that the comparatively low price of these facings, together with their advantages, ought to lead to an innovation which would result in the utilisation of much material now wasted, and the extension of the plantation of cork oaks in Algeria and other regions where the destruction of forests proceeds at present with alarming rapidity.

New Church for Heaton.—We understand that the members of the Presbyterian Church of England, at Heaton, feeling the inconvenience and inadequacy of their present place of worship, have determined upon the erection of a church, with lecture-hall and other buildings, fronting to Tynemouth-road, and have commissioned Mr. J. J. Lish, architect, Newcastle, to proceed at once with the designs, and invite tenders for the carrying out of the works, with the view of having the contract let, and substantial progress made with their new buildings before the winter sets in.

New Theatre Royal, Dublin.—Mr. C. J. Phipps has prepared plans for the new Theatre Royal, intended to be erected in Dublin upon the site of the old theatre, which last February was destroyed by fire. In the new plan the position of the theatre is reversed, the frontage being towards Hawkins's-street, and it is thrown back some 40 ft., so that the proportions of the façade may be better seen, and a greater space allowed for carriages. A carriage-porch, somewhat similar to that at the Italian Opera House, Covent Garden, gives access by five doorways to the outer vestibule on a level with the street, into which also open two other doorways for those coming on foot to the crush-room, 31 ft. by 50 ft. Here are entrances into the corridor of the auditory for visitors to the orchestra-stalls and the pit-stalls on the same level, the grand staircase to the dress-circle or first tiers on the right hand, and that to the upper-circle or second tier to the left hand. The pit proper is entered by an arcade of three doorways in Poolbeg-street, and two flights of stairs lead to the pit corridor immediately above the pit and orchestra-hall corridor. There is a special entrance for the Lord Lieutenant in Hawkins-street. The dress-circle has six rows of arm-chairs, and behind this are private boxes opening out from the corridors. Every tier of the auditorium has its inclosing corridor. Immediately behind the corridor of the dress-circle is a spacious *foyer*, 31 ft. long by 50 ft., intended to be used as a drawing-room, and for a promenading, refreshment, and smoking room. The dress-circle holds, with private boxes, 400; the upper-circle, 400; the orchestra and pit-stalls, 1,300; and the gallery, 1,300,—making the total number the auditory will hold over 3,400, which is about 500 more than the old theatre could contain. The width of the proscenium opening is 33 ft., and the stage is 72 ft. wide between the walls, by a depth of 65 ft. The style of the exterior elevation is Italian. The architect believes that by the autumn of 1881 the theatre will be ready for opening.

Loans for Public Works.—The fifth annual report of the Public Works Loan Board, 1879-80, has been presented to Parliament. The Loan Commissioners mention that four Acts affecting them were passed during the session of 1879,—two of them being the Artisans' and Labourers' Dwellings Act (1868) Amendment Act, and the Public Works Loans Act. The Commissioners remark on the number of harbour loans that are in arrear. They say that the Acts of Parliament passed to enable harbours to be made practically hind them to entertain an application for a loan where the estimate of the cost is shown to be trustworthy and the revenue appears sufficient. They are strongly of opinion that, with a view to prevent loss to the Exchequer, it would be expedient that when Parliamentary powers of borrowing are conferred for the execution of harbour works, further authority should be given for levying and assigning rates on property as collateral security for the repayment of the money to be advanced. They maintain that this course is perfectly equitable, as the property in the district, the inhabitants of which are the promoters of the harbour scheme, will be primarily benefited by the execution of the harbour works. A similar course has been adopted in the case of railways and of one or two municipal corporations, who are also the harbour authority. In Appendix F appear the particulars of the loans granted in the past year. In all, 3 381,621*l.* was advanced in 1879-80 by the commissioners, as compared with 3,471,358*l.* in 1878-9. Of this sum of 3,381,621*l.*, 980,776*l.* was advanced under the Elementary Education Acts, 1,637,819*l.* as sanitary loans, 111,546*l.* under the Artisans' and Labourers' Dwellings (Scotland) Improvement Act, 1875. Notice has to be given beforehand of the amounts intended to be applied for, and the notices greatly exceed the sums actually advanced. The notices given in 1879-80 were for 11,300,180*l.*; the notices given for 1880-1 are 8,735,663*l.*

The "Inner Circle" Railway Completion Bill was before the House of Commons on Tuesday last, when it was opposed by Mr. Alderman Lawrence and others, chiefly on account of the powers sought for "under-pinning" and "burrowing" under houses without compensation, which, it was contended, constituted a breach of the Lands Clauses Consolidation Act, and a new departure in Private Bill legislation. The Bill was discussed at some length, and in the end it was thrown out by 151 to 133.

How Wood is affected by Imperfect application of Creosote.—Some misapprehension concerning the properties of creosote as a preservative of wood appears to exist which is very desirable should be removed. The *Timber Trades Journal* says, "Vegetable matter decomposes rapidly when under the presence of heat, and when the vapours which result from the fermentation consequent cannot escape. To give to wood an external application of creosote to close the pores of the wood, and so to prevent the vapours which arise as soon as fermentation commences from passing away. Under such conditions fermentation rapidly increases, and, as a matter of course, decay quickly follows, and, when it has once commenced, its progression is very rapid. When wood is properly treated so as to receive creosote, the air is exhausted from the sap vessels, and the creosote oil being thus enabled to pass completely through the pores, or channels, the wood is, by the aid of a powerful pump, he thoroughly saturated with the oil, and the antiseptic qualities of creosote would then effectually prevent decay in any form. If an external application of creosote were not positively injurious to the wood,—which we, however, maintain it is,—the oil is so vaporizable that a mere coating would in a few weeks, being so completely exposed to the action of the atmosphere, evaporate to such an extent that any beneficial action which it is possible it might have once possessed would have departed, and then the cost of the operation would be thrown away entirely. The evaporation would in a few weeks he so complete that we doubt very much if the presence of creosote could he even detected by the smell." Creosote has long been a useful ally to engineers, and it is important that its properties should he thoroughly understood. Properly applied to wood, its antiseptic properties effectually arrest decay, but its indiscriminate use is a great evil; for, as above pointed out, it will, if improperly, or rather imperfectly, applied, assist decay, and thus its employment is discouraged, and a real benefit is passed over.

Statistics of Glasgow.—Mr. William West Watson, F.S.S., City Chamberlain of Glasgow, in his annual report (lately issued) on the vital, social, and economic statistics of the city for the past year says,—The rainfall, which amounted to over 37 in., could not he called exceptionally drenching, but there was a ceaseless drizzle which extended over 204 days, and a low temperature. The births numbered 19,674, 10,018 boys, and 9,666 girls, a decrease of 220; and the deaths, 12,493, 6,244 of males and 6,249 of females, a decrease of 1,647; so that the natural increase of the population was 7,191, an increase of 725 for the period indicated. The marriages numbered 4,180, the lowest total recorded during the year since registration was instituted, and about 600 below the average. The population at the middle of the year Mr. Watson estimates at 578,156, or, including those resident in the suburbs, at 760,891, and he says that thus, beyond doubt or question, Glasgow stands the second city in the United Kingdom. The property consisted of 106,889 dwelling-houses, of which 2,216 were unoccupied; and other buildings to the number of 20,212, of which 4,684 were unoccupied. The rental amounted to 3,406,000*l.*, being an increase of 10,356*l.* on that for the previous year. Emigrants, principally Scotch, to the number of 20,535, of whom more than one half were unmarried adults, sailed from the river, mostly for the United States. The quantity of water sent into the city averaged 37,636,265 gallons a day, and the quantity of gas manufactured reached 1,833,678,000 cubic feet.

Wages in the Leeds Building Trades. The operative masons, bricklayers, and labourers of Leeds have to submit to a reduction of wages. On the 27th of January, the masons and bricklayers, who had been receiving 8½d. per hour, were given six months' notice of a reduction of 1d. per hour. Deputations representing masters and men have agreed, however, to a reduction of ½d. per hour, all other rules to remain unaltered. The labourers, whose rate of payment was 5½d. per hour, received notice of a reduction to 5d., and this will take place on and after the 1st of August.

The Bristol Wagon Works Company, Limited, the well-known makers of carts, wagons, &c, have recently changed the address of their London office, and appointed Mr. R. Hill, of 8, Victoria-chambers, Westminster (formerly of their works at Bristol), as their London representative in this department.

St. John Lateran, Rome.—The question of enlarging the tribune of the Basilica of St. John Lateran has, according to a *Times* correspondent, been decided in favour of continuing the works. They were commenced in 1876 by order of Pius IX., it being considered that the space the tribune afforded was insufficient for the celebration of the religious ceremonies with that decorum required in the cathedral church of Rome, *mater et caput* of all others. The works were, however, suspended on account of the alarm raised by archæologists, artists, and historians at the contemplated demolition of the ancient apse, and the great possibility of the important mosaics within it being irreparably injured, if not destroyed, in process of taking them down from their original position and replacing them in the new apse to he constructed. On Leo XIII. ascending the Pontifical throne he ordered an examination to be made into the archæological and liturgical exigencies of the case, and the possibilities of reconciling them. The investigations were carried on under the supervision of a member of the Sacred College, "of great authority in archæology," who ultimately set forth their results in a general report. The first step taken was the nomination of a Commission composed of the distinguished archæologists Baron P. E. Visconti, the Commendatoro G. B. de Rossi, and the Rev. Padre Bruzza, to report upon the antiquity of the apse and the mosaics within it, and their decision has been contrary to the opinions expressed by some, that the apse and a portion of the mosaics belong to the time of Constantine. The pamphlet points ont that the construction of the apse is not of that period; that no such stamps bearing the initials of Constantine have been found on the bricks as were discovered in numbers when the apse of old St. Peter's was demolished; that the original apse was reconstructed hy Sergius II. in 845, when he was compelled by the canon law to enlarge the cathedral church, and that his apse, after having been repaired hy Sergius III. in the tenth century, was in so ruinous a condition at the end of the thirteenth that it was rebuilt from the foundations by Nicholas IV.

Compensation Case.—At the Sheriffs' Court, Red Lion-square, on Wednesday, the case of Mein *v.* The Metropolitan Board of Works came before Mr. Under-Sheriff Burchell and a special jury. This was an appeal from an award made by Sir H. Hunt, under the Artisans' Dwellings Act, for premises erected in Foster-buildings, Whitecross-street, hy Mr. Mein, a tailor in Forcstreet, for his workmen. Being dissatisfied with the amount awarded, Mr. Mein appealed, but the jury were not allowed to know the sums mentioned in the award. Witnesses were examined on both sides, and the case occupied the Court till half-past six o'clock. Ahout 2,900*l.* had been laid out on the premises, and it was said that after notice of a new scheme Mr. Mein continued the building. Mr. Under-Sheriff Burchell left the case to the jury, either to assess the compensation on the money expended, or on the rental value, which exceeded 3,000*l.* The jury assessed the compensation at 2,750*l.* It was stated that the award made by Sir H. Hunt was 2,900*l.*, and the verdict heing under that amount, the claimant will have to pay costs of both sides.—*Metropolitan.*

Pneumatic Bells.—Considerable improvements in pneumatic signalling apparatus are effected by Mr. A. Clarke's patent. The airholders as now used are made wholly of indiarubber, and of a hemispherical or oval form, being entirely closed with the exception of a small hole generally fitted with a short tubular neck for connexion to the air-tube leading to the bell or indicator. These holders usually contain a spring to expand them after they had been compressed, and are found to he snbject to several disadvantages. Mr. Clarke's invention obviates these by making the air-holder of a cap form, *i.e.*, entirely open on the flat side, so that it can he readily cleaned out before being fixed for use, and of such a shape and thickness that it will not collapse with usage. It also dispenses with the spring inside the airholder, except for long distances when a pull-handle is used; a spring is applied inside the airholder, but does not touch it in any part. Should the airholder at any time reqnire to he removed it can he without injury to the wall or paper. The invention also comprises improvements whereby the valves obliged to he used to prevent the return of the air in long tubes are dispensed witb.

The Sanitary Condition of City Establishments.—The attention of the City Commissioners of Sewers has recently heen directed to the sanitary, or rather the insanitary, condition of the residential portions of some of the large City establishments in the drapery and other trades. In the particular case which came before the meeting, a large nnmher of yonng men and women seem to have heen stowed away at night in small, low-ceilinged, and hadly-ventilated rooms contiguous to dilapidated and hadly-constructed water-closets. Under such conditions it is not to be wondered at that disease broke out. Dr. Sedgwick Saunders, the medical officer of health, hopes that the facts elicited and published in the report of the sanitary inspector may have some effect in directing the attention of the heads of large warehouses to the necessity for some kind of supervision over the residential portion of their establishments.

Art Exhibitions for Glasgow.—The Glasgow Institute of Fine Arts have arranged to hold a loan exhibition of works hy the late Sam Bough, R.S.A., and the late G. P. Chalmers, R.S.A., and an exhibition of works in black and white, the first that has been held in Scotland, simultaneously, in the months of August and Septemher.

TENDERS

For Board schools for girls and infants, for the Bushey School Board, Herts. Mr. H. H. Bridgman, architect. Quantities supplied by Mr. Frederick Thomson:—

Larter	£2,848 0 0
Scrivener & Co.	2,793 0 0
Andrews & Son	2,787 0 0
Toms	2,769 0 0
Chadwick	2,648 0 0
Wall	2,631 0 0
Hunt	2,600 0 0
G. & J. Waterman (accepted)	2,388 0 0

For alterations and additions to Nos. 332 and 334, Mile End-road, for Mr. J. Bishop. Mr. Geo. Ashby Lean, architect:—

Holloard	£995 0 0
Judd	949 0 0
Field	931 0 0
Parrish (accepted)	840 0 0

For works at Elm View, Hendon, for Mr. Alfred Smart. Mr. William Theobalds, architect:—

Willett, Hendon, (accepted).

For completing 27, Store-street, Bedford-square, for Mr. C. Rigby. Mr. A. Jowers, architect. Quantities supplied by Mr. H. Lovegrove:—

Stimpson & Co.	£618 0 0
Langmead & Way	617 0 0
Longmire & Burge	598 0 0
Patman & Fotheringham	593 0 0
Halliday	565 0 0
Blandford & Co.	559 0 0
Grover	548 0 0
Williams	500 0 0
Steep	475 0 0
Bishop & Hooper (accepted)	459 0 0

For repairs and ventilation to the Clayton Memorial Schools, York-street, Walworth. Mr. Ellis Marsland, architect:—

Marsland, Walworth	£320 0 0
Gilbert, Camberwell	265 0 0
Morby, Fleet-street (accepted)	248 0 0
Tyerman, Walworth	242 0 0

For alterations and additions to residence, Champion Park, Denmark-hill. Messrs. Adams Murphy & Pulley, architects. Quantities not supplied:—

Andrews & Anson	£1,695 0 0
Hayward & Sons	1,560 0 0
McLachlan & Sons	1,471 0 0
Colls & Sons	1,445 0 0
Maxwell Bros.	1,388 0 0

For the erection of a pair of semi-detached residences, at Deptford Lower-road, for Mr. Edward Sheppard. Mr. W. T. Hunt, jun., architect:—

Redman	£1,237 0 0
Redman	1,175 0 0
Newman	1,160 0 0
A. & F. Smith (accepted)	1,045 0 0

For alterations and additions to the Hercules Pillars public-house, Greek-street, Soho, for Mr. Higgins. Mr. W. J. Worthington, architect. Quantities supplied:—

Earle & Son	£750 0 0
Grimwood & Sons	679 0 0
Phillips	637 0 0
Pickersgill	612 0 0
Lamble	563 0 0
J. & H. Cox	543 18 0

For building a "Bon Marché," at Kilburn, for Mr. Cossey. Mr. H. E. Williams, architect. Quantities supplied:—

Lamble	£3,278 0 0
Barnes	2,999 0 0
Denton	2,940 0 0
Marr	2,873 0 0
Patman & Fotheringham	2,695 0 0
Aitchison & Walker	2,475 0 0

For alterations to 103, Tottenham-court-road, for Mr. W. Mackness. Mr. George Edwards, architect:—

Richardson	£435 0 0
Stimpson & Co.	279 0 0
White	273 0 0

For alterations and additions to house at Leatherhead, for Mr. H. Courage. Mr. W. G. Bartleet, architect:—

Brown	£550 0 0
Batchelar	535 0 0
Walker (accepted)	534 0 0

For the erection of four cottages and shop at Leatherhead, for Mr. James Attlee. Messrs. Bargman & Benison, architects:—

Hamblin Bros.	£1,470 0 0
Brown	1,427 0 0
Walker	1,394 0 0
Jarvis (accepted)	1,285 0 0

For curator's house and fencing, for the St. Neot's Burial Board. Mr. W. Jackson, architect. Quantities not supplied:—

Lord (too late)	£633 0 0
Osborne	597 0 0
Wellbam & Weycroft	569 0 0
Wade & Edey (accepted)	529 10 0

For alterations and additions to No. 13, Victoria road, Kensington, for Mr. G. S. Symons. (Second contract.) Mr. W. H. Collbran, architect:—

W. Farthing & Co.	£410 0 0

For enlarging dining-saloon and building servery (exclusive of decorations) for Major-General C. Baring, Belgravia. Mr. W. H. Collbran, architect:—

Hart	£216 0 0

For additions to premises, Curtain-road, for Messrs. Parker Bros. Mr. J. Hamilton, architect. Quantities by Mr. A. Johnson:—

Crabb (accepted)	£2,058 0 0

For pulling down and rebuilding 23, Vanstone-place, Fulham, for Mr. James Compton. Mr. William Cowdry, architect:—

Barnes	£499 10 0
Lathey Bros.	453 0 0
Davis	432 10 0
Parkinson, Fulham (accepted)	392 0 0

For preparation of site for chapel, Loampit-vale, Lewisham. Mr. J. Cubitt, architect:—

Staines & Son	£287 0 0
Jerrard	270 0 0

For alterations and repairs at the North Pole, Shadwell. Messrs. Perry & Reed, architects:—

		Time.
Clarke & Bracey	£1,336 0 0	13 weeks.
Mills	1,171 0 0	——
Mark	896 0 0	12 weeks.
Staines & Son	896 0 0	9 ,,

For new south aisle at Christchurch, Finchley. Mr. J. Notton, architect. Quantities by Mr. Thacker:—

Grover	£2,053 0 0
Braid & Co.	2,024 0 0
Adamson & Son	1,986 0 0
Staines & Son	1,883 0 0
Lawrence	1,798 0 0
Flowman	1,735 0 0
Boyce	1,719 0 0

For Methodist Free Church new schools and chapel improvements, Forest-gate. Mr. F. Borebam, architect. Quantities by Messrs. Mann & Saunders:—

	Schools.	Chapel Works.
Horlock (in error)	£2,287 0 0	£ 900 0 0
Alexander	2,232 19 0	1,342 0 0
Sargeant	2,197 0 0	1,345 0 0
Godbold	2,110 0 0	1,260 0 0
Bangs	2,020 0 0	1,240 0 0
Morter	1,968 0 0	1,189 0 0

For the erection of a block of school buildings and appurtenances (to accommodate 916 children), at Grange-road, Plaistow, Essex, for the West Ham School Board. Mr. J. T. Newman, architect. Quantities supplied by Messrs. Curtis & Sons:—

Catley	£8,390 0 0
Abrahams	7,697 0 0
North Bros.	7,650 0 0
Hoskings	7,549 0 0
Hearle & Son	7,445 0 0
Boyce	7,443 0 0
Wall Bros.	7,429 0 0
Nightingale	7,234 0 0
Knight & Dustow	7,117 0 0
F. & F. J. Wood	7,087 0 0
Reed	6,998 0 0
Mortat	6,813 0 0
Gentry (accepted)	6,495 0 0

For the erection of three cottages, at Fetcham, Leatherhead, for Mr. J. Barnard Hankey. Mr. F. J. Dibble, architect:—

Batchelar	£932 15 0
Edser	895 0 0
Heselgrave	847 10 0
Hamblin Bros.	816 0 0
Brown	800 0 0
Walker (accepted)	798 0 0

TO CORRESPONDENTS.

SS. Mary and John's (E.C.) Church, Wolverhampton.—The works here (described in our issue of the 10th inst.) were carried out by Messrs. Dawson & Bradley (now Bradley & Co.), builders, Wolverhampton.

J. T.—W.—G. A. L.—W. H. C.—C. H.—S. & Son.—E. K.—W. C.—Mr. L.—J. C. R.—W. T. H.—J. J. L.—D. W.—F. B.—R. H. C.—Messrs. B.—J. H.—R. H.—D. A. O.—J. H.—P. Bros. (should send list of tenderers and amounts).—S. P. (we must decline to express any opinion as to whether the Vicar told a story or not!)—P. & Son (next week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

NOTICE TO SUBSCRIBERS.

THE INDEX and TITLE PAGE for Volume xxxvii. (January to June, 1880) was given as a Supplement with our Number for July 10.

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Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. lait at the Office in reply to Advertisements, and strongly recommends that of the letter COPIES ONLY should be sent.

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"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum prepaid. Remittances payable as above.

The Builder.

Vol. XXXIX. No. 1957. Saturday, August 7, 1880.

ILLUSTRATIONS.

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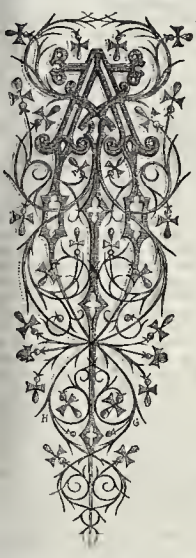


Sir John Soane's Museum.

GREAT many people in London whom one might suppose to be especially interested in art and architecture have hardly heard the name of the Soane Museum, and there are a good many among those who are familiar with its name who know nothing else about it. It seems strange that this should be so, but we have had evidence of the fact not infrequently where we should not have expected it. One cause of the comparative neglect of so interesting an institution is probably the fact of its being situated in what is now not a very central quarter, except for lawyers. Another reason, we have very little doubt, why some of those who know of it never visit it, is to be found in the rather complicated arrangement of the days for seeing it. London is provokingly full of places which can be seen on certain days in the week and not on others; and people are often prevented from visiting the National Gallery or the British Museum from not having at hand any note of their closed days, and fearing only to waste the journey thither. But in both these, as well as in other institutions which have closed days, the open and closed days are the same for all the year round, but in the case of the Soane Museum there is the additional complication that the days are different for different months in the year, and that during five out of the twelve months (September to January, inclusive) it is not open at all. It is impossible to be sure of remembering these in-and-out arrangements, and consequently no one feels safe in recommending any one to go to the Museum unless he is able, at the same time, to state the days on which it can be seen, and there is a general impression of some mystery concerned in gaining access to it. We have not infrequently heard asked why the original owner made such eccentric dispositions as to the time of opening. He, in fact, did not; he left directions that free access should be afforded to the public to see the Museum on at least two days in every week throughout the months of April, May, and June, "and at such other times in the same or any other months as the trustees shall direct." The trustees have accordingly invented the present complicated arrangement, which is very inconvenient to the public, and not in any way called for by the provisions of the Trust, and which they would do wisely to alter. If the same days of the week were adhered to during the months from February to August,—the time when the largest number of people are living in or visiting London,—that would be more easily remembered, and some perfectly needless trouble and uncertainty would be saved.

A few words by way of a reminder as to the nature and extent of the Soane Museum may not be out of place, on account of the comparative want of due attention which it meets with from professional and amateur architectural and art students. The outward aspect of the house on the north side of Lincoln's-inn-fields is simply that of an ordinary London street house, with some Gothic brackets and some caryatide figures fixed on the front. It was the dwelling-house of the eminent architect who made the collection, along with two other, or part of two other houses, which he purchased and threw into this one. In the rather rambling interior thus formed are to be found objects of architectural or archæological interest of the most varied description, showing how wide were the interests, and how active the mind, of the collector. But independently of the curiosities themselves, their arrangement, and the whole treatment of the house, are of interest as showing how much of individuality and picturesque arrangement may be imparted to a house even within comparatively small limits. Everywhere there is the evidence of original taste displayed in a kind of *curiosa felicitas* of arrangement, sometimes eccentric, always effective: nothing seems to be done as we might find it done in any other house. There is a little trickery in the ingenious use of mirrors in various places. Soane seems to have been fond of the effect of reflection, and to have aimed at breaking and destroying the sense of limited size, and giving apparent vistas to the eye by the use of mirrors where they would not naturally be looked for, and where for the moment they furnish not infrequently a complete illusion. As he was equally fond also of leaving unexpected peeps through unexpected corners, it is difficult often to decide at a glance whether we are really looking through an opening into another compartment of the house, or whether we are deceived by a mirror. The most effective use of the mirror is, perhaps, in the frieze of the library, the front room on the ground-floor, where glass is used on two sides over the cornice of the book-cases, which, being kept clean and free from dust, produces precisely the effect of an opening, a kind of clear-story, over the top of the book-case into another apartment. The ceilings of these two rooms are decorated with paintings by that weak and "pretty" painter, Howard, whose female figures have all the same insipid regular and inexpressive countenance. One of the larger compartments is evidently an inspiration,—one might perhaps say a plagiarism,—from Guido's "Aurora." There is a certain instruction conveyed by the comparison of these paintings, as well as of some other things in the house which are *passés* in taste with the taste of the present day. It is certain that no æsthetic person, architect, poet, or artist, would at present endure to have paintings in the style of these of Howard's on his walls or ceilings; in fact, he dare not have them, he would be a marked man. Yet these were considered beautiful and appropriate by a man of exceptional refinement and culture in the early part of the present century. It is equally possible that some of the mural decorative painting by a special school of painters which is so run after now, may appear just as weak to the eyes of spectators fifty years hence as these of Henry Howard's appear to us. Not, of course, that we would for a moment imply that there are no fixed grounds of criticism, no work which appears beautiful equally to its own and to succeeding generations. But it is certain that in almost every generation, at least during the last two centuries, there have been tastes of the time which have been mere fashions, which are obviously so to us who regard them now, yet which were most implicitly believed in by those who commissioned and those who executed them. What will future generations think of our Burne-Jones-ian beauties, with their long necks and protruding chins, and our decorative classically-draped damsels with conventional flower-jars beside them? Perhaps visitors may then wander over rooms decorated in the taste of to-day, and say, "How curious that people should have seen beauty or meaning in these stiff artificial figures!"

The models of restored Greek and Roman buildings in the dining-room, though on a small scale, are interesting as giving a means of immediate comparison of scale and proportion in some of the most important buildings of the great Classic period. Sir John Soane's portrait by Lawrence hangs in this room; and scattered about are various antique fragments, vases, &c., some of them of very exceptional interest. Through the little ante-room in one corner of the dining-room, filled with small antique fragments and casts (for every inch of space seems to have been made available by this enthusiastic collector), we come on a medley of things which seems bewildering at first, though they are all really very carefully arranged and distributed. In a gallery running east and west are numerous casts of antique sculpture and architectural ornament, mingled with bits of original antique work, as much being crowded into the space as it could possibly hold so as to allow any room for visitors at all. Eastwards through this room is reached what is called a corridor, but should rather be called an antechamber, in which are some fine fragments and casts of capitals, including a very interesting piece of an Egyptian capital, showing more relief in the design of the bell than we meet with in the most familiar forms of Egyptian capital. Through this ante-

room is the picture-room, which of all parts of the Museum shows most admirably the hand of the architect,—the man cunning not only to design artistically, but to arrange and contrive practically, and finding, like every true architect, a pleasure in clever contrivance and arrangement for its own sake. The picture-room contains Hogarth's election scenes,—the four pictures of the "Entertainment," "Canvassing," "Polling," and "Chairing the Member," once the property of pleasant David Garrick, and bought, at the sale after his death, by Soane. Among other works in the room are prints and drawings by Piranesi, a large Canaletti, and a considerable number of small paintings of architectural subjects, chiefly Classical ruins, by Clerissean, whose name is very likely unknown to many of our readers, but who had a decided specialty of talent as a painter of old buildings. Now we have got tired of painting old Classic buildings, and our most painstaking and talented architectural artists are rather taking to finding out the beauty of old barns and red-brick house fronts, which also no doubt have a beauty of their own. Still, there was about the subjects which Clerissean painted a poetic interest and a faded dignity and grace which we do not find in architecture of the red-brick epoch. Every taste has its reaction, however; only people have a habit now of mistaking the reaction for a new impulse in artistic production. But we are wandering ("re-acting") from Sir John Soane's picture-room, part of the interest of which certainly consists in the room itself, and the way in which it is fitted up. By an arrangement of reversible panels on the walls, more pictures are exhibited in this small room than could be shown in the ordinary way on the walls of a room of more than twice the dimensions. Then the south side of the room, which at first seems to consist of picture-screens similar to the rest, opens entirely, and the visitor looks over a railing down into the little room in the basement filled with Gothic work, and called "The Monk's Room," and across into a large recess backed by a stained-glass window, and in the centre of which stands a statue. It is worth while for those who are concerned in the arrangement of plans for producing effect, to see how much interest and novelty of picturesque effect has been produced by Soane in dealing with rooms of exceedingly small dimensions. The picture-room contains also one of those combination views of all the architect's works which were a favourite device at one time, and of which Cockerell made one in honour of the genius of Wren, the engraving of which is well known.

The little Gothic parlour in the basement, reached by a staircase from the vicinity of the picture-room, would not be of so much interest to Mediævalists of the present day as it might have been to those of fifty years ago; but it is surprising, considering the date at which Soane practised, and his own decidedly Classic tastes, that he should have shown so much interest in Gothic detail as the odds and ends in this little room evince that he had. The rest of the basement is occupied much as the ground-floor gallery over it, with various casts of figures and details, except the centre portion, where is placed the great Egyptian alabaster sarcophagus discovered by Belzoni in 1817, and purchased by Soane in 1824. The British Museum contains no such treasure as this in its Egyptian department; it is a wonderful relic, and enough in itself to give a European fame to the collection which contains it. Belzoni said at the time (in his account, which is copied into Mr. Wild's *catalogue raisonné* of the Museum) that this relic had not its equal in the world, and we know of no Egyptian discovery since which can be said to render Belzoni's opinion out of date. Soane bought it for 2,000*l.*, but it would probably command a sum very far in excess of that if it were offered for sale now. The exceptional character of the sarcophagus consists in its size, the preciousness of the material, from which the sarcophagus has been sunk out from the solid mass, only the lid being separate, and the minute and elaborate figures and hieroglyphic writing with which it is covered within and without, and the beauty of execution (from an Egyptian art point of view) of the large figure drawn on the bottom of the interior. The lid was unfortunately broken; the late curator, Mr. Bonomi, had the pieces arranged in the room over the ground-floor gallery, called in the catalogue "The Student's Room."

Going up to the ground-floor gallery again, and round to the south-west corner of it, we come on the breakfast-room,—a little gem of a room,—on which the former owner had evidently bestowed most affectionate embellishment. The breakfast-room is reached through a small lobby which, like every other corner of the house, is filled with casts and curiosities, and the room itself has been given a domical ceiling, with a little lantern in the apex, with miniature painted glass subjects in its sides. The room contains a collection of casts from antique gems, some splendid illuminated books, and various drawings, engravings, and designs, some of which are shown in turning cabinets or panels carrying objects on both their faces, in the same manner as in the picture-room, and turning on hinges on either side of the window.

Going out into the entrance-lobby and up the principal stairs of the house, we find even on the staircase every corner and window-shelf and recess carries its own object of interest. Here is Flaxman's original model for his immortal group of Michael and Satan, there a model at the life-school of the Academy, by Bailey; in a recess off the stairs a small collection of works relating in one way or another to Shakspeare ("The Shakspeare Recess"); in the corresponding recess on the next flight is a collection including a copy of part of the entablature of the Tivoli circular temple, whence this is called "The Tivoli Recess." These two recesses open anglewise off the winders of the stairs, and look as if, in the original economy of the habitation, they might have been water-closets or housemaids' closets (if the latter institution was known in Soane's time). To give an idea of the variety and multiplicity of interest of the Museum to those who have not been there, we give the list of objects to be found in this one last-named recess only, off the upper flight of stairs:—

A cast of a bas-relief of a "Grecian Feast," modelled by Flaxman during his studies in Italy.
A cast of an alto-relief by Banks, modelled under similar circumstances, "The Grief of Achilles."
An original terra-cotta model by Banks for his "Caractacus before Claudius."
A bas-relief in terra-cotta from the Borghese vase, modelled by Flaxman at Rome.
A model of a Sleeping Child, from Chantrey.
A cast from Flaxman's "Shield of Achilles."
Copies of Flaxman's figures of Cupid and Psyche.
Copy of a piece of the Tivoli entablature (as before mentioned), half the size of the original.
A painted-glass window, a copy of one compartment of the window designed by Reynolds for New College, Oxford.

The element of copying or reproduction is more represented here than in most parts of the Museum, so it must not be taken as typical in that way; but it will be admitted that this is pretty well to find in a corner of the stairs on the way from one room to another. The front drawing-room on the first floor contains Hogarth's celebrated series of the "Rake's Progress," the eight pictures being placed on easels in the middle of the floor; owing to the angle at which they are placed to the light, and their being also covered with glass, the details of some of them are not very easily seen: we should suggest that they might possibly be placed in some more advantageous position, but it must be admitted that the space is limited. The ceiling of this room has been very elaborately treated by Soane; and the room itself contains a medley of things besides the Hogarth pictures: drawings by Rubens, Ostade, Clerisseau, Stothard, Corbould, Panini, &c.; medals, bronzes, Indian furniture, models of statues by Flaxman, and a number of other objects of interest, including casts in gold, silver, and bronze of the medal "struck by the architects of England in honour of Sir John Soane," and the address presented to him therewith, on the 24th of March, 1835. Among the medals in the room are a series of 140 medals struck in France during the Consulate and reign of Napoleon. A pretty feature in this room is the treatment of the piers, which form really the main wall of the front and carry the outer wall of the story above, but in this story, as well as in the ground-floor, form a kind of internal loggia, a false front wall being carried up 2 ft. or 3 ft. in advance of the main wall of the front, and containing the windows. There is thus a passage between the window wall and the main piers, and in the drawing-room these piers have niches on the side facing the windows, and turned away from the room, in which are casts of antique candelabra from the Vatican: it makes a picturesque incident in the room when you walk behind these piers and find the niches and vases unexpectedly in the full light from the windows. The back drawing-room on the same floor contains a few good drawings and designs by Soane himself, especially parts of a design for a new House of Lords, in Classic style, with domes of an outline which Soane seems rather to have affected, somewhat low and squat, but looking very solid and monumental. This room, like the front one, contains a great variety of things, sketches, paintings, china, glass, and illuminated MSS. On the staircase ascending to the top story may be seen some bas-reliefs by Flaxman, and a medallion portrait of himself at the age of twenty-four. But we must stop enumerating, merely mentioning that the larger of the upper rooms contains, among a good many other things, large models of two or three of the Pæstum temples, as well as architectural drawings by Soane and others.

The library in the ground-floor room forms a large assortment of books bearing on architectural study,—mostly standard books, which can be consulted and studied, we believe, by application to the curator. But the library portion of the establishment contains other more out-of-the-way matters than these. A great deal of what is there is, in fact, not known or visible to general visitors. The *catalogue raisonné* which has been made by the present curator gives some hint of what is to be found which does not meet the eye, though only partially, as it is intended chiefly as a handy guide to visitors who do not know the place. Copies of Soane's own catalogue, handsome and large volumes in English and French, are placed on the library table for consultation. Of this catalogue only about 150 copies were printed by Soane, to send to amateurs and curators of museums in England and abroad. Among the things most prized is a very large collection of original drawings by Robert and James Adam, in no less than fifty-five folio volumes. These comprise chiefly furniture and decorative design, and many of the drawings are finished with a degree of delicacy which, coupled with their great number, gives a notable impression of the great industry of these "Adelphi," though we cannot (so far as we looked over them) agree with the remark in the catalogue that they are "of great interest to students of decorative art." They have great practical interest, no doubt, in this sense, that decoration in the style of the Adams has lately become the fashion, and that, for designers who want to dip their pockets by following the fashion, here is the very fountain-head to "crib" from; but we should be very sorry to see any student in which we felt an interest taking to the serious study of these designs as part of his education. They seem to us to illustrate significantly the fact that a man may be most industrious and earnest in his pursuit of his profession, and may be a beautiful and painstaking draughtsman, and yet may have missed true art altogether. There is, to say truth, little variety in these Adam designs: they harp on one string very much, and repeat the same conceits over and over again. Some of the furniture design is very good; some very bad. There seems no guiding principle; even the instances in which colour forms part of the design are too dreadful to think of—they set one's teeth on edge. Imagine a wreath with pink flowers on an arsenical green ground. Still, the value of the collection, as the best illustration possible of a phase in the history of English taste, we do not mean to underrate by any means. Among other collections of drawings is a volume of Thorpe's designs for houses with very roughly-drawn plans and elevations, in which some parts of the house are shown in geometrical elevation, and other details in perspective or bird's-eye view in order to exhibit them better: these illustrate curiously the *naïveté* of planning and arrangement of houses of the period, as well as some charming picturesque combinations and outlines, or what would be such in execution, though they are not shown to advantage in Thorpe's primitive style of drawing. Among other works of the same class are a collection of drawings by Wren, including many for his part of Hampton Court and for Greenwich, some by Inigo Jones, and a volume by Hawksmoor. Wren's are admirable specimens of clear, precise, but not laboured drawing.

It must not not be supposed that in running through the nature of the contents of Sir John Soane's house, we have by any means indicated a tithe of the things to be found in it; we have indicated their nature and variety, but the collection is so large, varied, and curious, that the wonder is that so much could have been got into so small a house, and arranged so as to be all seen. This, however, has been done, chiefly by the ingenuity and sense of order of the

leotor himself, hy whom the hulk of tbs collection was arranged just as it now stands. We have thought it worth while to give a little space towards recalling it to recollection, since, old as the Museum compsratively is now, it seems to hs practically unknown to many who ought to know it. This is partly, perhaps, hecause the fame of Soane's nams has been forgotten hy a generation intent upon another styls of architscture from that in which he laboured so industriously, and most people who read about or study architecture in the present dsy know little ahout Soane except that he was the srchitect of the Bank of Englsnd exterior design, as it at present stsnds; and many will he found to deny any particular merit now to a huilding in a style which the fashion of the present day turns away from. But in rsality the Bank of England, including the interiors, though no doubt open to criticism, illustrates very pointedly that which comes ont mors or less in most of the designs hy Soane that are extant, that he was an architect who thought for himself, who did not follow a beaten track, hut who put his own mind to an architectursl problem, and solved it in his own way. And the collection which he left hehind iu his house, and its admirable srrangement, indicate equally how he must have cared for his profession, how much of his heart and soul must have gone into it. One cannot help feeling, in walking over the houseful of srtistic objects and curiosities which he has left, how earnest this man must have heen iu his work, how wide-awake he must have been, how on the look-ont for everything of interest in connexion with his studies, how thoronghly practical as well as cultnred: and thus he, heing dead, yst speaketh, giving us the old lesson, "Whatsoever thy hand findeth to do, do it with thy might."

BIG BRIDGE CONSTRUCTION.

The rejection, hy a Select Committee of tbe House of Commons, of the Bill for the construction of a slightly modified bridge over the Tay, affords a practical comment on the observations we bave heretofore offered on the official inquiry into the causes of ths dissster which befel the former structure. That two engineers, one Roysl and one Civil, should have consented to csrry on such an inquiry in the absence of the drawings of the hridge, and without making any such representation as to tbe absence of those drawings as might, at all events, bave thrown the blame in the right quarter, was to us, at the time, inexplicable. We do not say that the Commissioners were bound to refuse to proceed with tbe inquiry in tbe absence of the drawings. But we did expect such an appeal to the Board of Trade in the first instance, and, failing redress, such a statement of the fact of this suppression of evidence in the report itself, as might have put the professional members of the Commission right with tbeir own brethren. As it is, the shareholders have to pay the piper. Considering all that had been said, and all that had not been said, as to the responsibility of Colonel Hutchinson in respect of what was called the examination of the bridge on tbe part of the Board of Trade before opening the line over it for traffic, ws do not see how Colonel Yolland could well have avoided reporting against the approval of a dssign which appears to bave been adopted by the directors of the railway between their first and their second appearance hefore the committee,—a design as to whicb the author admitted that "he had still much to verify." There is some confusion in the reports which ws bave read as to one point in his new design. From the evidence of Mr. Brunlees, it appsarsd as if brick piers on the existing foundations were proposed; but, on the other hand, it was stated hy counsel that the pisrs wsre to he for a double width of line, while the bridge was to he, in the first instance, only for a single line. We fully agree with Colonel Yolland in the opinion that a single-line bridge should not bo authorised. As to the question of brick or iron piers, it is a matter of design and of calculation, not to he settled off-hand, or witbout due investigation. Still moro important is the tbird requisition on whicb the Board of Trade has been advised to insist, namely, that the foundations should be entirely new. When demands of such a nature are made unexpectedly, hefore a committee, the promoters of a Bill are tsken ahack. It is possihle thst the addition of the proposed clauses would have the effect of at once douhling the cost of the bridge. At all events, this would take time to ascertain. Had the original design for the bridge heen produced and discussed hefore the commission of inqniry, this company would have known what to expect. New demands could not have hesn raised at the elevsnth hour; and the delay of a year, involving heavy expense, would have been saved to the company. As it is, however, the directors have only themselves to thank for an opposition which the suppression of the original plans rendered nnavoidable, though it is to be regretted that it was not announced until the latest available moment.

The question of entirely new foundations is one of very great importance. Its turning np at this last moment affords a very striking proof of the penny-wisdom, which may prove to be pound-folly, of stinting the proper outlay for an important work. If the traffic which the Tay Bridge was to accommodate was worth the cost of building a bridge at all, even if a single line of way would in the first instance have been sufficient to accommodate the trains of the company, no person of prudence would have sanctioned the preparation of foundations that were insufficient to carry a douhle way. If ths foundations had heen put in for a bridge of the ordinary width, and if, above a certain height, the bridge had hesn in the first instance proceeded with for a single way alone, it is very possihle thst the overthrow would have heen avoided. In any case, the contemplation that the need for a double line would arise at some future time ought never to have been omitted, nor should snch a mode of obtaining foundations have heen adopted as would have heen certain to involve a very grave engineering difficulty whenever the case of widening came to he carried out.

It is well to give full attention to this part of the case, hecsuse it points to something nearer home than Dundee. In the varions plsns which have from time to time heen ventilated as to the widening of London Bridge, ths advocates appear to have closed their eyes to the nature of tbe foundations obtained hy Rennie. This great engineer was compelled hy the City authorities to huild the noble monument in question in a spot which he considered not the fittest for the purpose. The true site of the bridge was ahandoned for the sake of saving the expense of a temporary bridge. As far as the means at the command of the science of his day went, Rennie made the hest of bis design. But it was touch and go. In fact, it was "go" for some 14 in., and though the movement of the ahutment was arrested, and the hridge has ever since been stable, there can he no certitude as to the anticipation how soon the steady action of the river in deepening its bed may set the hridge again on the move, and we think that there is very little room to doubt that any tinkering of the supsrstructure would very rapidly have that effect.

All huilders know how ticklish a thing it is to build a new wall as a continuation of an old one, into which it is to be honded. And if this he the case in the open air, on the side of a house, or on any line of plain surface, how is the difficulty increased if the junction has to he effected 30 ft. under water, in an estuary or tidal river? This task, which we think it would prohably prove impossihle to accomplish on London Bridge without some mishap, is not an easy one to effect in the river Tay. But the putting in of brick foundations for a double line would require such a junction of new and of old work. We think that it may be very seriously questioned whether it would not prove safer, and ultimately cheaper, to huild a new bridge *in toto*, and to remove all the piers of the old bridge, than to undertake the task of widening the piers of the latter. At all events, we hold it tolerably certain that there are no grounds for any confident expectation to the contrary. It might he possihle to coffer-dam round the existing piers, to excavate and lay wider foundations, and to carry up the whole as a sound piece of workmanship; but with evidence before the committee that it may he necessary to protect the hottom of the river from scour "by means of stone,"—in fact, to pave or pitch tbe bottom of the Tay, we feel sure that the very hest and most deliherate advice ought to be secured before making any such attempt.

The actual position of the Tay Bridge is such as to point to the need of an exhaustive inquiry into the theory of hridges of large span. At the present time the widtb of the span into which a hridge may he divided,—and we msy say the same with regard to the roof of a station, or of any great area,—depends pretty much upon the tsste of the engineer. The question of level, in the case, at all events, of the bridge, is here one of primary importance. A halance has to he struck hetween the cost of pier and that of arch; hetween the cost of numerous piers, and that of arches or girders over wide spans. No definite relation can he laid down as normal hetween the two estimates of cost, hecanse the cost of the piers differs to an extraordinary extent in different cases. Thus a span which it might he altogether extravsgant to use in the case of a wide flat valley, might prove to he economical in the csse of a dsep ravine. If any approach to a general formula of proportion is to he obtained, it must include an expression for the height of the piers, and another expression for the anticipated costliness, in the matter of obtaining foundations.

It is instructive, as giving some measurs of the progress made hy the engineer during the past sixty years, to compare the dimensions of Old London Bridge, according to the survey of it made hy Mr. Giles, in 1820, by order of the Committee of the Bridge Lands, with some of the latest erections of large spans, hoth in this country and the United Sstes. The width of the river between the ahutments of London Bridge, according to the survey quoted, was 931 ft. Of this width no less than 406 ft. 10 in., or above 42 per cent., was occupied hy the piers. But a further obstscle to the flow of the river was offersd hy the starlings, or pile-work protections, to prevent the piers from heing undercut hy the current, which amounted to 293 ft. 5 in. This reduced the wster-way, at low water, to 230 ft. 11 in., or rather less than one-fourth of the normal width of the river. The consequsnce of this contraction was to produce a row of waterfalls through the archos of the hridge, in which the river fell 2 ft. 1 in. at neap tides, and 4 ft. 4 in. at springs; an extreme fall of 5 ft. 7 in. having been noted dnring the occurrence of a highland flood, falling on a spring-tide ebh.

In contrast to this cumhrous and clumsy structure, we may cite the slaborste calculations brought hy Professor Clericetti, of Milan, hefore the Institution of Civil Enginsers, and published in vol. lx. of the Minutes of Proceedings of that Institution. The result, in two lines, is, that a girder can he constructed which would hear its own wsight for a span of 900 mètres, and that hy the addition of inclined steel cables, fixed to towers rising 90 mètres above the girders, a span of 1,500 mètres migbt he obtained. The pull upon the cable, in this case, is taken at 20 kilogrammes for eaoh squsre millimètre of cross seotion, or rather more than 13 tons per square inch. M. Max am Ende calculates the limiting span of a straight girder, with struts and diagonal ties, with 5 tons strain on the square inch, at 2,870 ft.; that for a straight girder, with diagonal struts and diagonal ties, at 4,000 ft. for iron, and 6,000 ft. for steel, witb a strain of 7½ tons per inch. For a parahoiio howstring girder, the limiting span is given as 3,000 ft., the corresponding depth of the girder heing 1,830 ft. For the parabolic fish girder, this gentleman proposes a limiting span of 4,200 ft., with a depth of 3,600 ft., in iron, and a span of 6,300 ft., with a depth of 5,400 ft., in steel. These are purely theoretical figures, and take into acconnt simply the force of gravity.

As to most of this, however, the practical builder will he content to allow it to remain in the cloudy limbo of algehraical theory. What is more to the point is to inquire of what spans hridges have been actually constructed. We can obtain some valuahle information on this subject from a paper by Thomas Curtis Clarke, M. Inst. C.E., which was read before the Institution of Civil Engineers on tbe 21st of May, 1878. But it is very remarkahle, as illustrating how far we yet are from arriving at any normal rules, such as we before indicated as desirahle, for the proportion between width of span and nnmher of piers, that in the 21 columns in which Mr. Clarke tahulates the information of which we are about to cite a portion, no mention is made of the height of the platform of the bridge above the water which it crosses.

The width of span, then, which has hesn obtained in tbe case of sixteen important tubular

and girder bridges, constructed of iron, up to the year 1877, are as follows:—

Where built.	Span.	Engineer.
1. Susquehanna River, U.S.	307	Phœnix Bridge Co.
2. Ohio River, U.S.	319	J. H. Linville
3. St. Lawrence River, Canada	330	Robt. Stephenson
4. Ohio (Parkersberg), U.S.	342	J. H. Linville
5. Rhine, Mayence	345	Gerber
6. Ohio (Louisville), U.S.	369	Albert Fink
7. Kentucky River, U.S.	375	C. S. Smith
8. Ohio (Louisville), U.S.	396	Albert Fink
9. Vistula (Dirschau)	397	Lentze
10. Conway, N. Wales	400	Robt. Stephenson
11. Ohio (Cincinnati), U.S.	415	J. H. Linville
12. Inn (Passau)	420	
13. Saltash	455	I. K. Brunel
14. Menai Straits	460	Robt. Stephenson
15. Lek, Holland	492	G. Van Diesen
16. Ohio (Cincinnati), U.S.	518	J. H. Linville

The figures merely indicate the width in feet of the longest span in each of the bridges cited. To these works should be added the suspension railway bridge over the Niagara river, immediately above the Falls, which was opened for traffic in March, 1855. The span of this bridge is 822 ft. 6 in. The height of the platform, which carries three lines of rails, of the respective gauges of 3 ft. 6 in., 4 ft. 8½ in., and 5 ft. 6 in., above the river, is 250 ft. Below the railway platform is suspended a second platform, for common road vehicles. The bridge is supported by four wire cables, of 10 in. diameter, each containing 3,640 wires of No. 9, B. W. G. The weight of the superstructure is 750 tons. The supporting strength of the cables is estimated at 7,000 tons. The bridge was designed and constructed by the late Mr. J. A. Roebling, the engineer in chief, who was also a manufacturer of wire ropes. The cost was about 500,000 dollars, or a little over 15*l.* per foot of span.

Of the bridges in the table, those built by Mr. Stephenson over the Conway, in 1848, the Menai Straits, in 1850, and the St. Lawrence, in 1859, are all tubular girders, through which the trains run. The bridges numbered 2, 6, 8, have the top chords cast, the rest of the girders being of rolled iron. The girders are quandrangular, with pin connexions. Numbers 1, 4, 7, 9, 12, 15, and 16, are all made of rolled iron. The Saltash Bridge, built by Mr. Brunel in 1859, crosses the river Tamar, about three miles north of Plymouth, at a place where the river narrows to about 1,100 ft. wide, and has a depth of 70 ft. It was at first proposed that this bridge should consist of seven openings, one of 250 ft. and six of 100 ft. each. But the Admiralty insisted that there should be only four spans, two of 300, and two of 200 ft. each, with straight soffits, and a clear headway of 100 ft. above high water. After a very careful and minute investigation of the bed of the river, made by 175 borings, carried on by aid of a wrought-iron cylinder 6 ft. diameter, and 85 ft. long, which was slung between two gun-brigs, and pitched at thirty-five different places on the river, Mr. Brunel decided upon adopting two main spans of 455 ft. each, supported on a masonry pier. For the construction of this pier a wrought-iron cylinder, 37 ft. in diameter and 90 ft. in length, was sunk through the mud at the bottom of the river to the solid rock. The total length of the bridge, including the adjoining land-openings, is 2,280 ft. It consists, besides the two main spans, of two openings of 93 ft., two of 83 ft. 6 in., two 78 ft., two of 72 ft. 6 in., and nine of 69 ft. 6 in. each. The central column, of solid masonry, 35 ft. in diameter, is 96 ft. in height from the rock foundation to above high-water mark. Upon this are placed four octagonal columns of cast-iron, 10 ft. in diameter, carried up to the level of the roadway, which is 100 ft. above high-water mark. Holding-down lewis bolts were let into the solid rock on which this pier was built, with iron bars built into the masonry. A description of the centre pier of this noble bridge, by Mr. B. P. Brereton, M. Inst. C.E., will be found in vol. xxi. of the Minutes of Proceedings of the Institution of Civil Engineers.

In the course of the discussion on Mr. Clarke's paper, from which we have cited the spans of sixteen large bridges, Mr. Barlow compared the efficiency and structural merit of the several designs, according to a method proposed by Professor Rankine, which consists in ascertaining the limiting spans attainable on each system. The bridges in question may be arranged in four classes, viz.,—(1), quadrangular girders, with pin-connexions; (2), the Saltash Bridge, which Mr. Clarke calls a lenticular girder; (3), lattice bridges; and (4), tubular bridges. Of these, the six examples of the first kind have an average limiting span of 900 ft., the several cases ranging from 852 ft. to 982 ft. Mr. Brunel's bridge, though of comparatively an early date, has a limiting span of rather more than 900 ft. In the lattice bridges, the waste of metal amounts to from 40 to 46 per cent., as compared with the former structures. In the tubular bridges it is still more; but it must be remembered that these were the first efforts to introduce iron in large spans in railway bridges.

In looking at the large amount of valuable information that may be gleaned from many of the sixty volumes of the Minutes of the Proceedings of the Institution of Civil Engineers, we are struck with the absence of any attempt to show such a comparative view of the cost of these great structures as would be of service in framing general rules for the guidance of the bridge-builder. The remarks which we have just quoted go in the right direction, but they only go a little way in that direction. Mr. Douglas Fox, in the discussion on Mr. Clarke's paper, gave the counsel to avoid large spans altogether if possible, because, if a pier could be introduced, even though the cost were the same, it would be a great advantage. We are disposed to agree with the recommendation. But what we want is, not to have it offered as an opinion; but to have the facts so clearly brought out as to allow them to speak for themselves. "The larger the span, the greater the risk in erection, and the greater the cost in maintenance." That, moreover may be true, but again we wish for proof. Again, the fact that certain elements of strength are required to increase, not as the span, but as the square of the span, is one that needs being brought fully out,—so as to show in what manner, other things being equal, the cost of one opening of 200 ft. span compares with that of two openings of 100 ft. span each,—taking the girders alone; so that allowance may be made for the piers according to the height of the structure. We find no attempt to bring this before the professional world, and we feel very sure that architects, engineers, and builders will have reason for gratitude to the writer who shall put into available form the large mass of experience which has been attained on this subject.

Mr. Clarke, in his reply, made some observations which show that American engineers have given due attention to a subject on which it must be admitted that English engineers have not of late exhibited the most profound knowledge. "A bridge," said this gentleman (whose address is given as in New York), "is a complex structure. It has to bear not only the force of gravity, but the side pressure of the wind. It had been said that it was a simple matter to provide against the force of wind, but that was really the most difficult and complicated part of the problem. The most economical height possible had to be used to resist the force of gravity; but then the side-pressure prevented the use of an economical height; consequently the bridge, when it was finished, was a compromise between the results of two forces. That was why the long-span bridges were comparatively not so high as those of shorter span. In spans of less than 200 ft. the proportion of height to span was 1-5th or 1-6th." When we find that this outcome of American practice was brought before the Institution of Civil Engineers in May, 1878, Mr. W. H. Barlow being in the chair, we cannot avoid referring to the opinion we felt bound to express (*ante*, p. 39) with regard to the report of Messrs. Hawkshaw, Bidder, Harrison, and Barlow, as to the adoption of 10 lb. as side-pressure on the Forth and Tay Bridges. In this country, when the first bridges of wide span were designed by Mr. Stephenson and Mr. Brunel, the question of wind-pressure, although duly considered by those experienced engineers, had not assumed the importance which attached to it in the opinion of the designers of the bridges on the American pattern. We have on record references to investigations as to the force of the wind on the Menai Bridge, as well as to the wind action on the suspension bridge of Telford over the same Straits. But with regard to the tubular girders we might almost as well have inquired whether a storm of wind could blow down the walls of Conway Castle, as whether it could shift or overthrow the great tubes. And in the case of the Saltash Bridge, where the resistance offered to the side pressure of the wind was comparatively so small, we have seen what were the ponderous dimensions of the central pier. Those were the works of the fathers of our railway system; and whatever may be said of the advance of science since, it is certain that Stephenson and Brunel did not build works which it was unsafe to cross in a storm, were it the fiercest that ever blew in our island. What we feel to be so lamentable,—we might use a stronger word,—is the comparison of the evidence and arguments offered as to the Tay Bridge with the practice of our two great engineers on the one hand, and with the study, as well as the practice, of their engineers of the United States on the other. In the discussion to which we have referred, one engineer, Mr. E. W. Young, said that "in every bridge designed by him 40 lb. wind pressure per square foot had been allowed, and security obtained." "The difficulty in designing girders of very long span is to get width enough to resist wind-pressure," observes Mr. Clarke. It would be well if every student who reads the reports made to the Board of Trade by Mr. Barlow and Colonel Yolland, as well as that of Mr. Rothery, were also to read with attention the debate from which we have made extracts. It will strike them, we think, that the degree of knowledge of wind-pressure that has been brought to bear on the subject of the Tay Bridge by all those who have given advice or evidence on the subject is very far below that which is common to the engineers of America, of Germany, and of France.

EXHIBITION OF METAL WORK IN PARIS

It is but a few weeks since that the annual *Salon*, with its 7,000 exhibits, closed its doors, and now we have to announce the opening of the Palais de l'Industrie, on Saturday, July 31st, of the sixth biennial Exhibition of the "Central Union of the Fine Arts applied to Industry." The first of a special series of exhibitions, each devoted to some important branch of the industrial arts, this year's exhibition shows very properly the ancient art and industry of the metal worker.

Incomplete as naturally the show might be expected to be at this early stage, it is not difficult to judge of its character. Amidst the confusion, the hammering, and the general arrangement of tardy exhibits, an order is observable, and by the excellent management of the president, M. Henri Bouilhet, we shall in a few days see "cosmos" issue from all this apparent "chaos." When all is arranged (particularly the museum, not opened on Saturday) those interested will have it in their power, between this and the middle of November, to examine with care the interesting collection of objects which have been gathered together under the hospitable roof of the Palais de l'Industrie, which, since the Great Exhibition of 1855, has opened wide its doors and afforded shelter to ample space for so many artistic and industrial wonders, not alone of France, but of the world.

The promise is sufficiently extensive in show that is made by the various trades connected with the great metal industry; there a retrospective museum, with its specimens of work of the past; the working drawings of industrial compositions,—among these a number by Viollet-le-Duc; a series of models of decorative paintings by contemporary artists completed by the various competitions that will be held during the exhibition, add to the various other attractions of a more popular nature which are never wanting in a French "Exposition," and it will be seen, we think, that the Union Centrale have skilfully prepared their campaign for 1880.

Those who remember the modest commencement of this society, and its comfortable if narrow quarters in the old Palais Royale (the Place des Vosges of to-day), and who may even then have derived instruction from its well-selected library, may congratulate the promoters of this society on the enormous progress they have made in carrying out their original aim.*

A demur is often expressed in England, not only as to the desirability of these great shows, but with the general public, and even with the various professions, such exhibitions are very troublesome and "boring"; but whether or not that the French people can stand a great

* What this progress has been (particularly in connexion with the tapestry exhibition of 1876, the last held, to which reference was made in these columns) the President and Vice-president showed in the two speeches made at the close of the exhibition, and reprinted as an introduction to the present catalogue.

more "boring" than others (as they seem to show by the patience with which they can sit out lengthy performances, or twenty-five minute *entr'actes*), or that they are sound in their appreciation of exhibitions, it is certainly the case that rarely in Paris does one hear any person complain of being "bored" at the Palais de l'Industrie.

This great difficulty overcome, ample opportunity is afforded for the consideration of the means to attain the chief aim of the exhibition, whether it be artistic, industrial, or scientific. The importance of this question may be judged when it is remembered how, through a misconception of the requirements of the public, the excellent and interesting series of technical exhibitions which were to be annually held at South Kensington miserably collapsed. In Paris the success of each succeeding exhibition is proved to be greater than the last, a fact encouraging to those who have expressed it as their opinion that exhibitions have now entered entirely into the needs and habits of modern existence.

Certainly, one of the most valid arguments that can be brought against some of the exhibitions recently held is their too general character, in which, by their very vastness, any special aim has been overlooked. This having been admitted, we cannot too warmly thank those who, resisting the fascinations of pecuniary success and popularity, have determined that the exhibition under their management shall prove of a character purely instructive in its highest sense. In reality both the public and the professional world are gainers by this arrangement.

It is, of course, difficult to tell the direction that the industrial arts might have taken unaffected by the impetus given to them by the Great Exhibition of 1851. Art in its application to industry was rapidly passing even beyond the influence of tradition, and normal as may have been the cause which led to the revival, we may at length feel that we are progressing on the road to a more general spread of refined taste, which, let it be remembered, was not so universal in the past as many either believe or would make us believe. The foundation of the numerous museums and schools which have followed on the art revival of the middle of the century,—never can sufficient credit be given to the great promoter of the movement, Prince Albert,—the artistic agitation in favour of a return to traditional art, fostered by equally earnest literary support; the foundation of societies and journals, have all influenced powerfully within twenty years the relations of art and industry to each other. In all civilised countries the same movement is to be traced; in England and America efforts made in this direction are leading to results which are to the utmost degree satisfactory when the short time is taken into consideration during which the new teaching has been practised. In France, the decadence into which the industrial arts had fallen a generation or so since aroused, as it had in England, the energy of the more thoughtful and observant; it was felt that some effort must be made to arrest the industrial arts, too evidently on their downward slope. Much was said and written at the time by professors and professional critics, and eventually a society was formed,—the aims of which we have already discussed in these pages,—the title of which suffices to show the direction in which the members desired to act upon the public, the "Central Union of the Fine Arts applied to Industry."

The consideration of the fine arts in their application to industrial purposes was a subject of no small importance; the society have not shrunk from their task, and have steadily been carrying out the intention of their originators. The present exhibition forms a portion of the plan, but it is not alone on this means that the society relies. In addition to its excellent working library,* it affords a series of lectures treating always of art in its application to industrial purposes; and competitions open to students of Paris and the provinces. The object of the society is in every way to further in the mind of the designer and the workman a sense of the importance of the beautiful in connexion with the useful,—an aim which is so rarely attained in this essentially utilitarian age.

* From a recently-published monthly report we learn that during March and April of this year respectively some 365 and 567 artists and artisans, sculptors, painters, designers, engravers, chisellers, decorators, architects, jewellers, cabinet-makers, lithographers, and others, worked in the library of the Society. In March 320 works, in April 635, were consulted. This, for a private institution, is a satisfactory piece of statistics.

If there is a want of the beauty which the artists of the past so universally placed in their simplest work, may not a reason be sought in the absence of our respect for the traditions of those older masters of ours, who themselves in every work they produced showed so religious a worship of their predecessors? Without we avail ourselves of the great lessons of the past, how can we hope to do more than did Robinson Crusoe on his island, puzzle out with infinite difficulty the objects which he needed for daily life, and to the construction of which he had never before devoted a moment's thought? Availing ourselves of the lessons of the past, we may leave valuable instruction for the future.

As an important factor in the education of the designer and the workman, this knowledge of what his predecessors have done cannot be too constantly brought forward; and the "retrospective" museums which the French so successfully prepare, and which form a marked feature in the educational scheme of the Union Centrale, form an admirable school for the young artist and the young artisan, who have by our modern system,—in which the hard and useful apprenticeship of the past is abolished,—so much to learn. Nothing more curiously showed the deficiency of even the most ordinary technical education than the recent competition for a design in metal, held by the Union Centrale, and of which we had intended to speak before now. In the designs, skilful as they were, it was easy to detect the absolute insufficiency of the knowledge indispensable to every artist, an ignorance of the most simple elements of architecture. It seems, wrote a French journal at the time, as if our designers had a profound contempt for serious and methodical study. "This," continues the same critic, "must be remedied, for it is by the order and severe nature of their system of study that the progress of our rivals has become visible, if not formidable,—a fact which would permit one to consider that we should end by allowing ourselves to be beaten if we did not add to our natural qualities those of the respectable artificer, by the aid of which neighbours, far less gifted than ourselves, have already made rapid advances."

Let us respect, therefore, the lessons of the past,—a piece of advice which at first sight might appear somewhat needless, were it not for many who, in their search for originality, would wish to ignore the bygone days. Such workers can never hope to attain their object; their originality will alone manifest itself as they find their minds better stored with the knowledge of what has been done before them.

Those who may take the gloomy view of the uselessness of any attempt to rouse the artistic sentiment in our nineteenth-century souls, who somewhat despairingly speak of "the whole current of human life setting resolutely in a direction opposed to artistic production," and who complain that we now possess "no love of beauty, no sense of the outward dignity of things, and, as a corollary, no dignity, no comeliness for the most part in their outward respect";* those, we repeat, who take this gloomy view of our nineteenth-century existence may be right, for an acquaintance with the history of the development of the human race shows us that its progress has not been uninterruptedly continuous; in the past the search after the beautiful and the useful has not been invariably pursued with complete success. In citing, therefore, the past as our teacher for the present and the future, a wise discretion must be exercised in the choice of the production of a period worthy the attention of the student; and it is the duty of the learned in the history of bygone days, to direct those under their control to the two most important points in all education,—what to emulate and what to avoid; from what encouragement is likely to be received; from what warning lessons are to be obtained.

* Sir Frederick Leighton.

Richmond.—Mr. John Barran, M.P., recently laid the memorial-stone of a new Baptist Chapel in Duke-street. The freehold site has cost 1,500*l.*, which includes a valuable building now on a portion of the ground. The new chapel will be octagonal, faced with stone, and carried out in the Early Gothic style. It will seat eventually between 700 and 800 persons. There will be school-accommodation and class-rooms. The estimated cost of the proposed building is 3,500*l.*

A CAXTON MEMORIAL.

The recent Printers' Exhibition at the Agricultural Hall, Islington, following the Caxton celebration held at South Kensington three years ago, has given to all those who were able to be present pretty good evidence of the progress made in the mystery of the art of printing during the past four hundred years.

At the present time there are very few persons indeed who have given their attention to any extent in the reading of current literature, who have not heard of William Caxton, the first English printer; but, at the same time, we venture to believe that there are a great many individuals who, while knowing the name of the Westminster printer, are nevertheless totally ignorant of the history of the times in which he lived, and, what is more, know nothing of the hardships he had to encounter in his professional capacity,—of his remarkable perseverance and industry, which, by a very small beginning, has produced that great power, the printing-press, to which, and to those who have laboured at it, from William Caxton's time to our own, the readers of this journal, and of every other printed sheet of paper, are so greatly indebted.

The late Mr. Charles Knight, a very worthy disciple of Caxton, very truly remarked, some forty years ago, "The object of the general diffusion of knowledge is not to render men discontented with their lot,—to make the peasant yearn to become an artisan, or the artisan dream of the honours and riches of a profession,—but to give the means of content to those who, for the most part, must necessarily remain in that station which requires great self-denial and great endurance, but which is capable of becoming not only a condition of comfort, but of enjoyment, through the exercise of these very virtues, in connexion with a desire for that improvement of the understanding which, to a large extent, is independent of rank and riches." Next, therefore, to the sustentation of the body, must naturally come the improvement of the mind,—and in working to this end, Caxton and his descendants have earned,—nobly earned,—the lasting gratitude of mankind at large.

It is not our intention to detail the life of Caxton, but only to give a few facts in connexion with his career, as a preface to our present article, which we have thought best to entitle a Caxton Memorial. The subject-matter is derived from the very interesting churchwardens' books of St. Margaret's parish, Westminster,—in which parish Caxton worked at his press and died,—and which books contain a remarkable account, in their various entries, of the remarkable times in which our printer lived. For these extracts we are indebted to Mr. T. C. Noble, who, through the great kindness and courtesy of the rector, the Rev. Canon Farrar, and the churchwardens, Messrs. Helder & Hockridge, has been permitted to have free access to and to carefully examine these very interesting records.

It was about the year 1422, and in the Weald of Kent, that William Caxton is supposed to have been born, and in 1437-8 an entry in the books of the Mercers' Company of the City of London informs us he and John Large paid four shillings as a fee upon being bound apprentices to Robert Large, who was an alderman of the City, and resided in the Old Jewry. But at the end of three years Alderman Large died, and the young 'prentice lad was "turned over" to a new master. We next hear of him at Bruges, engaged in the wool-trade, in which the mercers dealt largely, and in 1462 he is named as "Governor of the English Nation abroad," and copies of several letters to him, in that capacity,—one dated as late as June 3, 1467,—are still preserved in the Mercers' books.

In 1468 was solemnised the marriage of the Princess Margaret of York, sister of Edward IV., and Charles, Duke of Burgundy, and it was then, probably, that William Caxton first came under the notice of the duke, to whom, with two other mercers, he was a trade ambassador in 1469. It was in this year, too, we first find him appearing in print as a literary man, commencing, as he tells us, a translation of Lefevre's "Recuyell of the Histories of Troye," which, under the patronage of, and as a servant to the Duchess of Burgundy, he completed in September, 1471. It would appear he made several MS. copies of this work, which, pleasing the nobility, brought him so many orders that he began to think what was the best way of supplying the demand. It was a very simple circumstance, it is true, but to it the world

at large is indebted for the introduction of the art of printing into England, and the work was the first book printed in the English language. The Duke of Devoushire's copy, with the autograph of Elizabeth Grey, the Qneen of Edward IV., was purchased at the celebrated Roxburghe sale, in 1812, for one thousand guineas, and this book, it may he remembered, was exhibited in a glass case on a velvet cushion at the Caxton celebration. It was probably printed at Brnges in 1474, and in it Caxton explains its history in these words:—"And for as moche as in the wrytyng of the same my Penne is worn, myn hande wery & not stedfast myn eyen dimed with overmoche lokyng on the whit paper, and my corage not so prone and redy to laboure as hit hath been, and that age crepeth on me dayly and feebleth all the hodye,'and also be cause I have promysid to dyuerce gentil men and to my frendes to addresse to hem as hastely as I myght this sayd book, Therfor I have practysed & lerned at my grete charge and [dispense to ordeyne this said book in Prynte after the maner & forme as ye may here see and is not wreton with penne and ynke as other hokes ben."

It was in 1475 or 1476 that William Caxton (and Colard Mansion, who assisted him in these early prints) issued a translation of Cessolis's "Game and Playe of the Chesse," and the same year, or early in 1477, he must have left Brnges for England. It was a momentous time for this country, and readers of this journal will readily understand why, when they are told that within a few months after, the first hook printed in England with a date was issued from the precincts of the Ahhey of Westminster.

Mr. Blades, in his interesting and very valuable "Life of Caxton," tells us that "his arrangements for settling in England, the engagemont of assistants, with all the other matters inseparahle from a novel undertaking, must have ocopied a considerable portion of time. If, therefore, we assume that about the latter end of 1476 Caxtou commenced his new career in this country, we cannot be far wrong." One thing, however, is certain, and that is, we find the imprint to "The Dictes and Notable Wise Sayings of the Philosophers,"—"Emprynted by me, Wylliam Gaxton, at Westmestre, 1477," and this would appear to have been issned, or, as he tells us in the hook itself,—"fynished the xviij. day of the moneth of Novembre,"—thus clearly estahlishing a precise date for the commencement of printing in England.

From 1477 to the year 1485 we have nnmerons works from his press, and it is noticeahle how curiously his colophons vary. Thns, in the "Chronicles of England," issned just 400 years ago,—in 1480,—we first read of the press as "In thahbey of Westmynstre by London"; in 1483 as "at Westmestre," as well as "in thabhey of Westmynstre"; in 1484 "in Westmynstre besyde London"; and in 1485 "in thahbey Westmestre,"—all leading us to suppose he was carrying on two printing-offices. Then, again, we have a handhill, which Earl Spencer has a copy of, 5 in. by 7 in. in size, desiring his customers to come "to Westmonester in to the Almonesrye at the reed pale," which was probably issued ahont 1478 or 1480, all which addresses, Mr. Blades concludes, meant but one place; that "thahhey" was really the precincts; that in the precincts was the Almonry, where alms were given to the poor, and Lady Margaret, the mother of Henry VII., erected almshouses; that this Almonry existed, not on the site of Henry VII.'s Chapel, as has been so often asserted, but was "west southwest of the Abbey towers"; and, finally, that the old honse, which has been so often pictnred as the building where Caxton did his printing, and from the timher of which, when it was pulled down in 1846, were made countless walking-sticks and snuff-boxes, was in reality a house erected long after Caxton's time,—so recent as the reign of Charles II.!

Therefore at the sign of the Red Pale,—and this was not a red pole or a red paling, as often asserted, but a shield in heraldry so called,—Gaxton worked, lived, and died. During the years 1477-1490 he was a notable man in his parish, as may readily he snpposed. He attended the andit of the chnrchwardens' accounts, we know (by those existing having his name inserted hy the scribe), in 1480, 1482, and 1484. He was a member of the Guild of our Blessed Lady Assnmption, held in tbe church; and in 1491, close npon seventy years of age, he passed away in the very midst of the work he loved so well, for Wynken de Worde's colophon to the "Vitas Patrum" tells us it was "translated onte of Frenche into Englisshe hy William Caxton, of Westmynstre, late deed, and fynyashed at the laste day of hys lyff." This was hringing matters to a pretty close ending even at that early date; and although we do not know the exact time of his death, yet, fortunately for us, there are the accounts containing his burial still in existence, very religionsly preserved, as may be supposed, in the parish in which he died,—St. Margaret's, Westminster. Towards the end of the chnrchwardens' acconnt for the years 1490-1492, some time towards the close of the year 1491, we find the entry of his fnneral, costing 6s. 8d. for the four torches used on the occasion, and 6d. for ringing the knell from the hell in the church tower, payments which seem not very excessive for burying a great man, bnt, according to the other entries, very much higher thau the majority of funerals then cost.

Again, we have it printed in "Scala Perfectionis," in 1493, that the hook was finished "in William Caxston's hons," while in Lyndewode's "Constitntiones," in 1496, we find the source of its printing to have heen "Apud Westmonasterium in domo Caxston," thns showing that the good work still continued at the old press. Of this William Lyndewode, it may be remembered, some cnrious particnlars were given by the Society of Antiquaries in 1852, when his body was discovered in St. Stephen's Chapel that year ("Archæologia," vol. xxxiv. pp. 406-430). He was formerly rector of All Saints, Breadstreet, in the City of London, and died bishop of St. David's, in 1446, and at the opening of his coffin in 1852, the late George Cruikshank made an etching of his head, which is very rare, if not uniqne, and which is now in the collection of Mr. Noble.

Although we should have supposed that William Caxton made a will, yet after a lengthy search no trace of one could he found by Mr. Blades. He surmises that our printer had nothing to leave heyond his stock-in-trade; and if this surmise is correct, then the possibility occurs of his having arranged hefore his death who should succeed to his estate. There are entries in the churchwardens' accounts of the "hequest of William Caxton" of a number of his "Golden Legend,"—probahly the second edition of the book which was printed; and we find the parish was paid for sixteen copies hetween the years 1496 and 1504. Unfortunately, the accounts for 1492-1494,—the two years following Caxton's death,—are missing; but in the receipts for 1494-1496, nothing is mentioned. In the first year's accont for 1496-8 we find three copies sold for 6s. 8d. each, "of thee printed hoks that were heqnothen to the church hehove by William Caxston"; in 1498-1500 there were disposed of teu copies, viz., one each at 5s., 5s. 6d., 5s. 10d., and 5s. 11d., four at 5s. 8d., and two for 10s. 4d.; in 1500-2, two copies realised 5s. each; and the last copy, which was sold in the first year of 1502-4 hronght in 5s. 8d.,—snm total of the sixteen copies, 4l. 10s. 11d. Of conrse, the valne of money four centuries ago was very different to what it is now: the entries which we shall quote hereafter will prove that; hut as an illnstration of the valne of the "Golden Legend" in our day, we may remark that in 1812 the Duke of Roxbnrghe's copy sold for 31l., and J. D. Gardner's copy in 1854 bronght in 230l., and became the property of the Duke d'Anmale; and that no perfect copy of the book is known.

Of those gentlemen to whom the chnrchwardens sold their copies, William Ryoll pnrchased two, "the parisshe prest" one. Single copies were sold to four others,—one to "Elys hokebynder," seven to William Geisse or Geyse, and one (in the first year 1498—1500) was "solde in Westmynster Halle" for 5s. 8d., establishing, as we presume, the fact of there having heen hooksellers in the hall at this early period; while at the same time in that year there is actually an entry, "Rewarded to John Roff for the selling of a legende" one penny,—not a rninous commission, one will certainly exclaim.

In 1820 the Roxhnrgbe Club desired to raise a monnment to Caxton in Westminster Abhey, and the reader will snppose that was a very easy matter. Nothing of the kind. It was as difficnlt sixty years ago to get a monnment *into* that sanctnary for the record of the deeds of a *great* man as it has been *sixty* years later to keep one *out* of it,—the only difference heing, one was to the memory to a simple printer, yet to whom the world is so greatly indehted, and the other was to a young prince to whom the world owed nothing. However, the Westminster Abbey authorities prevented Caxton's tablet to he erected within the Abbey in 1820; bnt the natiou was not to be even then readily insulted, for the authorities of St. Margaret's Church gladly accepted the trust; and there it rests to this day.

The next thing noticeable is the total absence of any reliable item referring to the family of our printer. It is trne that in the first year's accounts for 1478-1480 we find "Item the day of hnrying of William Caxton" for two torches and fonr tapers "at a lowe masse," twenty pence, and this William Dibdin assumes to have been our printer's father. In 1464, at the burying of "Oliver Cawston," 8d. was received for fonr tapers; in the first year of the Guild accounts (1475-1478) a "John Caxston" paid 6s. 8d. upon admission as a hrother; in the first year (1490-1492) there was received "atte hureyng of Mawde Caxston" 3s. 2d. "for torches and tapres," and in the second year (1494-1496) "atte hurying of Richard Caxton," 2d. These, with the entry relating to the printer himself, are all that can be found relating to the name in any of the accounts preserved hetween the years 1460 and 1510; but whether either of them was a relative to "our William Caxton it is impossible for us to say.

Having thns given a few details relating to the man himself, we now propose illnstrating the times in which he lived among us a Westminster, hy aid of the parish accounts between the years 1477 and 1492, for the preservation of which the anthorities of St. Margaret's are to be commended, seeing that this parish passed through, and was most closely associated with the men of, a former age when in tronbled times were little respecters of ancient records, ancient customs, or even persons themselves.

In giving in print for the first time many curions items from these interesting hooks which Mr. Noble has very carefully extracted we would but remark that the reader must judge for himself of the relative value of money of four centuries ago and now, for no reliable valnation can be given. It must he presumed that from ten to twenty times would probably be the limit, according to the article or circumstance of the case. Sir N. H. Nicolas, who in 1830 edited the wardrobe accounts of Edward IV. and the privy purse expenses of Elizabeth of York, gives some equally curious items to those we now give. For the support of the queen's two nephews and niece, two females servants, and a groom, 13s. 4d. a week was allowed! The board wages of the "Fool,"—by no means a fool,—was 2s. a month. A surgeon's fee for going from London to Richmond to visit the queen was 13s. 4d., while workmen's wages were at the rate of 6d. a day! A pair of shoes for the fool cost 6d., and a pair for the queen's Beer cost 2s. 8d. a barrel, while two shirts cost 1s. 5d.; and sixteen rowers for conveying her majesty in a harge from Baynard's Castle to Westminster in 1502 had 4d. each, and the master 1s. 4d. These prefatory notes will give the reader some idea of the interesting contents of the Westminster parochial accounts, which we now intend to quote.

1478-1480.

This account is from the 7th of May, 1478, to the 18th of May, 1480 (John Wycam and Nicholas Wollestroft being churchwardens), and consists of forty-five written quarto parchment pages. The first year's receipts amounted to 33l. 16s. 4d., and the second year's to 34l. 15s. 2¾d.,—and a farthing at that date was an important item. The payments for the two years came to 21l. 12s. 6d. and 23l. 6s. 7d., leaving a balance at the end of the account of 23l. 10s. 5½ in favour of the churchwardens for 1480-8. And although all the items appear very trifling they were not so at that date. William Caxton was one of the parishioners present at the audit.

The general account of receipts chiefly consisted of payments made for torches and tapers used at the burial of the inhabitants; but at the end of the accounts there were seventeen items owing, the whole of which was but 3l. 12s. 4d. They would thus appear to have given credit for such matters at that day; for "William Sampson Brewer in Totehilstrete oweth for the burialI of his child, for 4 tapers, 8d." [In all cases we shall use modern figures in specifying amounts.] Then, again, we find "the wife of Nicholas Wollestroft oweth for his burying 10s.," and "for 4 tapers at the moneths mynd of the same Nicholas, 12d." In the first year

receipts we 6nd there wae received "the day of hnrying of William Trollop for 2 tapers," 2d. May we he permitted to ask what relation wae this William Trollop of 1479 to the celebrated builder of the same name in the same parish 400 years afterwards? "The hrynging in of 2 stranngе torches in the chirche at crystynyng of a child" was 8d., and "for 4 tapers w^{t} onr lady candilstykkys," 3e. 4d.; hnt what the occasion wae at which they were nsed ie not speciбed.

The burials of individuals ranged from 2d. paid for two tapere, "at the hnrying of Elizaheth Dennam," to the extravagant sum of 17s. 2d. paid "the day of hnrying of John Wytteney for 4 torches and 4 tapers, and the pytte and the helle," consequently, Westminster that day was witness to "a grand funeral." "The yeres mynde of Sir Thomas Grey for 4 tapers," cost 12d.; and this year's mind wae the religious ceromony in the chnrch, held on the anniversary of the knight's death, whon his soul, his wife's soul, his mother's and father'e souls, and all Christian sonle, were prohahly prayed for. For "hnrying of a child from Saynt Albons" 2d. was received; and if this meant St. Alhans, Herts, the child was hrought (for those times) a very long way. In all these accounts the vast majority of fnneral payments were 2d., and somotimes the entries were very vague ahout names; for instance, "one Crystopher of Knyght-hrigge," and "a hrewer'e wife fro. Charyng Crosse," the latter costing for fonr tapers 8d. The burial of "John Shordyche" cost 2d., while that of "Sir Alexander" was 4d.; hnt the most interesting entry of this year'e acconnt is "Item, the day of hnrying of William Caxton for 2 torohee and 4 tapors at a lowe masse," 20d.; and this is enpposed to have been the father of onr printer.

In the second year, the "hnrying of Rohert of the Covent [Convent] Kychen for 2 tapers, 2d.," and the same for "Isahell Braye,"—and at this early date the Bray family was a noted one in the parish. When a parishioner was above the ordinary folk, and conld afford hurial in the chnrch, he was favonred with a "pytt," as the grave was called, for 6s. 8d., and as a rule his "knyll with the helle" was rung, which cost 6d., as was the case with one Richard Cowper. "A Mayde of the Swan,"—a noted tavern in the parish,—was hnried this year, and there was paid "for 2 tapers 2d." as nsual.

Another source of receipts was "The Comon Gadering,"—heing collections made on feast days and holidays: Pentecost, St. Margaret, All-Hallowe', Nativity, Good Friday, and Easter Day, the latter heing the grand day. The two years' receipte amounted to 19*l.* 7s. 11½d., of which nearly a half was collected at Easter.

Pew-rente were then in existence, of which there are twenty entries the first year, and forty-three the second. According to position in the church, so they appear to have heen charged, some being 12d. and some as high as 3s. 4d. Thns "William Cowper for a pewe for hie wife" paid a shilling, and "John Breght for his pewe" 3s. One entry reads, "Thomas Bough for an cuyr almȳ under the foot of o^{r} lady of Pyto to kepe brede, wyne, and wexe for straungē to syng w^{t}, 12d."

Under the heading of "Bequests" we find one giving 20d. and another 20s. Others gave various articles (as Caxton did in 1491,—copies of his hook). Thns we find "the guyfte of John Wardrop a playne towell conteyning 3 yerdys," while the wife of John Taillonr gave another towell of diaper eight yards in length.

The "Dyvers Payments" which were made during the same period are interesting. In the first year "to 4 men to here 4 torchis on Corpns Xpi day, 4d."; and "in Wyne to the Syngers the same day, 4d." Throughont these accounts we shall eee many entries of payments for wine, ale, hread, and snch "creature comforts." The two clerks and headle received amongst them each quarter 5s. St. Margaret's-day was then a high festival in the parish. The first year we find "to John Greve for a rewarde for the Clothe of Arras at Seynt Margrete day, 2s."; and "to a man *for a day* at the hangyng np of the saide Clothe and takyng downe, *and for brede and ale to them*, 6d." In the second year, "for hrede, ale, and wyne into the rode-loft on Saynte Margrets day, 12d.," while these refreshments were preceded the night hefore hy a more elahorate, if less costly, entertainment. "Paid in expenses at tavern on Saynte Margaret evyn npon the Syngers of the Ahhay, 8d."

Here are a few entries that may interest our building friends:—

"For a new dore at the hedde of the steple and lok to the same dore 2s. 1d. For a dore in the rode lofte to save and kepe the people fro the orgaynes, 12d. For half a hnndred of 6d. nayles, 6d. For makyng of a new dore for a pewe, 8d. For makyng of a newe staire in to the rode lofte and the stuffe, 30s. For a pnl-pytte in the chirche-yerde agenst the prechyng of Doctonr Penkey, 2s. 8d. To a carpynter for makyng of a rofe ovir the new steir and the tymhre that wente thereto, 2s. To a dauehour and his man for four dayes at the eame staire, 4s. 4d. For a lode of lome, 4d. For 100 lathe, 6d. To Nicholas Plomer for a gotter over the newe etaire, and 4 faggots to make fire, 5s. For makyng of a keye for the chist, 4d. For a lokk w^{t} 2 keyee, 20d. For 3 harrys in the wyndowe at the staire-hedd weying 12 lh. pce. the lh. 2d., = 2s. For a hope of yron for the holy-water tnhhe, 4d. [The hooping of the holy-water tnh was an annnal charge.] For 6 holy-water eprynkyles, 6d. To a carpynter for makying of the crncyfix and the heme he standeth upon, 40s. For kervyng of Mary and John, and the makyng newe, 33s. 4d. For the gilding of the eame Mary and John, the crosse, &c., 6*l.* 6s. 8d. For takyng down of a heme in the hody of the Chirche afore the crucifix, and oettyng up of a new cople arche wyse, and horde to sealyng thereof, and other etnff, 26s. 8d. For naylys, stapule, bolts, and other iryn worke, 6s. 8d."

Among other items of payments we find 4d. was paid "for holme and ivy at Cristmas." "Cotyn candyl for the lantern for alle halowen tyde to Candylmae," cost 12d., and "the lamp bason" 8d. "For mending of glasse wynddowys aboute in the Chirche" cost 4s., and this also appeare to have heen a frequent charge npon the accont. "To Mathew Metynghm for playing at the Orgons when we had hutt one clerk," 8d. "For brede and wyne on holy thnrsday when pcession was done," 8d. "For 4 torchys weying 83 lh. pce the lb. 4d." "For mendyng and makyng clene of the small organs" 12d.

"A Tyler and his man for a days werk npon Seint Margets ile" received 3s. 1d., while "the wyfe of the Balle for pavying tyles" was paid 3s. 4d. Two dozen candles at Christmae cost 2s., hut they were prohahly of larger eize than we hurn at the present day.

Such are a few of the interesting items derived from the accounts of the parish the year following Caxton "opened shop" in it as a printer. We have said that the hook itself ie comprised of forty-6ve written parchment pages. The cost of the hook ae well as the writing of it is eet down at the end in these words:—"To Paule Aeshewell for wrytyng of the hoke of Accompt, 6s. 8d. For Pchement to thie hoke, 14d.,"—both payments, it will he acknowledged, not heing excessive.

1480-1482.

The next accounts which we find in the volume are stated to he from the 18th of May, 1480, to the 23rd May, 1482, William Garard and William Hatchet heing chnrchwardens. Although there are only twenty-four written parchment pages, and of smaller size than the first-quoted accounte, heing, in fact, 8 in. hy 11 in. in size, yet the entries are written closer and more compact. The total receipts for the two years wae 65*l.* 5s. 2½d., and the payments 49*l.* 13s. 10½d., leaving a halance of 15*l.* 11s. 3½d. When the hook wae made np there were hnt two hurials owing for, one of which was "Richard Hunt, yeoman of the Crown," 10s.

In the first year's ordinary receipte we find, "the day of hurying of a man that was slayne in Saynte Jamys felde, 2 tapers, 4d.," and "of a childe of knyght hrigge, 2 tapers, 2d."; "of lewys Welyngton, for 2 tapers, 2d."; "for the knelle of Thomas w^{t} the grete helle, 6d."; and "for 4 tapers," 4d. At the hurial "of Sir Thomas Cleyton, pste [priest], for 4 tapers," 20d.; for 2 torchee, 2s., and "for licence of 4 torches of Seynt Anne," 4d.; at the "Crystenyng of Maistr Chamherlayn childe," 12d. was paid for 2 torches.

There are two interesting entries in the second year; one gives the value of old silver, the other refers to the rent of a honse. The former reads: "Item the same wardeyne charge theymself w^{t} hroken sylver, whiche was of the olde Crosse, weying 68½ nncee, pce the nnce, 3s. 6d. = 11*l.* 19s. 9d." The other entry tells ns,—"the forsayde wardeyns chargith theymself of rent of the tent, called the sonne, payd hy the handys of Robert Bromflete hy all the tyme of this accompte, 7*l.*,"—that is, seventy chillings a year.

The collectione on the "Gaderyng dayes" hrought in during the two years 20*l.* 14s. 8½d.; while the pew-rents (9 the first year, and 47 the second) produced 4*l.* 8s. 8d. Of theee, we find our scribe, "Paul Asshewell, for his wifes pewe," paid 16d., and we also learn he was himself a Pnhlic Notary.

The heqnests in the two years only amounted to 13s. 8d., viz., two money gifts of 3s. 4d. each, and two gifts of a somewhat curione nature. One "of Baynhrigge, a pece of tymher," which was valned at 12d.; and the other, "of John Greve, a marhle etone," valned at 6s. What the churchwardens did with this marhle stone we are nnahle to say.

It was no nncommon thing for the church goods to he lent out in these times, for there is an entry of "a Rewarde of the Lord Berkeley for a vestment and a chaleys," 12d.

The payments are as varied as nsnal. A lantern cost 9d.; a lock with key for rood-loft, 6d.; "a fire panne," 6d.; "for makyng clene of the Chirche yerde," 20d.; mending a pew in the church, 2d.; mending the velvet ahove the sepulchre, 4d.; and the glass window in the rood-loft, 4s.; two red skins "for 2 etolye in the qnere" cost 8d.; and 4 yards of green fringe, with nails and making, came to eleven pence more.

We can readily helieve the condition of the churchyard at that date, and at certain periods of the year, when we read such entries as this continnally occnrring:—"For carrying awaye of dungge in the chnrcheyerde, 4d."

A chain to the church-door cost 3d.; a rope for the little hell, 6d.; hanging of the hells cost 5s.; and "a halderyck to the grete hell, 6d."

St. Margaret'e Eve this second year was attended by the singers of the King'e Chapel, and the wine which was hy them "drnnkyn at Rohert Whityngton" coet 2s.; and for the wine had for them the next day in the rood-loft, 16d. was paid; and "when even songe was done" at Thomae Burgesy's, 2s. 4d.

Of conree, there were eoveral "pite" opened in the chnrch for the hnrial of the aristocrats of the parish, and for paving these over, John Faydar received 3s. 2d., and in thie oum we presume stone was included. The special paving over of "Jone Witteney'e pitt" cost 8d.

We have already given the extract relating to the hreaking np of the old cross, and we now come to the entries relating to the pnrchase of the new one. "For the new crosse, weying vi^{xx}x [130] nnces pce evry nne v^{s} [5e.] sm.," 32*l.* 10s. Now for this elahorate piece of work it was necessary to clean np the staff, the painting of which coet 20d., while "for gyltyng and hnrnyehing of the npper parte of the crosse staffe and hnrnisshing of the fote of the crosse," coet 4s. more.

Mr. Ashwell received 6s. 8d. for writing the account, and 12d. was paid for the parchment.

1482-1484.

"Here folowith th accompt of William Burghm and Thomas Crane, wardeyns," &c., from 24th May, 1482, to 24th May, 1484. This is written in twenty-six folio pages hy onr old friend Ashwell, and William Caxton attended the andit. The two years' receipte amounted to 66*l.* 11s. 10¾d., and the paymente, 47*l.* 11s. 5¼d., leaving a halance on the right side of 19*l.* 0s. 5¼d.

Among the general receipts we find, for 4 tapers, "at the yeres mynd of Richard Humfrey fader and moder," 12d.; "the day of hurying of a poore woman w^{t} in grete Maude in totehil strete," 2d.; "at the hurying of John Shordyche wyfe," for 4 tapers and two torches, 5s.; "a man at the vyne gardyne, 2 tapers," 4d.; "of Thomae, of the Convytte house, 2 tapere," 2d.; "of a preist oute of Chanon Aley, 4 tapers," 12d.; "for 2 torches for the same preist to brynge him to the chirche," 16d.; "of John Nicolas, yoman of the Crown, for 2 tapers," 4d.; "of Jamee Halywell, for 4 torchee to hrynge hym to chirche, 5s.; for 4 tapers, 20d."; "of Sir Willim Hopton, tresorer of the king's howse, for his pytte in the chirche, 6s. 8d.; for lycence of 24 torchee and 4 tapers, he gave to the chirche 2 torches; for his knylle, 6d."; "the day of hnrying of longe Jone, for 2 tapers, 4d."

"The Comon Gaderyng day" receipts produced, in the two years, 20*l.* 4s. 9d., and the pew-rente (twelve items the first year and thirty-seven the second), 3*l.* 16s. 10d.!

"The hequests" only amonnted to 18 yards of diaper, and from two donors, in the eecond year.

With regard to the payments, "three hondys of iron to the hatche at the chirche dore" coet

in 1878, 38,898 mètres, at a coet of 577,757 lire; there were aleo completed 43,359 mètres of provincial roads, at a cost of 1,178,277 lire; and several branches of the national roads. The railway works are aleo rapidly advancing, especially the main line between Cagliari and Sazzari; and it is expected that early in 1881 the two principal cities of the island will be united by rail,—a circumstance that will produce a marked improvement in the eocial and moral conditions of the island; and still more important will he the means of harmonising the feelings of rivalry which these cities entertained for supremacy, as they were almoet unknown to each other by the former difficult means of communication,—a feeling which ancient Governments did not seek to appease, hnt rather foetered, in order to keep the Sarde divided among themselves. In point of roads, then, and means of communication, the island is making rapid strides, and will not long delay to reap the benefit of euch an important work.

According to an official report from *Odessa* a large extent of grownd there—now oovered by the sea,—is being filled in, on which customhonees will be built. Quays are being made along the partthue reolaimed, and an additional harbour, to he obtained by dredging, will be protected by a breakwater, in slow process of construction. It would be well if, before proceeding to dredge the new harbour the present harbour were dredged to a sufficient depth. An Englieh veesel drawing 22·4 feet got agrownd in the harbour, causing much detention and loee of time. A plan for a new theatre has been accepted. It will be very handsome. Extensive drainage works are in conrse of construction, and are partially finished. The sewerage will he carried many miles ont of town. It is hoped the health of the town will be thereby much improved, and also that it will he the meane of fertilising a large extent of ground now a saltmarsh. Tramways are being laid in the town, and are to extend to some neighhonring villages. The lines outside the town will probahly he worked hy eteam.

From *Damascus* we learn that, as regarde pnhlic works, there is little to notice, Government impecuniosity not even permitting the regular payment of engineers. A so-called carriage-road has, however, been made between Damaecus and Homo, whence it has been carried on to Tripoli; while another ie now being traced out hetween Damascus, Kuneitrah, Merj Ayoum, Nabatié, Sidon, and Beyront; the works to be executed by forced lahonr of the peasantry long the road. The ovile attending the want of roade in Syria were amply demonstrated in the case of the district of Latakia, the last harvest of which, inetead of being far helow the average, as in other districts of the conntry, was in excess over former years, permitting large exports to Italy during the past autumn. The freight per 100 kilogrammes from Latakia to Leghorn and Genoa was 2½ fr. hy sailing-vessel; that, from Latakia to Hamah, across the Anegaliah mountains, a jonrney of twenty-four honrs on a good road, hut three daye hy the present track, was 10 fr. The districts of Hamah and Homo are now obliged to import grain from Egypt, involving a sea voyage and a three days' land journey.

From *Kastamuni* (Tnrkey) we get eome particnlare ahont honeee. The poorer olasses live in log hnts, generally hnilt on prope, which raise them one story above the ground; underneath, the stahle is constructed amonget the props. The rooms are low, with very small windows, a lage fireplace, and a large platform or baloony ontside, open to the air; the roof is of shingle or tiles. The hetter-class houses are hnilt of wooden framee, filled in with sun-dried hricks, and they are panelled inside with wood; they are eometimee plastered ontside, and have glass windowe. The rooms are generally partitioned off, leaving large open spaces on each floor, so that the commnnication from room to room is through the opan air; this is healthy, bnt trying in winter. The Christian honees are generally the hest, and are hnilt in more European style. At Sinope there are some good honsee.

From *Java* we get some information regarding the Batavia Harbour works. Great progrees hae been made with the conetruction of the new harhour during the past year, and the engineers in charge deeerve credit for the energy they have displayed in overcoming the various obstacles with which they have had to contend. Owing to the inferior workmanehip of some of the dredging-mills which had been obtained from Europe, dredging operations were somewhat retarded at the commencement of the year; hut this deficiency has been more than counterbalanced hy the rapid strides made in the other departmente. In the first section (at Tandjong-Priok) the greateet activity has prevailed. The exteneive workehop there, consisting of a emithy, a hoiler manufactory, a copper foundry, a carpentry establishment, &c., was completed and hrought into nee early in the year, eighty-five machinee driven hy steam heing daily in motion. A large warehouse was aleo finished in which the whole etock of working materials, representing a value of ahout 1,500,000 guilders, was stored. During the latter period of the year the monthly dredging operations averaged ahont 80,000 cnhic mètree; hnt it is hoped that, ere long, 100,000 cnbic mètree per month will he removed under more favourahle conditione. An important eaving in the coet of the foundations for the hreakwaters, and one not calculated upon in the original eetimates, has been made hy the discovery that the sand dredged from the inner harhour, when amalgamated with the clay-soil on which the foundations are laid, forme a hard resisting substance capahle of hearing the weight of the trachyte superstructure without sinking, so that a considerahly smaller quantity of thie stone than originally expected will, in all probability, he required to complete the piers.

ARCHITECTS AND CONTRACTS.

The following letter, signed "A Houseliolder," was printed in the *Times* of Saturday last, and was commented on in a leading article:—"Building Difficnlties.—Sir: Why is it that no effort is efficient to obtain accurate knowledge ae to what will he the cost of huilding or repairing one's house? Allow me to state the difficnlties which, in my own experience, attended the alterations of a honse. We once thought we should like to have two new windowe thrown ont in the drawing-room and a slight alteration made in our stable-yard. We conenlted a huilder, who presented us with a very neatly-written estimate, apparently fnll of the frankest detaile. The coet wae to he 50*l*. The paper looked exceedingly enconraging and pleasant, and with light hearts we embarked in the scheme. We endeavonred to keep an eye on the workmen, and acted as onr own clerk of the works. It wae just a month before the work was done, and we eaw the men clear ont. The hill eent was hy no means so clear and frank a docnment as the promising estimate. The cost of onr windows, &c., was ahout 100*l*. Our friends console ns hy telling ns that they have known much worse cases."

Inferentially, the *Times* gave its correspondent a proper answer in saying, "Few men are competent to he their own architects. They will generally repent it hitterly if they dispense with professional advice." Bnt then, unfortunately, it goes on to assert that the result, so far as increased expense is concerned, and so far as regards the impossibility of learning beforehand what will he the coet of huilding or repairing one's house, will he precisely the same even if an architect he employed. "Most huildings," the writer says, "are erected nnder arrangemente which naturally and almost inevitably terminate in ench a manner as we have deeorihed"; namely, that "the total coet" (though there have heen drawinge, specifications, hills of quantitiee, and contract), "is ahont twice as much as that which wae contemplated or, as the owner thonght, was hargained for."

Now, thie ie not trne. The *Times* article ie written with moderation, and, douhtless, in perfect good faith; it admits that "no more honourable hody of men than architects exists"; hnt it is founded on insnfficient knowledge. The writer judges all from a few. We assert unhesitatingly that huilding operations are completed every day of the week, whereof the cost, so far from being twice as much ae was contemplated, doee not exceed the amonnt agreed upon except to the extent of the cost of additions or alterations made hy the employer. The answer to "A Householder's" first inquiry, "Why is it that no effort is sufficient to obtain accurate knowledge as to what will be the coet of huilding or repairing one's house?" ie, that it starts npon a false aesnmption. Without any great effort such knowledge can he obtained, and is obtained, every day. If the employer himself knows exactly what he wants, employs a competent and honourable architect, conveys to that architect his views, and avoids alterations he need not fear any important addition to the amount of the contract.

ROSLYN CHAPEL.

It will concern every one interested in matters archæological to know that it is proposed to make an addition to this ancient historical monnment and most interesting example of Mediæval art.

The chapel, as many of onr readers are aware, ie merely the chancel of what was intended to he a cruciform church. The west end is entirely destitute of openinge, the chancel arch, which is richly moulded and decorated, heing hnilt up. This obstruction is to be removed, and a small addition of one hay made to the west end. The carrying ont of thie plan has been entrusted to Mr. Andrew Kerr, formerly of her Majesty's Office of Works, a gentleman known to he poseeseed of a fnnd of antiqnarian lore. The pnrpose of the addition is to provide a baptistery and organ-chamber, the latter of which is much needed, the instrument now in use having suffered greatly from damp. The new structure is to he two storiee high, and of the breadth of the central aisle, the organ-chamher being reached hy a spiral stair. The haptistery showe on teach side a single light window and a western doorway, flanked hy small lancets, the roof being formed hy the floor of the organ-chamher. The organ-chamher shows at the sides similar windows to those below, and at the west end a circular window, filled in with a cross, will he seen from ahove the organ. The roof is flat, and the walls are to he lined with pitch-pine, of which material all the wooden fittings are to he formed. The internal walls of the haptistery are to he lined with the old stones, which were used in huilding up the chancel-arch. Externally the elevation shows a flat roof, with cornice and parapet. The western angles are eplayed off, having hnttresses at the ohtuse angles, which terminate in pinnaclee, with foliated finials. On the face of the huttresses are niches, and the same featnre appears on the narrow epace hetween them.

What strikes one most when examining the plans is that the whole height of the chancel arch is not embraced hy the new portion, the flat roof reaching only to the sprinqing of the arch, and the portion above heing filled in with glass. This arrangement has been arrived at with the avowed object of showing distinctly that the addition is no part of the original design. The enriched moulding of the chancel arch will be seen cropping up through the flat roof and the walls on each side, which declare that transepts were intended, are left open to inspection.

Mr. Kerr has given the matter his most anxious consideration, his desire having been to disturb no single feature of thie nnique structure; for the addition might, at any future time, he removed, and the chapel restored to what it was, the only portion interfered with being the wall which fills up the chancel arch.

While designing the addition to harmonise with the original, Mr. Kerr has abstained from any attempt to rival it in richness of detail.

THE PROMOTION OF THE FINE ARTS IN SCOTLAND.

The annnal meeting of the Association for the Promotion of the Fine Arts in Scotland was held on the 28th ult. in Edinhurgh. Mr. A. S. Kinnear, advocate, occupied the chair, and in opening the proceedings said he was eatisfied that the Asecciation was serving a good and neeful purpoee; and if they compared the state of public opinion ahout art as it wae now and as it wae forty-five years ago, hefore the society came into existence, they would have no donht that not only that institution, hnt every inetitntion and every influence, whether embodied in an institution or not, which had for ite object the diffusion as widely as possible of a taste and appreciation for art had been working continuously, persistently, and most snccеefully for the attainment of that end. Why, it was now an axiom which everyhody took for granted, that the love for and enjoyment of works of art was not only one of the most nohle pleasures of the human mind, hut one which ought to be, and might very easily be, bronght within the reach of almost everyhody in a civilised community. Now, he was persuaded that was not a senti-

ie same way, if a light were introduced, as a ixture of 50, or 75, or 90 per cent. of gas? a case accentuated by such misfortune, and y such happy escape from more overwhelming isfortune, it would be well if the official lviserc of the Metropolitan Board of Worke had veu a little more definite and practical infor- ation ae to explosive mixtures. This ie ren- ered the more necessary from the intermittent ature of the explosione; and we cannot but rge upon those whom it may concern that this neetion of successive explosions, whether in ie Tottenham-court-road case, the Bilston case, the case of the Frameries Colliery (p. 100, *ute*), ought to he made the subject of accurate xperimental investigation. It would be little nort of a scandal to science to remain satisfied ith the hypothesie that, *somehow or other*, in efiance of the laws whicb have bitherto been eld to regnlate the interpenetration of gases, dribble of coal gas into a pipe would form a riee of seven puddles of explosive mixtnres, parated hy just ench a mixture as would hurn ke a slow matoh!

When the eeries of phenomena in tbe two ases are compared, the idea suggests itself that ach explosion must have had a distiuct effect,—echanical or chemical,—on the unexploded ortion of the gas. Thus, for instance, looking t the differsnt specific gravity of the car- nretted hydrogen (wbich is 0·4381) and of air which is taken ae unity), it is conceivable that itber the lighter or the heavier gas ebould have een so much more readily acted upon hy the orce of the explosion as to have been driven hrongb the mixtnre until it accumulated in an xplosive proportion.

We do not, in suggesting thie explanation, at ll ventnre to assert that such was the case; ut the phenomena are, as yet, altogether nnex- lained. We may hold, and do hold, that mix- nree of different proportions were present, within he interval of time that separated the first rom the last explosion, in different parts of the ain in one caee, and of the colliery workings n the other. We do not thiuk that this state of hinge can have been caused by the nninter- upted action of a leak in a valve, or of a lower from one portion of the mine. Science ill be extremely imperfect until the cause of he intermittence of the explosione ie made lear. We suggest what seems to us a possible bysical canse. We shall be glad to hear of urther investigation boing directed to the ubject.

The final recommendation of the reporters gainst testing gas-leakage hy open flame is one hat we think should have the wideet circulation iven to it. Such a proceeding might, with dvantage, be made subject to heavy penalties. But with regard to the applying anything of he nature of a jet to the stand-pipe, it should e remembered that this would tell nothing as o the contents of the main without they were nder pressure. If this he forgotten, what is nggested ae a test for safety might lead to isaster.

FROM THE BANKS OF THE SEINE.

Were the French public not accustomed to he enunciation and practice of somewhat startling political theoriee, they would have reason to he indeed alarmed at the accouut their daily papers have recently given them of the resolutions of the several working-men's con- greeses which have been held within the last few daye at Paris, at Lyons, and Marseilles. The English householder would he scared to have eerved up with his comfortable coffee and hie hot rolle or hie toast such printed imprecа- tione and threats ae those to which the dele- gatee to these congressee have given free vent Fortunately, bowever, the whole agitation has met with general indifference on the part of the pnblic, if not of the professional world. The Paris congress continued, to the day of its close, to breathe, against all remonstrance, the same threats, and preecribe for the eickly state of our social system. It was not, however, without further startling us by the enumeration of some really refreshingly novel viewe that the congress was to break up. "Every workman who saves money ie a robber, and commite a crime against the State," was one of the last deliberations of the congress. What the laborious and thrifty workman has placed in the savings-bank, he has robbed from the "collectivity," for if he had epent his savings he would have occupied a certain nnmber of his fellow-workmen. One delegate even defied tbose about him to point ont any eingle object, "bowever emall, which, possessed, ie not branded with the same in- famone stamp." It ie evident, tberefore, that, in the minds of the collectivists, the definition of Proudhon, that "property is robbery," ie an accepted axiom. The views of the congress on *salaries* are equally worthy attention. According to the congrees, a good workman must not not be paid more tban tbe bad,—a desiguer and hrain-worker more than the navvy, —the architect more than the mason or the bricklayer; and all tbie on the ground that tbe good workman alone owing bie special talents to the education he has received or to the enrroundings in which he is placed, it is "collectivity" which has given bim tbe power of making use of his talente. Had M. Garnier not bad masons and carpenters at his disposition, urged one delegate, it would have been impossible for him to have bnilt his Opera-honse. Whether the sketch of thie "collectivist equality" reigning among mankind at large hae or hae not heen drawn from the life at a well-arranged convict prieon, we know not, bnt certain it is that there will he found in perfect working order this admirable system of equality in the acknowledgment of talent. There, special individual powere are little taken into account; the same hours, the same work, the eame rontine, is imposed on all alike. In this well-ordered existence a democratic equality of ealary reigne supreme; one eole difference can be drawn between this system and the application of the "collectivists'" doctrine. Under our existing lawe the equality of prison rules is alono inflicted on criminals; tbe worthy "collectiviste" would eeem to wish to apply it to all honeet workmen, laborious inventore and creators, and the rest of society at large. Needleee to say, that to attain this cherished ideal, insnrrection ie scen to he the sole means; when insnrrection will have killed thousands npon thonsande of men, the survivors, if they carry out the programme of the Paris congress, will have nobly acquired the right, not to gain money, still less to economise, but to have nothing that any one can call his own, natnrally not even bie family; perhaps the worde "my" and "mine" will disappear from conversation; he will, however, have the hononr, as an evening paper wittily observed, of being one of the occnpants of the convict prison of the future. The firm protestation of M. Drouet, which was mentioned last week, has not remained nnsup- ported; among the protestore an unexpected ally arose in *Citoyenne* Rouzade, who, in the conrse of her well-expressed address (in which naturally the rights of her sex were set forth), rated the "anarchists" so warmly in showing their weakness in imagining that any system "can destroy the causee of division, which are inherent to human natnre," and in further showing how "the realisation of their views would lead to the complete extinction of society," that she gained, curiously enough, a round of applause. But this is not the sole protest to add to that of the Havre delegate, whose action has been since fully approved in an admirable letter addreseed to him from Havre hy the "federal commission,"—a letter of which one passage merits notice. "Taught hy the events of history, which have showed us that violence has never founded any durable state of affairs, we have decided to demand the just reparation of the abusee from which we suffer, solely by tbe methodical organisation of our forcee under the protection of the just lawe whicb we claim, and which we will obtain by pacific meane, since we know the value of onr voting-ticket." In our last letter we urged on English readers the warning that the opinion of the great majority of workmen and artisans in France must not he judged hy the inanities expressed in these con- gresses of so-called "working men." The true- hearted and thoughtful workers have hastened to protest warmly against the violences expressed. With M. Dronet'e withdrawal, the trade com- mittee of the bronzeworkers, after matnre con- sideration, addressed to the congress a reproof of its "had action" in helping the supposed common cause. It is eatisfactory to feel tbat the real workere repulse any idea of associating their views with thoee expreesed by tbe con- grese, and which if they do not meet with the same indignant proteet, pase off in the midst of indifference.

Among other exhibitions, the competitions for the variouе "Prix de Rome" in painting, sculpture, architectnre, and engraving, bave attracted within tbe last few daye a large number of the students and art-lovere to the École des Beaux Arts. To friende and relations aud echool-cbums these exhibitione may be very interesting; bnt it ie eo rarely that any special ability shows iteelf in these yonng aspirante for fame, in whom study and a better acqnaintance with the works of their great predecessors can alone develop any peculiar talent, that the interest of tbe July ehows at the École is some- what (with the foreigner at least) blunted after a residence on the hanke of the Seine, and a growing acquaintance with the treasnree of the Louvre and the other museume. We can ein- cerely eympatbise with the conscientioue editor wbo, unassisted by enthusiastic helpers, desires to give a faitbfnl acconnt of these competitions. We cannot wonder tbat there should appear some truth in the accusation that conductore of jonrnals are not alwaye warm in the interest they show in snch questions, and tbe nntanght artistic world are much more indebted than tbey sufficiently acknowledge to those editore who freely open their colnmns to the consideration of the subject. Ae we bave so often remarked, it ie the arcbitects who ehow in their exhibited work the most satisfactory results of their study. Whether these resnlts lead to any real further progrese beyond the furtherance of archæological erudition, ie a qnestion difficult to decide; but certain it is tbat after their spell of classical arcbitectural stndies at the École, and in Italy or Greece, Classic architectnre seeme to bave no followers when once the etudent hae entered at home the active rauke of the pro- feesion.

PUBLIC WORKS ABROAD.

From a eeriee of official papers presented to Parliament, we get some interesting information relative to the progress of public works abroad. Thus, with regard to *Venice*, we note that the pnblic cemetery in the island of San Michele, five minntes distant from Venice, has been re- modelled and enlarged. The municipality bave eet apart three burying-gronnds for the inter- ment of the romains of Protestants, Orthodox Greeke, and Jews. The works are actually in a very advanced state, and it is asserted that the cemetery will be completed and opened to all classes within the present year. The repaire effected on the north and south façade of St. Mark'e Church, in Venice, as readers of the *Builder* know, have lately been much criticised by Englisb echolare and artists, and hy the majority of Venetians, who, in concert with the former, argued that the glow and rich colour of tbe old marhlee and columne had been com- pletely destroyed; that the new marhlee em- ployed were nnequal to such a magnificent structure; that the priceless old mosaics bad been ratber rndely refitted; that the part of the pavement anew reconstrncted had lost all its original beauty of colour; and finally, that the whole reetoration was not carried out with the devotion due to one of the most splendid monnmente of Venetian grandenr. On the otber band, it was alleged that when the repaire hogan tbe marbles were simply in a state of utter decay; that the rebuilding of the north façade began and was brought to an end under the Anetrian rule, and tbat the Italian authorities had consequently no alternative left but to preserve the same style on the south façade; that it was impossible to replace the old marhlee brought there in different cen turies hy Venetian commodores from the East; that it wae not a question to stop for the moment tbe ravaging work of the time, but, to prevent ruin by a radical restoration; and that, among many other difficulties, not one of the least wae the large amount of money required for such a colossal undertaking. The deep interest felt by the English nation in the fate of the most magnificent work of art erected by tbe Venetian Republic cannot ultimately fail to create a feeling of gratitude amongst sensitive Venetians. The Italian Government have issned peremptory orders to stop for the present all repairs on the principal façade; and a com- mission for the preservation of ancient monn- ments wae directed to proceed thither, and to report any resolution they may arrive at to the Superior Council for Fine Arts, who will subse- quently pronounce a final verdict on the matter.

We fnrther note in reepect to public works in Italy that an important activity is manifested in the province of *Cagliari* in the construction of new roads, whieh are divided into three classes, —the national roads, made hy the State; the provincial roade, made by the province; and the ordinary obligatory roads, made by the communes. Of the latter there were completed

NATIONAL PENNY BANK AND ARTISANS' DWELLINGS, CLERKENWELL.

This extensive pile of buildings, at the corner of St. John's-square and Clerkenwell-road, has been opened for business and occupation. The buildings were to have been opened by H.R.H. the Princess Christian, but owing to her Royal Highness's other engagements, the formal ceremony had to be deferred.

The ground and first floors of the building are used for the purposes of the National Penny Bank and three shops, the whole of the upper part of the building (*i.e.*, the second, third, fourth, and fifth floors) being planned for artisans' dwellings,—two sets of two rooms and two sets of three rooms on each floor, with w.c. to each set of rooms. The floor of the second story, separating the artisans' dwellings from the bank premises, is fireproof, formed with 6 in. by 2 in. rolled iron joists, 12 in. apart, filled in with selenitic cement concrete, and covered with joists and wood flooring. The roof flat is also of the same construction, but covered with Lawford's patent asphalte, to form a drying-ground. On the roof flat is the laundry, formed with framed timber, roofed with corrugated iron, and fitted up with four coppers, the water being laid on to each. All the rolled iron joists are supported on cast-iron columns and stancheons. The main staircase is constructed of Portland stone, running in continuous flights from basement to roof, with wrought-iron grille on each landing. Each set of rooms is furnished with cupboard, larder, and coal-cellar. All the rooms are plastered and papered throughout, the corridors having a cement dado 4 ft. high, and painted. At the end of each corridor is a dust-shaft fitted with wrought-iron door, the dust descending to a place provided for its reception in the basement. The roof over the staircase is covered with Broseley tiles. Ventilating pipes are carried from each w.c. to the highest point of the roof, also from the sinks in scullieries.

Externally the facings are stock bricks and terra-cotta dressings, relieved with terra-cotta string-bands 12 in. square, each bearing the device and inscription of "The National Penny Bank." The bank portion of the building has a large projecting bay and circular corner, built with red brick and terra cotta. The building has a frontage of 140 ft., and a height from the ground line to the top of the parapet of 70 ft. The foundation-stone was laid in August last by her Royal Highness the Princess Christian.

The building has been designed by Messrs. Henman & Harrison, architects. Mr. F. Dashwood has acted as clerk of the works, which have been executed by Messrs. Aitchison & Walker, of William-street, St. John's Wood, Mr. W. Woolacott being their foreman.

BLAENGWAWR SCHOOLS FOR THE ABERDARE SCHOOL BOARD.

These schools have been opened by Sir George Elliot. The new buildings, which have been carried out by Mr. J. Morgan, of Aberdare, from the designs and under the superintendence of Mr. E. H. Lingen Barker, of Hereford, the Board's architect, and without the aid of a clerk of works, include lofty rooms, conveniently arranged for teaching purposes, somewhat in the form of the letter H, the central portion being for infants, in two rooms, measuring 58 ft. by 24 ft. and 30 ft. by 20 ft., the wings being for boys and girls respectively, in two rooms each, measuring 81 ft. by 22 ft., and 21 ft. 6 in. by 19 ft.

There are back and front porches, cloak-rooms, and lavatories to each department, as well as convenient offices in the playgrounds, which latter are divided and fenced in with stone walls, the river Gwawr having been bridged over at the entrances, and parapet walls erected on each side.

The walls are built with local stone, in level bedded courses, with a cavity and internal brick linings. Forest of Dean stone has been used for dressing, and the pointed relieving arches over the windows, and the door-arches are carried out with red and white bricks, similar materials in bands being used in the tops of all the gables, the chimney-stacks being of white fire-bricks only. The roofs, which are covered with Bangor slates, are of open description inside, the curved principals being supported on stone corbels, and the other timbers being stained and varnished, and plastered between. The bell is hung under a ventilating spirette, which rises from the centre of the building, the other ventilation, as well as the warming arrangements, being of a complete character.

Accommodation is provided for 754 children, according to the new, and 797 according to the old, Government regulation; and the cost has been, for the school buildings, with their offices, 3,122*l.* 11s. 9d., 62*l.* 11s. 9d. of this amount having been found necessary for additional foundation works. The cost per head has therefore been 4*l.* 2s. 10d., according to the former, or 3*l.* 18s. 4d., according to the latter calculation. The outlay on the boundary and division walls and gates was 250*l.* 11s. 9d., bringing up the expenditure, independent of the fitting up and furnishing of the rooms, and the formation and draining of the playgrounds, to 3,373*l.* 3s. 6d.

PROPOSED EFFACEMENT OF TOOLEY-STREET.

The well-known thoroughfare in Southwark, which for many generations past has been celebrated as the locality of the "three tailors," has just escaped a process of effacement; for at the last meeting of the St. Olave's Board of Works, a notice of motion had been given to the effect "that the Board memorialise the Metropolitan Board of Works that on the completion of the street improvements in the district, the street now known as Tooley-street may again bear its ancient name of St. Olave-street, which should be extended to the streets now known as Free-school-street and Thornton-street, so that the whole of the improved line of communication which lies within the district, and which, with the parts of Tooley-street not affected by the improvements, runs in a continuous line from London Bridge to Dockhead, may in future be known as St. Olave-street." When the resolution came on for discussion the chairman said it was a very important matter, and he advised the Board not to adopt it without very careful consideration; on which Mr. Sard, the gentleman who had given notice of the motion, said that he had been thinking of the inconvenience that would arise to the large merchants and wharfingers in Tooley-street, who did business all over the world, if it were carried out, and he had come to the conclusion to withdraw the resolution. Tooley-street is saved for the present.

MONUMENT TO THE COUNTESS OF CAEN, PARIS.

The Countess of Caen, who during her lifetime was a great friend of the fine arts, left, at her death in 1872, a large part of her fortune for the foundation of a scholarship in the three branches of art, painting, sculpture, and architecture. The scholarship is confined to those artists to whom the "Grand Prix de Rome" is awarded, and enables them to continue their studies on their return from that city for a further period of three years. The Countess in her will bequeathed an annual pension of 4,000 francs to painters and sculptors and 3,000 francs to architects, the recipients engaging, during the last year, to furnish a work for the museum which will bear her name. This museum will be inaugurated very shortly, and will be established in the right wing of the Mazarin Palace (Institut de France). At the *Salon* last year were exhibited the first three works contributed by the "pensionnaires" towards the decoration of the above museum. The one which more particularly interests us is that of the architect, M. Emile Ulmann, Grand Prix de Rome in the year 1871; "hors concours," 1879. M. Ulmann, as the first recipient in the branch of architecture, conceived the happy idea of a monument to perpetuate the memory of the most worthy and generous Countess. This monument, which will be erected in the museum, is, in a measure, in the Italian Renaissance style, though the composition is original in conception and in conformity with the spirit of the subject. In a recess, reclining upon a cenotaph, her head resting upon one hand, and holding in the other her will, the Countess is dictating her last wishes, which two winged children at her feet are writing down. Above the recess are three niches containing allegorical figures of painting, architecture, and sculpture, with their respective attributes. On either side of the monument are marble tablets on which are engraved those portions of the will referring to the Institution. These tablets are surmounted by the heads of Minerva and Rome. On the base of the monument is engraved the votive inscription crowned by the arms of the Countess of Caen. The entire monument will be of white marble. Our thanks are due to M. Ulmann, the architect, for his kindness in supplying us with every necessary information.

PROPOSED NEW BUILDINGS, NEAR NICE.

ST. MARGARET'S SCHOOLS.

These schools, of which we give a view, will accommodate fifty boys and fifty girls, and are provided with two class-rooms to each school, master's residence, offices, &c. There are two large playgrounds at the back, which will be paved with asphalte. A local stone will be used. The cost will be about 9,000*l.* Mr. Braitbwaite, of Lichfield, is the donator, and Mr. E. B. Lamb, of Manchester, the architect.

VESTRIES, ETC., ST. MARGARET'S CHURCH.

The facings are to be of local stone, dressed with Caen. The interior of the school and meeting-room will be faced with white glazed bricks, with a grey dado. The floors of the passage to the church and porches are to be paved with tiles. The roofs of the school and meeting-room are principally of English oak, and open-timbered.

The cost of the buildings, including tower, will be about 1,100*l.*

The school is intended mainly for the musical instruction of the choir, seating being provided for about forty.

NEW THEATRE, TIFLIS.

In 1876 the Administration of the Russian province of the Caucasus advertised for designs for a new theatre at Tiflis, in the Caravan-Serai, to take the place of the one destroyed by fire. In accordance with the terms of the competition, the theatre was to be constructed of stone, at a cost of 250,000 silver roubles (37,500*l.*); a premium of 1,500 roubles being offered for the best design, and for the next two in merit 750 roubles each. The style of the building, that is the outward appearance of the theatre, was left to the option of the competitors; but as regards its interior, and especially of the auditorium, it was to be decidedly in an Eastern style, Arabian, or Persian. Moreover, the new theatre was to be as nearly as possible like the old one. At the time appointed, four designs were sent in to the committee specially appointed; the devices being respectively "Nie Vpervive" (Not for the first time), "Sphinx," and "Popnitka" (a Trial), the fourth being marked only with initials. The first one named was deemed the best, the successful competitor being the architect Schreter, an Academician. The designs with the devices "Sphinx" (architect Simonsen), and "Popnitka" (Princes Tourmanoff and Liavdansky, captains of Engineers) received the second and third prizes of 750 roubles each. The design of B. A. Schreter, which satisfied all the requirements of the competition programme, is distinguished by the convenient arrangement of the interior of the theatre. The building is lighted by gas, and warmed with hot air.

A PROJECTED MONUMENT IN JERSEY.

A movement is on foot for the erection of a statue of Major Peirson, in the Royal-square, St. Helier's, Jersey. That gallant officer, who led the British forces to victory during the French invasion of 1781, and who met with a 'soldier's death at the supreme moment of victory, is represented standing upright, in a martial costume, and in an observant but hopeful attitude. The model has been taken (from the best engraving extant) by Mr. H. W. Sohier, a clever local sculptor, whose chief works,—busts of Dr. Jeune, late Bishop of Peterborough, Major Peirson, and Advocate Le Sueur,—adorn the town-hall. His latest work is a bust of Swedenborg, presenting a striking likeness. The projected statue will be in marble.

Art-Gallery for Birmingham. — At a meeting in Birmingham on Thursday, about 3,000*l.* were subscribed towards 5,000*l.* required to secure an additional 5,000*l.* conditionally promised by Messrs. Tangye for contributions to the Art-Gallery. The Mayor, who presided, headed the subscription-list with 500*l.*

nt which would have met with anything
universal acceptation fifty years ago.
srs was at that time a very prevailing
nion among sensible and intelligent people
t pictures and statues, and even poetry and
sic, were really toys for the rich, and that
ople who had their way to make in the world
l no time and no money to spend upon such
lles. Now, that was a sentiment which
body would venture to utter privately or
blicly at the present day. And not only at
time referred to were the arts largely con-
ered as mere toys and luxuries for the few;
t even the few could not, he thought, be
nsad of overestimating the importance of
se toys and luxuries, at least when they
re of native production. At one of the
rliest meetings of the Association, the late
an Ramsay, who always took a great inte-
t in its prosperity, said he had been com-
ring certain figures, and that, while up
the ninth year of the existence of the
iety it had expended 36,000*l.* in the pur-
ase of works of art, in a particular year
fore its establishment, the whole amount
ent in the purchase of such works from
exhibition of the Royal Scottish Academy
s 30*l.*, and the sister Academy of Arts
Dublin had subsisted for four years upon
s.! Now, it appeared to him, looking at
ese figures, that there had been very signifi-
nt and palpable progress in the public mind
regard to matters of art. Although he
lieved that the capacity for taking delight
painting was universal, or almost universal,
ll it was a capacity which was not very
rongly developed in people who had no oppor-
nity for sseing good pictnres; and accordingly,
hen a society was formed for tha purpose of
fusing a taste for art, the best thing it conld
, the only thing it could do with any very
eat and immediate hope of success, was the
stribution, as widely as possihle, of as fine
ecimens of art as it was enabled to distribute.
ch was the principal purpos for which the
sociation existed. It endeavoursd to attain
at purpose in two different ways. It had con-
buted to the National Gallery many fine
rks of the greatest of our recent and living
ottish artists; and it distributed, not only all
er the country, hut all over the world, the
rks of Scottish artists in the shape of original
stures, and still more largely in the shape of
gravings. It was always one of their main
jects,—and he thought it was one they would
the last to abandon,—to aid and enconrage
ung artists, whose excellence had not yet ob-
ned acknowledgment. During the existence
the society there had grown up a new genera-
n of Scottish artists, of whose great fame and
putation they were all justly proud; and it
peared to him a remarkable proof of the
ccess of the earlier committees of tbe
ciety in selecting, among the works of un-
own and rising men, those which gave real
dications of originality and genins, that, look-
g hack to the earliest lists of the society's
rchases, he found among them almost every
me which the country and the world now
cognised as that of a Scotch artist who had
ne hononr to his country.

The Secretary (Mr. Cornillon, S.S.C.), then
ad the report by the Committee of Manage-
ent, of which the following is tbe substance:—

The subscriptions for tbe past year, notwithstanding
prolonged depression of trade, both at home and
road, amount to 4,719*l.* 15s., showing an increase of
7*s.* over tbe amount subscribed last year, a result
dnly attributable, as formerly, to tbe hearty co-operation
tbe honorary secretaries. As the presentation work
tbe current year, an etching after the picture by tbe
e G. Paul Chalmers, R.S.A., "The Legend," now in the
ottish National Gallery, has been completed by M. Rajon,
om the recent exhibition of the Royal Scottish Academy
Committee purchased for distribution among the mem-
rs, at a cost of 960*l.* 1s., twenty-eight works of art, con-
ting of twenty paintings, seven water-colour drawings,
d one bust in bronze. The following are the names of
e artists from whom the works selected were pur-
ased:—Alexander Fraser, Robert Gavin, John Hutchin-
n, and Walter H. Paton, Academicians; J. C. Noble and
bert Anderson, associates; George Aikman, Laura T.
ma-Tadema, Jessie A. Brodie, Hector Chalmers, James
danbead, J. Jamieson Chalmers, David Farquharson,
mes Faed, jun., Giuseppe Ferrari, Harry Frier, James
milton, E. Hume, G. W. Johnstone, Robert Little,
illok S. Nisbet, G. Postnn, Robert Ross, Sam. Reid,
hn Reid, Archibald D. Reid, and John Fraser Taylor,
tists. In addition to tbe purchases from the Academy's
hibition, tbe following original paintings were commis-
ned by tbe Committee from the artists, at tbe cost of
l., to be included in the distribution, viz.:—"Novem-
r," by George Reid, R.S.A. (126*l.*); "When the Boats
me in," by William McTaggart, R.S.A. (126*l.*); "An
stern Connoisseur," by W. E. Lockbart, R.S.A. (126*l.*);
Jeanie Gray," by J. H. Lorimer (63*l.*). As regards tbe
graving for next year, tbe Committee announce that they
ve arranged for the reproduction of Sam Bough's
Cattle crossing the Solway," now the property of John
M. Crabbie, esq. The execution of the engraving has been entrusted to Mr. Lumb Stocks, R.A., who has contracted to finish the plate in June, 1880, so that copies will be issued to the subscribers for the year 1880-81. The engraving, which will be 20 in. by 14½ in., is to be in line, on steel. The total sum expended up to this time by the various committees of management of the Association in the acquisition of paintings and sculpture for the members, in the purchase of pictures for permanent preservation in the Scottish National Gallery, and in the production of engravings and illustrated works for circulation among the subscribers, now amounts to upwards of 193,000*l.* The sum at the credit of the National Gallery amounts at present to upwards of 800*l.*, including the percentage of this year's subscriptions, set aside in compliance with the terms of the Association's royal charter of incorporation.

The report was adopted, and other business transacted.

THE VAUXHALL GROVE ESTATE.—NEW BUILDINGS AND THOROUGHFARE.

What is known as the Vauxhall Grove Estate, lying between Harleyford-road, opposite Kennington Oval, and South Lambeth-road, is now being laid out for residences, a spacious new thoroughfare through the centre of the estate forming a portion of the undertaking. This thoroughfare will open out an entirely new road between Harleyford-road and South Lambeth-road, and will accomplish a much-desired improvement in the locality, as it will render unnecessary the present circuitous route between Harleyford-road and South Lambeth-road *vid* Vauxhall and the South Western Railway Station. The houses on the estate, upwards of eighty in number, will be in crescent form, and contain three stories each, with bay windows, and elevations in red brick, and stone dressings. Several of the houses have already been erected, whilst others are in progress. The entrance to the estate from Harleyford-road is distinguished by two pillars, on which are inscribed "The Grove." It is stated that another outlet into Fentiman-road, giving access to Clapham-road, is contemplated.

The estate is being laid out by Mr. Archer, architect and surveyor, the builder being Mr. Coombs, who is also the owner of the property.

SALE OF A LARGE WEST END MANSION.

Last week, under an order of the Court of Chancery, Mr. F. T. Galsworthy, of the firm of Messrs. Chinnock, Galsworthy, & Co., offered for sale at the Auction Mart, the spacious leasehold mansion, No. 27, Portland-place, at the corner of New Cavendish-street. The mansion was described as containing twelve bedrooms, six reception-rooms, and an unusually extensive range of domestic offices, the premises having been recently decorated in a very elaborate and costly manner. The property likewise included extensive stabling in Weymouth-mews, comprising a six-stall stable, with coach-house for four carriages, and men's rooms over. The mansion was stated to be held from the Duke of Portland, for a term of forty years from January, 1874, at a rental of 250*l.* per annum. It was sold for 12,550*l.*

THE PAVING OF THE DULWICH ROADS.

PROTEST BY THE INHABITANTS.

The inhabitants of Dulwich are at the present time much concerned by a proposal of the Camberwell Vestry to lay down York paving in the different roads, which, it is urged, would altogether destroy the exceptionally rural character of the hamlet of Dulwich. Last week a numerously-attended meeting of the inhabitants was held in the Hall of Dulwich College for the purpose of opposing the action of the Camberwell Vestry on the subject. Amongst those present were several of the Governors of the College.

Mr. Young, one of the governors, was called upon to preside, and moved a resolution to the effect that the meeting deprecated the idea of laying York paving on the footpaths of rural roads such as those in the Manor of Dulwich. He observed that the feeling of the governors was entirely with the inhabitants in this matter. Captain Bedford Pim, another of the governors, seconded the resolution, which was carried unanimously.

Another resolution, proposed by Mr. Wraggs, was to the effect that the Camberwell Vestry should be asked to reconsider their resolution to lay down York paving in all roads taken over by the parish. He observed that it would be a thousand pities to introduce York paving in Dulwich, for a thing which might do very well for Camberwell Green was quite out of place in that district. It seemed to him absurd to say that a rural traffic required York paving. He was sure there was no one present who would like to see that beautiful hamlet converted into a mere suburb of London, but that all of them would very much prefer that it should retain its present rural aspect. Mr. Goodall, who supported the resolution, denounced the proposal of the Vestry as one of spoliation. They might as well talk of paving Kew Gardens with York paving as Dulwich. It was on æsthetic grounds, in opposition to the utilitarian notion that every place should be alike because they were under the control of one Vestry, that he deprecated the conversion of that rural hamlet into a town. He had heard strangers remark that they would not find a more charming aspect of rusticity fifty miles from London. Mr. Whitsley, a member of the Vestry, also supported the resolution, stating that in the Vestry he had often strongly urged that the proposition to have all the footways in the parish, urban and rural, York paved, was monstrous. The motion was unanimously adopted, as also another resolution to the effect that the resolution be forwarded to the Metropolitan Board of Works, and requesting their assistance in preventing the unnecessary outlay which would be caused by York paving the roads in Dulwich.

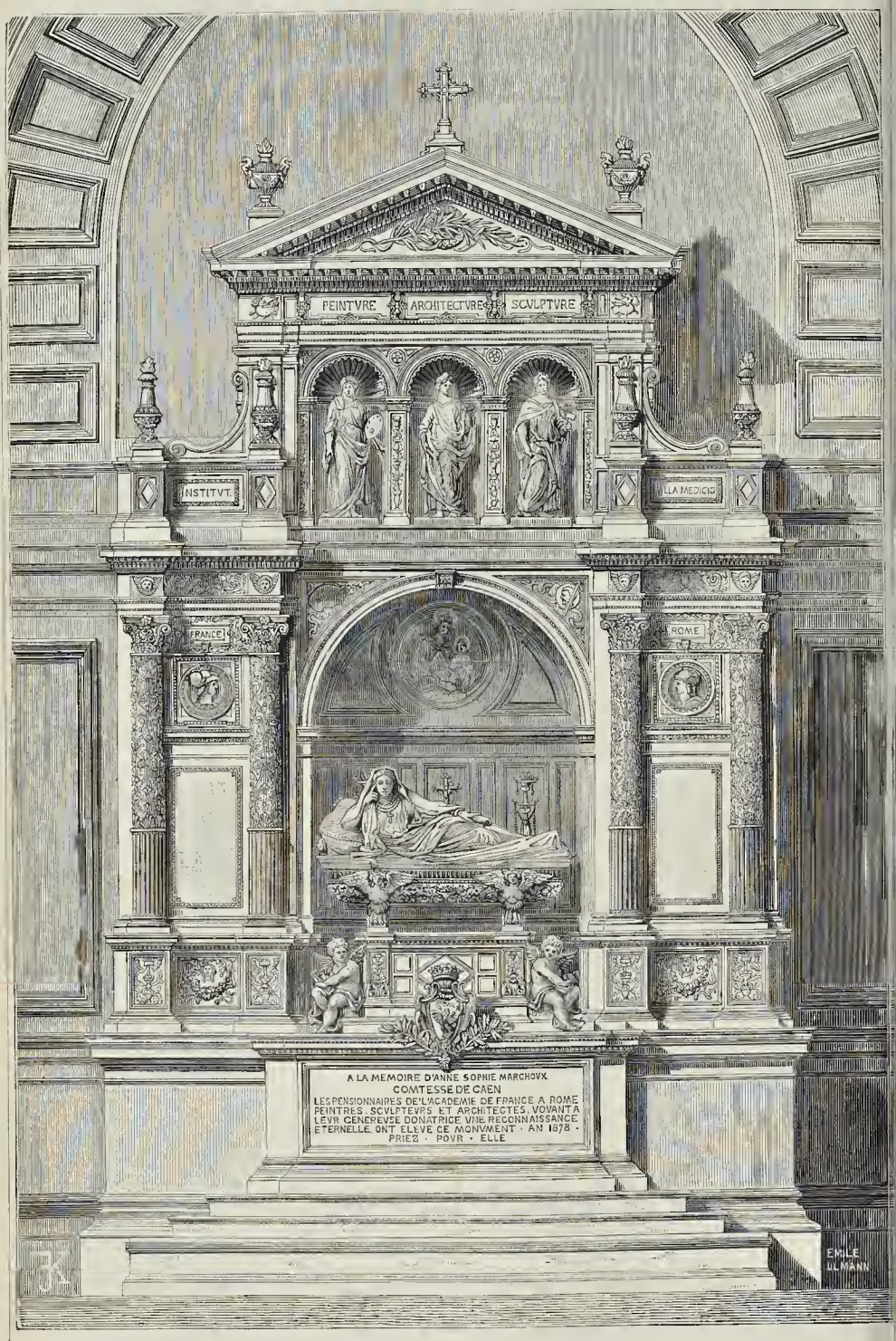
The general feeling of the meeting seemed to be that asphalte and tar paving was the most suitable for the footways in the hamlet.

TREATMENT OF DAMP WALLS.

An interesting and successful experiment has recently been made in Germany in drying a wall which had become damp from outside through a roof built against it, the saltpetre contained in the lime oxydising and forming crystals on the wall. As pulling down the wall would have been too expensive, the following experiments were made:—The wall was coated with liquid asphalte, which, as is well known, cannot be laid on thin, but is in every respect proof against damp. But as oil colour and asphalt do not agree together, paint not adhering to asphalte, the latter was scraped off with the spattle so as to leave very little of it remaining. The asphalte was then softened and made liquid by means of a red-hot iron, or better still with a spirit soldering-lamp, and at once well rubbed about with a stumpy brush, until the remaining asphalte had the thickness of tissue paper. A plate with red-hot sand was then passed along the wall. The sand heated the asphalte, and as much sand adhered as was necessary to enable another mass to be put on, which otherwise would perhaps have not adhered. Two coatings of spirit lac (shellac and spirit) and Venetian turpentine, specially prepared, were then laid on, so that afterwards oil-colour could be put on, and isolated from the asphalte. The oil-colour, white-lead paint, was laid on thickly, and linen or muslin put on this. Much dryer having been used, the whole was dry in three days, when again spirit-lac and oil-paint were put on, and finally the whole work was treated with the spattle. The wall thus operated on has now stood for two years, and although it is damp on the outside, it remains dry inside. The cost is said to have been 3s. per square mètre.

OBITUARY.

Mr. William Moseley, Architect.—We mention with regret the death of Mr. William Moseley, which took place on the 29th ult., at 32, Cumberland-terrace, Regent's Park, in his eighty-third year. Mr. Moseley was appointed county surveyor of Middlesex in the year 1829. He held that office for twenty-five years, and during its tenure built the Female Ward of the House of Correction, rebuilt the House of Detention (formerly the New Prison), added wings to Hanwell Asylum, was the architect of the Surrey Lunatic Asylum at Wandsworth, and of the West Derby Asylum, Liverpool, and was appointed consulting architect to the Commissioners in Lunacy. Whilst in partnership with his brother, Mr. Andrew Moseley, he built the Westminster Palace Hotel, the City Bank in Threadneedle-street, the City Bank in Bond-street, and many other mansions and buildings. He was elected district surveyor of West Islington in 1853, and held this appointment till his death.



PROPOSED MONUMENT TO THE COUNTESS OF CAEN.—Designed by M. Ulmann, Architect.

PROPOSED NEW SCHOOLS NICE.

E. B. LAMB, ARCHITECT - 54 EXCHANGE ARCADE CHAMBERS, MANCHESTER.

Whiteman & Bass, Photo-Litho 236 High Holborn

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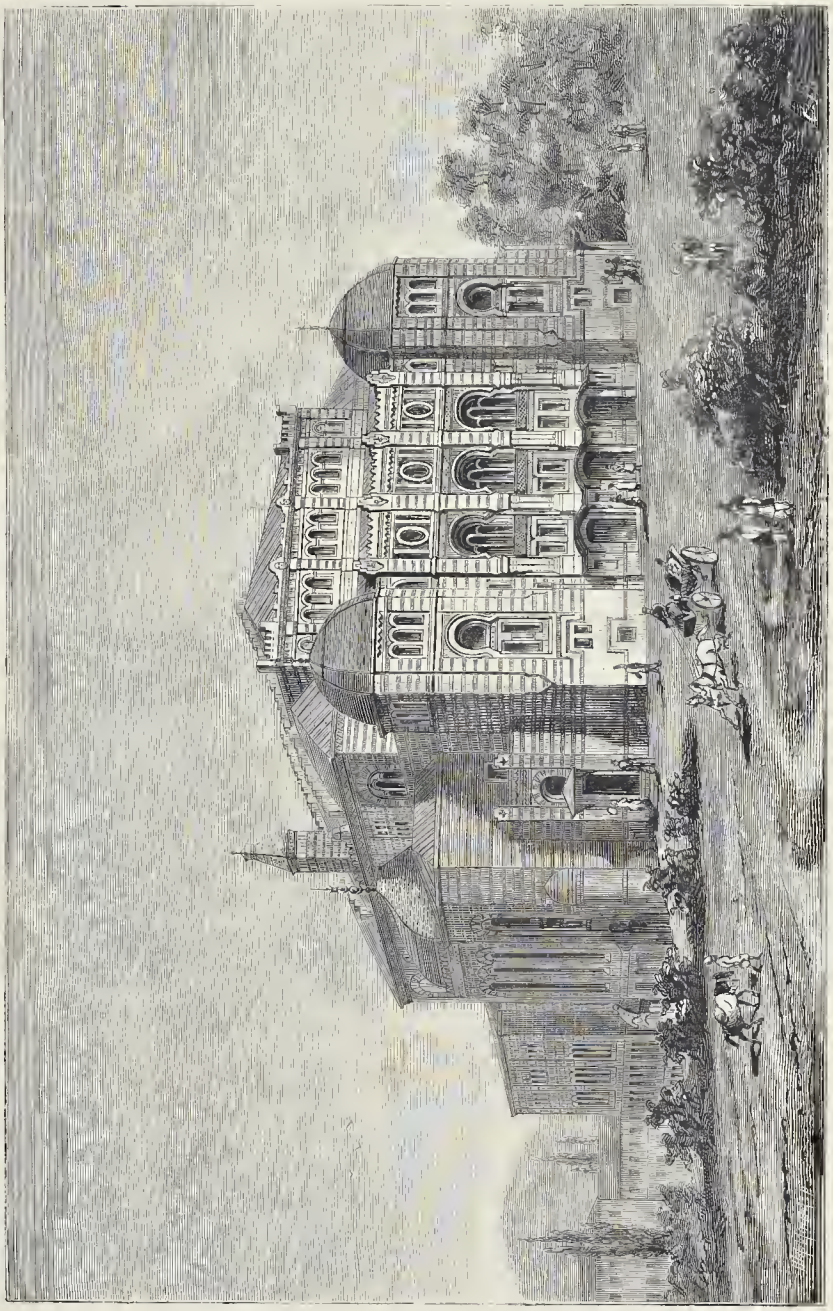

THE NEW THEATRE AT TIFLIS.—B. L. Schreter, Architect.

MEMORIAL OF KING LEOPOLD I. OF BELGIUM, IN LAEKEN PARK.——M. L. DE CURTE, ARCHITECT.

EXETER HALL, STRAND.

THE Committee of the Young Men's Christian Association having purchased the Crown lease of this property, invited competition designs from three architects for the proposed alterations.

The plans prepared by Mr. Alfred R. Pite, of Bloomsbury-square, being unanimously approved, the committee have authorised the works to be carried out as speedily as possible, that the public may have possession of the Hall early in 1881.

The additions proposed are of an extensive character, the whole of the ground-floor being appropriated to the work of the Association, having spacious reception-rooms and assembly-hall. The mezzanine floor is retained for offices. The large hall is to be considerably improved, and provided with additional staircases for egress and access.

MEMORIAL OF KING LEOPOLD I. OF BELGIUM.

WE mentioned, in a recent number, the inauguration of the monument which has been erected to the memory of the first king of Belgium, in the Park at Laeken, Brussels, and we now give a view of it. Like the memorial of the Prince Consort in Hyde Park, it originated in a public subscription, the amount of which was supplemented by a vote of the Legislature,—in this case, 2,000,000 francs, or 80,000*l.*

The monument is placed on an elevation, from which the visitor has a fine view, not merely of the capital, but of the suburbs. It presents a polygon of nine sides, in remembrance of the nine provinces forming the kingdom, and of these it includes allegorical statues. In the central enclosed space is a statue of the king in white marble. The upper part of the monument consists of an open-work spire, about 70 ft. in height. A terminal statue represents the genius of Belgium holding with one hand the national flag, and in the other a civic crown. It is designed in the style of the fourteenth century, and the architect was M. L. de Curte, who has increased by it his reputation.

Production in England.—From a recent book, "The Progress of the World" (Stanford), it appears that in manufactures England at present stands pre-eminent. Its operatives number 2,930,000 against 2,781,000 of Germany, and 1,936,000 of France, and 1,150,000 of Russia. The production per operative is given as—United Kingdom, 224*l.*; France, 220*l.*; Germany, 103*l.* In the principal textile manufactures,—cotton and wool,—the United Kingdom produces a total of the value of 155,000,000*l.*; the United States, 84,000,000*l.*; France, 68,000,000*l.*; Germany, 48,000,000*l.*

ENGINEERING IN THE UNITED STATES.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

On the last annual convention of this Society, the President being unable to deliver the annual address in consequence of his journey to Europe, it was, at his request, prepared by Mr. O. Chanute, Vice-President, with the assistance of members of the Society. It is a very interesting and valuable review of the subject. We give some portions of it:—

We seldom realise how very young is our profession. From the earliest historical periods, until within about 200 years, construction, practically, was in the hands of architects. They built pyramids, temples, roads, fortifications, and such weak machines as they could work by hand, but it is only in modern times that a special body of men has devoted itself exclusively to the building of works and machines for utilitarian purposes,—to the emancipation from toil of the "hewer of wood and the drawer of water."

So recently as 200 years ago, when the English people began the works which have made them one of the great nations of the earth, there was such a lack of trained constructors in the country that they were compelled to send to Holland for what were then called "hydraulic architecte," to direct the reclaiming of their marshes and to inaugurate their canals. Soon, however, they excelled their early teachers, and trained the very able engineers who established the modern profession, and whose labours led to the invention of the steam-engine scarcely a century ago. We, who cannot remember the time when steam-engines were not in common use, can scarcely realise that their introduction was so recent; and yet it was only in 1778 that James Watt, after struggling for over twenty years to remedy the imperfections of such machines (as invented by others), finally triumphed over all the mechanical difficulties he encountered, and began the regular manufacture of steam-engines. By this step an enormous impetus was given to development and invention. Not only did the engineer find himself possessed of an instrument which increased many-fold the productive powers of labour, but the use of steam, and the wonders it accomplished, turned men's thoughts to the advantages of machinery and labour-saving appliances. Invention followed invention in every field of mechanics, fresh discoveries of natural laws took place, which were quickly applied by the engineer, and he has been able to accomplish more in the past 100 years than had been achieved in the previous 19 centuries. It is my purpose to-night briefly to pass in review what has been done in this direction in this country. In doing this, I shall touch upon some fields which are as yet scarcely recognised here as within the province of the engineer, but which are falling into his hands in other countries, and probably will in time. I think that you will agree with me, that starting as an independent nation about a century ago, with a population of some 3,000,000 only scattered, and with next to no capital, the modern inventions which we have appropriated or made have enabled us to accomplish many remarkable results.

Water Works.—The first works in America for the supply of water to towns were constructed by Hans Christopher Christiansen, and are in operation on June 20th, 1754, at the Moravian settlement of Bethlehem, in Pennsylvania. The water from a spring, which is still used for the supply, was forced by a pump of 9 in. bore, through hemlock logs of 6 in. bore, through hemlock logs into a wooden reservoir. The same ingenious engineer, eight years later, replaced this rude pump by three iron pumps of 4 in. bore and 18 in. stroke, which for many years were the only machinery for water-supply on the continent, and for seventy years furnished the water for Bethlehem. Among the oldest, if not the very oldest in date to Bethlehem, is the Morristown, N.J., Water Company, which was incorporated in 1791, and has ever since furnished the town with water collected from the neighbouring hills. The first application of steam to pumping was in Philadelphia, in 1800, when the third steam-engine of any considerable size in the United States was erected on the banks of the Schuylkill. It is believed that these works were the first constructed by a municipality. The first cast-iron water-pipes were laid in Philadelphia in 1804. New York was first supplied by a company which erected a small pumping-engine about 1800. About 1850 the substitution of light wrought-iron pipe, lined inside and out with hydraulic cement, for cast iron, at greatly reduced cost, was found to be practicable in many cases, and the formation of companies to manufacture and lay such pipes introduced a commercial element into the matter of water-supply, and led to the construction of many works. All American works are constructed for a constant supply, and most of those first built had a capacity far in excess of the then demand, which caused the formation of habits of wastefulness, which it has been found difficult to check when the limit of the capacity was nearly reached. The magnitude of the interests involved in this branch of engineering may be judged from the fact that there are now in the United States and Canada 569 towns with a public water-supply, having a population of about twelve millions, to whom there are daily distributed over 600 millions of gallons of water, through 13,000 miles of pipes, of which about 10,000 miles are of cast iron. About one-half of these towns are supplied by gravity, many of them, however, having supplemental pumping power,—the total capacity of the pumping engine now in use being about 1,900 millions of gallons per day. Meanwhile improvements in plumbing and house distribution have greatly added to the convenience about our homes, and we now virtually have a spring of cold and another of hot water in almost every room of our city houses, to put on tap at will.

Hydraulics.—The attention of manufacturers was drawn at an early day to the development of the water power of the streams on the Atlantic coast. With the aid of capitalists, who appreciated the value of an investment in experimental researches, some of the most effective efforts towards the solution of problems in practical hydraulics have been made by American engineers, on a scale unattempted in Europe. The early foreign experiments, on which most of the formulæ for the discharge of water from weirs, orifices, and pipes are based, were on too small a scale to furnish data capable of generalisation for greater discharges.

The experiments of Mr. Jas. B. Francis, at Lowell, have, among other valuable results, established correct values for the co-efficient of discharge of weirs, and his formula is now generally used. The researches which have been made at Holyoke and Lawrence have done much to settle disputed points in relation to the movement and effect of water in channels, and the systematic experiments now in progress, on the new conduit of the Boston Water Works, cannot fail to be of the greatest value in determining the co-efficients of flow in masonry channels. The laws governing the flow of water in pipes, are still too little understood. It is a reproach to American engineers that so little effort is made to discover them, notwithstanding the opportunities presented by the pipe systems of our water-works, sewage systems, and hydraulic mining conduits. . . .

Railways.—Quick to appreciate the consequences of the invention of the locomotive, or rather its marvellous improvement by Stephenson in 1829, and the peculiar adaptability of the railroad to our country, as a means of settling up new lands and of cheapening the interchange of products, we began building railways very soon after the English, and have pushed their construction with unexampled vigour. . . .

Since 1875, some 10,268 miles have been built in Europe, and about 5,000 miles in other parts of the world, outside of the United States, chiefly in Australia and India, so that the world's railways probably stand to-day as follows:—

Europe	98,275 miles, or	47	per cent.
United States	86,121 "	41	"
Rest of the world	25,000 "	12	"
	209,396		

Thus our fifty millions of inhabitants have furnished themselves with 86,000 miles of railway, while the 306 millions of Europe have 98,000 miles, and the 1,050 millions of the rest of the world possess but 25,000 miles. There were in Great Britain on the 1st of January, 1879, 17,333 miles of railway, on which there were about 32,000 miles of track, 12,969 locomotives, 418,322 passenger and freight cars, owned by the companies, in addition to some owned by private parties, and over which trains ran 222,376,114 miles, and conveyed 565,000,000 passengers. The capital account of the English roads was 698,545,154 pounds sterling, or $3,380,958,545, thus giving an average cost of $195,059 per mile of road. The average cost per mile in several other countries about the year 1875, was as follows:—

France	1873		$152,500
Belgium	1873		111,342
Germany	1875		100,570
Austria-Hungary	1875		106,847
All Europe	1875		120,960
United States	1879		58,915

Thus our railroads have cost less than half as much per mile as those of Europe. Going back one year, for purposes of comparison, on the 1st day of January, 1879, we had in the United States, 81,841 miles of railroad, on which there were 101,660 miles of track, or enough to encircle the globe three times and a half. There ran upon these roads 16,445 locomotives, 11,683 passenger cars, 4,413 baggage, mail, and express cars, and 423,013 freight cars. The capital invested was $4,772,297,349, or $58,915 per mile of railroad; the gross earnings were $190,103,351, or $6,209·52 per mile; the working expenses were 61·79 per cent. of earnings, or $302,528,184, —say $3,887·10 per mile of railroad; and the net earnings were $187,575,167,—say $2,322·42 per mile, or 3·932 per cent. on the nominal capital. While the greater cheapness of our American railroads is in some measure due to the comparative smoothness of much of our country, and to the absence of heavy land damages, much more is due to the methods of construction applied to the railroads themselves, to the cheap and efficient expedients which our engineers have introduced, and especially to the character of the rolling stock which we have adopted. . . . . Although our railroads were originally cheaply and imperfectly built, and although we pay in this country a great deal more for labour and material than the prices which obtain in Europe, we have nevertheless reduced the cost of transportation to as low figures, if not lower, than any which obtain on the other side of the ocean. The grindstone of competition between the railroads themselves, and with canal, river, and lake routes, has reduced freight transportation to such a fine point that our railroad managers have devised new and cheaper methods of doing their work, have learned to operate their roads with a smaller proportion of men, and have accomplished results which astonished even themselves. Sharp competition and the incessant demands of the public have for the past few years diminished rates so rapidly that, as a whole, our railroads are now paying smaller returns upon the entire capital invested in them than those of most foreign countries, and the people of the United States have since 1873 had their property transported for less than it was reasonably worth. It has been shown in giving the net earnings of all our railroads, that for the year ending January 1, 1879, they earned 3·93 per cent. upon the total capital invested in them, while the railroads of Europe in 1875 earned the following returns upon their capital:—

Great Britain	4·4	per cent.
France	5·1	"
Germany	5·1	"
Austria-Hungary	3·9	"
Russia	4·0	"
All Europe	4·3	"

As Americans, we have no reason to be dissatisfied with the results accomplished thus far. We have succeeded in so organising labour that while we pay it from 30 to 50 per cent. more than in Europe, we build our railways for about one half the cost, and we transport freight over them with the aid of our machinery, at materially cheaper rates than those which obtain in other parts of the world. Not only should engineers endeavour still further to improve and to cheapen the construction, and especially the operation, of our railroads, but they should now find in foreign countries, as yet unprovided with them, fields in which they can introduce the features of economy which we have developed. At home we shall doubtless continue to build new lines in the same cheap light style which we have made so efficient, and we shall largely extend the narrow gauge in sparsely-settled districts. We should, however, so locate our roads as to secure the best possible line and gradients, even if, after they are adopted, we do not bring the embankments to the full heights, in order to save present expense. As population and traffic increase, we can, if the works are well planned for that purpose, rebuild, add to, and improve them, so as to diminish the cost of transportation to the best economy. . . . The day cannot now be far distant when the merits and economy of the American type of bridges will be recognised by other nations. Already, notwithstanding the fact that labour and materials are cheaper in other countries than in

this, we are enabled to compete successfully in Canada and in South America. I believe that a well-directed effort to make known abroad what we have accomplished in this branch of engineering during the last fifteen years would open a market for our bridges and bridge designs in Europe and in Asia.

Lighthouses.—From the report of the Lighthouse Board for the year ending June 30, 1879, it appears that the Government has erected the following lighthouses:—

First order		47
Second	,,	26
Third	,,	55
Third and a-half order		10
Fourth	,,	200
Fifth	,,	123
Sixth	,,	165
		626
River Lights,—Mississippi, Ohio and Missouri Rivers		737
Buoys in position		3,114
Fog-signals,—steam or air		56
Light ships		31

As a measure of comparison, it may be interesting to note that on the 31st of December, 1878, England reported 597 lighthouses, and France 346 lighthouses. . . .

Telegraphic Engineering.—The lines of telegraph are being extended so rapidly that it is difficult, even for their owners, to state the aggregate quantities at any particular time. The best information, however, which can be obtained is that on the 1st of January of this year, there were 119,042 miles of telegraph-lines in the United States, and 299,859 miles of wire, without counting those lines specially used by the Gold and Stock Telegraph, and the District, the Fire Alarm and Burglar Alarm Telegraphs in the various cities. One telegraph company alone, the "Western Union," had in June, 1879, 8,534 offices, from which were sent and received 25,070,106 messages during the preceding year. Equally prompt has been the application of the telephone, which, looked upon doubtfully, or only as a toy, when it was first shown by Professor Bell at our Centennial Exhibition four years ago, has so rapidly become a necessity, that there are now in this country 121,000 instruments at work, connecting our business places and dwellings with each other, and with the central offices, by means of which we are almost instantly brought within speaking distance of the persons, miles away, with whom we have to transact our business. . . . .

Iron and Steel.—We are now the second iron-producing nation in the world, England being the first and Germany the third, while 44 new furnaces are reported as being built. We have in addition 382 rolling-mills and steel works, containing an equivalent of 4,467 single puddling furnaces, 2,419 heating furnaces, and 1,397 trains of rolls, with a capacity of 4 millions of tons a year in finished iron. Seventy-three of the rolling-mills have nail factories attached, with 4,152 nail-machines, and to make the list complete, we may add that there are in addition 69 forges, with a capacity of 85,000 tons a year, and 59 bloomaries, with a capacity of 80,000 tons a year. Mr. Swank says: "Our steel industry is now the second in the world in productive capacity, and in a year it will pass that of Great Britain, and take the first rank. The increase in the past year in the capacity of our Bessemer and open hearth works, either completed or projected, is equal to an addition of 50 per cent. to the capacity which existed in 1878."

The Engineering Future.—Although during the past few years there has been a depression in the progress and undertaking of new enterprises, and a diminished demand for engineers, I do not believe that we are at the end of the great industrial movement which began with the steam engine. I think rather that we stand on the threshold of greater undertakings, and, perhaps, of inventions, which will mark epochs in civilisation, and which, whether made here or in some other country, our engineers should be prompt to take up, to perfect, and to introduce. There are signs that a new motive power will be invented, which shall be safer, of greater energy, and less wasteful than steam. You know that chemists tell us that the theoretical energy of a pound of coal varies between 8 and 11 millions of feet pounds, while we utilise with our best steam-engines but from 3 to 11 per cent. of the theoretical value of the fuel. I think it not impossible that we shall perfect methods of employing directly the gases produced from our fuels (instead of using them to generate another gas out of water), and thus obtain better economical results than with steam. I know of several promising attempts in this direction. And, with a new motive power, perhaps will come the solution of the last transportation problem which remains to be solved. I suppose you will smile, when I say that the atmosphere yet remains to be conquered; but wildly improbable as my remarks may now seem, there may be engineers in this room who will yet see men safely sailing through the air. In making this review, I have gone over rather a wide field, and touched upon topics which some of you, perhaps, may consider as foreign to our profession. I have, however, but followed the European practice, and that especially of our early professional teachers, the English, who, mindful of the original distinction between the civil and military branch, recognise all makers of marine, telegraph, gas, mining, and agricultural engines, as civil engineers. In this country we have taken hitherto a somewhat narrower view of the province of the engineer. We think of him mainly as a builder of water-works, canals, railways and bridges, and we underrate his importance as a builder and applier of machines. In point of fact, the most important services which the world has received from our profession have been rendered by the mechanical engineers. The men who have reduced the cost of iron and steel to less than half the prices which obtained half a century ago, who perfected the steam-engine, who set it to drawing carriages over the land, and driving great ships through the sea, and who harnessed lightning to convey thought, are the men who have made the present development possible, and enabled us to build the public works of the country. In Europe, the civil engineer is required to be much more than a mere designer and layer out of public works. Not only must he thoroughly understand the application of machinery, and be able to devise new methods, if necessary, but he is expected to be a business man, to act as an originator and promoter of new enterprises, as a director or superintendent of public improvements, and as an organiser of labour. It is probably in consequence of that broader understanding of the field open to them, as well as the better organisation of their professional societies, that the civil engineers have attained a higher position abroad than they have, as yet, in this country, and have attracted into their ranks the most enterprising and gifted men, who remain permanently in the profession; while with us, engineers cease to be regarded as such by the public when they achieve success, and become presidents or superintendents of public enterprises. In France, the direction of almost all departments of public works is in the hands of engineers, and two of them are members of the present ministry. In England, so great is the confidence that the public have in engineers, that they are constantly called upon to appear before committees of Parliament, thus coming into contact with the ablest men in the kingdom, to advise them concerning the merits of various propositions; and no new scheme stands much chance of success unless it is approved by the leading members of the British Institution of Civil Engineers, which includes within its list, not only the names of all the eminent men in the profession, but also those of princes, kings, and an emperor.

THE PROPOSED THEATRE IN BEAUFORT BUILDINGS.

Changes in the arrangements have been made. On Tuesday last Messrs. Stuart Barker & Son disposed of the materials of the buildings which are to be cleared away on the site of the intended structure. They consist of five private houses on the west side of Beaufort-buildings, two houses in Herbert's-passage, on the north side, and several workshops and warehouses in Carting-lane, which will form the extreme west boundary of the new theatre. The site thus to be cleared covers an area of something like 10,000 superficial feet, which will represent the capacity of the theatre. The new building will have four distinct frontages, namely, in Beaufort-buildings and Carting-lane, on the east and west, of about 150 ft. in length, on the north side in Herbert's-passage, about 80 ft. in length, and a fourth frontage on the south side, in which, it may be observed, will be the principal entrance to the boxes and some other parts of the house. The steep gradient from the Strand into Beaufort-buildings renders a carriage approach there inconvenient, and Mr. Phipps, the architect appointed, has so arranged his designs that the approach to the theatre for setting down visitors will be from the Thames Embankment into Savoy-place, arriving at the entrance to the theatre on the south side under an archway contiguous to Beaufort House, the business premises of Messrs. Rimmell. In addition to the principal entrance on the south side, Carting-lane, on the west side, will also admit of other entrances from the Strand. Although the chief entrance will be as before stated, we understand that the principal elevation will be in Beaufort-buildings. It is expected that the new house will be completed and ready for opening about the end of the year.

THE NEW POST OFFICE SAVINGS-BANK.

The new building which has been erected for the Savings Bank department of the General Post Office in Queen Victoria-street has been opened for business. The building adjoins (and dwarfs) the British and Foreign Bible Society's new building, and extends northwards to Knightrider-street. The elevation is in Portland stone, the ground and first floors being rusticated. Each floor above the ground-floor contains a range of eleven windows. There are five floors and a basement. Over the two entrances, one at the west end, the other at the east end, there are bold cornices, supported on carved brackets, and the whole elevation is crowned by a massive cornice, with a parapet at the edge of the flat roof, each end of the cornice terminating with a scroll, in which, on the face of the building, is carved a lion's head of large size. The whole height above the pavement level is nearly 96 ft., and the length of the frontage is nearly 148 ft., but the other side of the building in Knightrider-street, which is of Suffolk bricks, with stone dressings, is only about 86 ft., owing to the intrusion of some separate premises at the west. There is an inner shaft measuring 45 ft. by 30 ft., lined throughout with white enamelled bricks, which runs up the whole height of the building. The building has an average depth of about 100 ft., and covers a ground area of nearly 15,000 superficial feet. All the floors rest on iron girders and columns, the construction being, as far as possible, on the fire-proof principle. The ceilings throughout are 16 ft. high, except in the basement, where the height is 12 ft. The public entrance is at the west end, in Queen Victoria-street, and over the doorway are inscribed, in letters of gold on a black ground, the words "Post Office Savings Bank," embellished on either side by the Royal monogram "V. R." On entering by the public doorway the principal staircase is on the left, and at the right is the public inquiry office, beyond which, comprising the rest of the ground-floor front, is a spacious apartment devoted to general correspondence, together with the rooms of the Controller and the Assistant Controller. Behind is a large room appropriated to what is called the deposit section, where acknowledgments for all deposits made to the 6,120 post-office savings-banks throughout the United Kingdom are written from the postmasters' daily accounts. The first floor is appropriated partly to the rest of the correspondence branch and partly to the bookkeeper's branch, and the latter also occupies the whole of the second floor. In this branch are the ledgers, about 3,560 in number, containing more than two millions of depositors' current accounts, in which every deposit and withdrawal is duly entered. The third floor is divided into two parts, one being assigned to the male staff of the examiners' branch and the other to a portion of the main establishment employed in sorting duties, which include the folding and despatching of correspondence, the daily number of communications so dealt with having sometimes been about 40,000. The fourth floor is appropriated exclusively to the staff of female clerks, whose duties are chiefly the examining of warrants for the repayments of deposits, the checking of postmasters' accounts, and the compiling documents to prove the totals of daily and quarterly transactions. Dining-room, kitchen, cloak-room, and lavatories are here provided for the special use of the female clerks. By the use of the entrance from Knigbtrider-street and a staircase connected therewith the female staff will be separated from the rest of the establishment. The basement extends throughout the entire area of the edifice, and is used chiefly for the storage of papers.

The Treasury sanctioned the erection of

building in 1877, at an estimated cost of 40,000*l.* (revised estimate, 43,000*l.*), the cost of the site being 70,000*l.* The building has been erected from the designs and under the superintendence of Mr. James Williams, of her Majesty's Office of Works and Public Buildings; Mr. William Brass being the contractor.

SCHEME OF PROFESSIONAL EDUCATION PREPARED BY THE INSTITUTION OF SURVEYORS.

An Examination System, which will take effect from the 31st of July, 1880, has been established by the Council of the Institution of Surveyors to meet the requirements of professional education.

The Examinations will be classified under three heads, viz.:—

Class I.—Students' Preliminary Examination.
Class II.—Students' Proficiency Examination.
Class III.—Professional Associates' Qualifying Examination.

The Examinations in Classes I. and II. will be compulsory.

Class II. will be divided into the three sub-classes shown in Table A.

The Examination in Class III. will be voluntary, and is designed to give Professional Associates an opportunity, subject to conditions hereinafter stated, of qualifying themselves to be Members of the Institution.

As regards the "Students' Preliminary Examination," any person eligible under the existing bye-laws, being desirous of becoming a Student of the Institution, will be required to undergo a preliminary examination, with the view of testing his general knowledge and educational acquirements.* The subjects of examination will be as follow:—

Elements of algebra, including simple equations.
Euclid,—the first three books.
English history.
Composition and writing from dictation.
Some acquaintance with either Latin, French, or German will also be required.

Those successful in passing the examination will receive a certificate to that effect, and will be enrolled as students of the Institution. The examination will be held in the month of January in each year. Applicants shall send in their names to the secretary before the end of the preceding month of November. The pupil passing with the highest number of marks will be exempted from the payment of fees during the term of his studentship.

(free of charge) of acquiring practical experience, for a period not exceeding twelve months, in a London office.

A Medal will be given to any student obtaining 900 marks in any of the sub-classes."

Printed particulars as to the examinations are obtainable.

PITCH-PINE, RED PINE, AND YELLOW PINE.

With reference to "An Architect's" query in your last (page 157), a proper knowledge of the qualities of various sorts of wood is one thing; it is, however, equally important to know how wood will endure under use in various forms. Some wood will last longest when preserved dry, other sorts of wood when wet; but in both cases it must be all dry or all wet. Other samples of wood will have a tolerably long life when exposed to alternate wet and dry; whilst such form of exposure tends to rapid decay with other wood. There is one test to which pitch-pine, red pine, and yellow pine, when put, that settles the question in favour of the softer wood,—namely, the deck of a steamboat. As to this, I can vouch for results by experiments on a considerable scale. I had charge of an inland navigation some years ago, where there were thirteen steamboats and numerous canal boats employed. Pitch-pine and red pine had been used for decks for many years, when one of the foremen suggested that yellow pine would last longer than either of the more costly and harder woods, especially over the steamboats' boilers. The experiment was made, with the result that afterwards yellow pine was selected and used exclusively for decks. American elm, used as planking for canal flats entirely below the water-line, would wear, as one of the men said, "like whalebone"; but "betwixt wind and water" would rapidly decay. Pitch-pine and red pine cannot be seasoned to stand for house-furnishing as wainscot oak stands, as may be seen when it is used for inside woodwork, as in architraves, skirtings, door-frames, and doors to be varnished. Fine white and yellow pine are therefore used for internal joiner's woodwork, and not having the ornamental appearance and hardness of the red woods, are painted.

"An Architect" has arrived, by experience, at a correct conclusion, namely, that yellow deal cills will last longer than either red or pitch pine cills. But would not well-seasoned English oak, or teak, make better, because more enduring, cills? They would cost more. But how much?

Table A.—Class II.—Students' Proficiency Examination.

Sub-Class I.—Chiefly Land Agency.	Sub-Class II.—Chiefly Valuation.	Sub-Class III.—Chiefly Building.
Compulsory Subjects.	*Compulsory Subjects.*	*Compulsory Subjects.*
Bookkeeping.	Bookkeeping.	Bookkeeping.
Principles and Use of Valuation Tables.	Principles and Use of Valuation Tables.	Principles and Use of Valuation Tables.
Land Surveying and Levelling.	Land Surveying and Levelling.	Land Surveying and Levelling.
Law of Landlord and Tenant (Elements of).	Law of Landlord and Tenant (Elements of).	Modes of Pricing Work.
Agriculture.	Enfranchisement of Copyholds.	Estimation of Quantities and Measurement of Artificers' Work.
Construction of Farm Buildings.	Law of Fixtures,	Constructive and Working Drawings.
Forestry.	Law of Dilapidations,	Law of Fixtures,
Land Drainage.	Agricultural Law,	Law of Dilapidations,
Geology and Composition of Soils.	Law of Easements and Riparian Rights,	Law of Easements, Light, and Air,
	} Elements of.	} Elements of.

A Report on some Special Subject named by the Council will be required of Students passing in Sub-Classes I. and II.

SCIENTIFIC AND SPECIAL.

(Two at least of these Subjects must be taken in Each of the Three Sub-Classes.)

Algebra.	Metallurgy (Physical Properties of Metals).	Composition and Properties of Stones and Cements.
Botany.	Agricultural Chemistry.	Road-making.
Natural History.	Mineralogy (Form and Physical Properties).	Metropolitan Buildings Acts.
Trigonometry.	Mechanics (Law of Forces).	Principles of Parochial Assessment.
Hydrostatics (Elements of).		
Meteorology (Principles of).		

Various prizes are open to students. For example:—

"To signalise conspicuous merit, a Medal and the title of 'Institution Scholar' will be given to the student who obtains the greatest number of marks, over 900, of any of the students examined in Sub-classes I., II., and III.; and the name of the student so distinguished will be permanently recorded on the walls of the lecture-hall.

The members of the Council will give the candidate who succeeds in earning the distinction of 'Institution Scholar' an opportunity

* Persons producing a certificate of having passed the matriculation examination of the University of Oxford, Cambridge, London, or any other university in the United Kingdom, or who have passed with honours the senior local examination of the University of Oxford or Cambridge, will be exempted from this examination.

Scamping timber in quality and in scantling is one of the evils of modern country house-building, and I do not know a greater risk than purchasing a new house run up in the suburbs of some town, or in the country where building regulations are not in force, or are not enforced. Take a house, priced at 1,000*l.*, and reason thus:—25*l.* saved by scamping the timber may make such a house comparatively valueless, where 25*l.* additional, or 50*l.* extra, would have paid for the best quality of timber, of full scantling, with well-seasoned oak cills throughout. The scamped house is a cripple to begin with, and, like cripples of all sorts, is an unceasing trouble and care, with no chance nor hope of cure. The house built with well-selected material will be sound and enduring for years, saving the extra cost many times over,—we will say, first, in temper; and then, by not needing repairs. Mr. Briggs has told us, in *Punch*, what are the costs and miseries attendant on scampingly-built houses, and subsequent repairs.

Yellow pine will be found to stand and wear better in street paving than any of the harder samples of wood; for which I could give reasons. I will only say that the best sample of wood paving I have seen, or driven over, is that portion near to South Kensington Museum, which is yellow pine, set on felt, and jointed with felt, the foundation being Portland cement concrete. This paving is smooth, close-jointed, and firm; free from mud in wet weather, and from dust in dry weather. By being laid close, with a jointing of felt, the surface is water-tight, and looks like one smooth sheet, as if on asphalte. This must be the street paving of the future.

A Civil Engineer.

SALE OF A CITY FREEHOLD.

Last week Messrs. Fox & Bousfield sold, at the Auction Mart, the modern freehold buildings recently erected in St. Dunstan's Passage, Great Tower-street, facing St. Dunstan's Church. It was stated that the buildings were specially constructed for office purposes, and had an ornamental elevation, in which carved and moulded stone was freely introduced. The building contains four spacious floors, the ground-floor consisting of a well-lighted public office, extending the entire depth of the building. The basement was stated to be substantially fitted with strong rooms. The property covers an area of 1,167 superficial feet. Mr. Bousfield, who conducted the sale, alluded to the great value of the property, as being situated in the very centre of the colonial produce, and import markets, adding that in view of the contemplated improvements in this part of the City, and the eventual carrying out of the Inner Circle Railway completion (which would intersect the property), it was difficult to estimate what the increase in its future value might not amount to. There was an active competition for the property, which was ultimately sold for 8,150*l.*, its present rental being 350*l.* per annum on a repairing lease for twenty-one years from 1870.

SALE OF A MANSION AND ESTATE IN HERTFORDSHIRE.

An extensive manorial estate in the neighbourhood of London was sold at the Auction Mart, on Tuesday, by Messrs. Debenham, Tewson, & Co. The property consisted of the Ardeley Bury Estate, in Hertfordshire, comprising an old mansion and grounds, 875 acres in extent. It was described as within an hour's ride of the metropolis, and for many years the residence of the late Sir Henry Chauncey, the historian of Hertfordshire, and his ancestors. The sale took place by order of the executors of the late Mr. Philip Longmore. The actual present annual rental of the farms on the estate, together with the great tithes, was stated to be 1,500*l.* a year, and the estimated annual value of the whole estate, including the mansion and park, 2,000*l.* The bidding commenced at 20,000*l.*, and on 28,000*l.* being offered, the biddings slackened, upon which Mr. Tewson, the auctioneer, observed that at 40,000*l.* the purchaser would obtain four per cent. for his outlay, from the present actual rentals, giving him the mansion, the park land, and all the valuable timber, for nothing. He added that from his experience, land in the North of England, as a rule, actually sold for more than land in the neighbourhood of London, for which he was altogether at a loss to account. On 35,000*l.* being offered, he declared it to be an open sale, and ultimately the property was sold for 36,000*l.*

Wandsworth.—On the 16th ult. Sir Charles Reed, M.P., chairman of the School Board for London, formally opened a new building erected by the Board in Warple-way, Wandsworth. The school will accommodate 603 children, and the total cost amounts to 6,671*l.* 14*s.* 8*d.*, being at the rate of 11*l.* 1*s.* 3*d.* per head. Mr. E. R. Robson is the architect. Sir Charles Reed, speaking of the work that was being done by the Board, said that it had 311 schools under its charge, most of them built and handed over to the Board, all in working order, and all of them practically full. In these schools there were 219,000 places, and 233,000 children on the roll.

THE LINCOLN MEETING OF THE ARCHÆOLOGICAL INSTITUTE.

This year's country congress of the Royal Archæological Institute of Great Britain and Ireland was held in Lincoln and neighbourhood last week. The opening proceedings took place on the 27th ult., when the Corporation presented an address of welcome, to which Lord Talbot de Malahide, president of the Institute, replied, and the Bishop-Suffragan of Nottingham, as president of the Associated Architectural and Archæological Societies of the diocese of Lincoln, county of York, and archdeaconry of Northampton, having read an address of welcome in the name of that body, Lord Talbot de Malahide vacated the chair in favour of the President of the Congress, the Right Rev. the Bishop of Lincoln, who, on assuming the chair, delivered his inaugural address. In the course of this he said,—Archæology emancipates us from the thraldom of modern prepossessions and prejudices, and frees us from the tyranny of ephemeral passions and local conventionalities. It makes us contemporaries with every age and citizens of every clime. We are too prone to be absorbed and engrossed by the things of to-day, and to be the slaves of personal interests and party trammels. We need to be liberated from such vassalage. Archæology does this, if studied aright, and especially if it is connected, as your present visit to Lincoln is, with a tour and pilgrimage to places hallowed by the memories of great men in bygone ages. In the Roman arch standing in the northern wall of the ancient citadel of Lindum, and spanning the military road which stretched from Lincoln to the Humber, we may imagine ourselves spectators of the warlike regions of the ancient mistress of the world which marched along those great martial highways, marked by milestones of which one was disinterred the other day from its grave of 1,600 years; and near it we may listen in fancy to oratorical pleadings of lawyers in the ancient Roman Basilica, of which the columns of the façade have just been revealed to our view. Near them we are brought into contact with the greatest of Saxon kings and of Norman conquerors in his feudal castle of Lincoln, and with one of the greatest of Norman bishops, St. Hugh, and with St. Hugh you will also hold spiritual communion in your visit to the noble Minster of Stow and to Stow Park; and when you make your pilgrimage to Southwell and its grand Collegiate Church, soon, we hope, about to become the cathedral of a new diocese, you will be brought into union with Paulinus, the apostle of Northumbria and Lindissi, in the seventh century, who built a church at Lincoln, and with Cardinal Wolsey, Dean and Bishop of Lincoln, in the sixteenth, and King Charles I., in his latter days, in the seventeenth century. You will thus be brought into sympathy with great men, and into synchronism with great events, and will drink in a refreshing draught of that generous spirit which the study of archæology freely ministers, and which, if we are not wanting to ourselves, will make us wiser and better men. We might, my lord, if time allowed, dwell on that consolatory influence which this study exercises in times of sorrow. It was said by the greatest critic of antiquity that tragedy has a purifying power, because it displays noble examples of suffering. There is also a tragedy of events, and of places connected with great events, and this has a purifying, elevating, and soothing influence. When we contemplate the desolation and ruins of ancient buildings and cities,—of palaces, churches, abbeys, and castles,—we forget our private griefs in a feeling of sympathy with public sorrows. One of the most instructive revelations which this study presents to us is that of the deep feeling of religion which animated the greatest nations of antiquity in their most heroic days, and which showed itself not only in their cities at home, but wherever they planted colonies abroad. Let any one stand in the solitary plain of Pæstum, or on the hilly ridge of the Sicilian Girgenti,—the ancient Agrigentum,—and contemplate the group of magnificent temples on both those sites, or in the sequestered vale of Segesta, and look on that noble religious fabric standing there in its lonely grandeur, or on the huge columns of Selinus thrown prostrate by an earthquake, or let him stand on the Areopagus at Athens and look at the Erechtheum and Parthenon towering above him, and let him remember that all these grand buildings were works of religion, not, indeed, rightly directed, but grounded on a belief in unseen heavenly powers controlling human affairs, and in a future state of rewards and punishments; and let him consider also that those who erected those noble religious buildings cared little for their own private houses, which were comparatively mean and insignificant, and he will feel himself constrained to ask whether we may not learn some lessons of religious zeal and self-sacrifice, especially in this sceptical age, from heathens themselves. The first thing that some of them did in planting a colony was to build a magnificent temple. Where are our cathedrals erected by England in her own colonies? One topic more. We may claim also for archæology the honour of illustrating the inspired text of Holy Scripture and confirming the truth of Revelation. The researches of Rosellini and Sir Gardner Wilkinson in Egypt have refuted the allegations of certain sceptics, and have corroborated the Mosaic narrative. The cuneiform inscriptions of Nineveh have proved that Samaria was not taken by Shalmanezer,—as some have supposed, but as the Bible nowhere asserts,—but by Sargon, once mentioned by Isaiah, whose history they have revealed. And they have shed a flood of light on Hebrew prophecy. Archæological researches at Babylon have brought to light Nebuchadnezzar's own account of his magnificent works in which he gloried, and have explained to us why Belshazzar is represented by Daniel as chief in power at Babylon when taken by Cyrus. Similar contributions have been recently made by archæology to the elucidation of the New Testament.

After the members and friends had, to the number of about 200, partaken of luncheon in the Masonic Hall, at the invitation of the Mayor (Mr. F. J. Clarke), there was a general inspection and peramblation of the city. Amongst the buildings visited were the churches of St. Mary-le-Wigford and St. Peter-at-Gowts, "John o' Gaunt's Stables," &c.; and in the course of the afternoon a goodly party assembled at the Castle, which was described by Mr. G. T. Clark. The Rev. Prebendary Scarth subsequently described the Roman remains seen in the course of the afternoon.

In the evening the Antiquarian Section met, under the presidency of Sir C. H. J. Anderson, bart., who delivered an address in the course of which he referred to the recent discovery of Roman remains in Bail-gate, and said there could be no question that modern Lincoln was built over the old Roman city,—particularly Above-hill,—some 7 ft. or 8 ft. above it, indeed, which had been satisfactorily proved by the discoveries alluded to. Mr. G. T. Clark afterwards read a lengthy and able paper on "Post-Roman and English Earthworks."

In the Historical Section the Dean of Ely presided, and the Bishop Suffragan of Nottingham read an interesting paper on "Little St. Hugh of Lincoln." The Rev. Precentor Venables afterwards read a paper on "The Jews of Lincoln," which had been prepared by Mr. D. Davis.

The Architectural section met on the 28th ult., under the presidency of the Right Rev. the Bishop Suffragan of Nottingham, when Mr. J. T. Micklethwaite read a paper on "The Growth of a Parish Church." In the Historical Section, the Rev. Canon Wickenden read a paper on "The Muniments of Lincoln Cathedral," and the Rev. Canon Perry one on "Some Episcopal Visitations of Lincoln Cathedral." In the afternoon there was an excursion to Gainsborough and Stow, and at a *conversazione* in the evening an interesting paper on "Lincoln in 1644" was read by Mr. E. Peacock, F.S.A.

We may have more to say about the congress next week.

Drury-Lane Theatre.—Four renters' shares in Drury-lane Theatre were sold by auction last week by Mr. George Robins, at the Guildhall Coffee-house, by order of the executors of the Rev. C. G. Freyer, deceased. The particulars stated that a renter's share in the theatre was originally entitled to 2s. 6d. per night of performance, since reduced to 1s. 3d. per night, but now paid an annual dividend, with a free admission admitting upon all occasions and to every description of performance. It was stated that the last dividend declared, which was paid in February last, was 5*l.* per debenture, and that the dividends have ranged from 8*l.* 5s., in 1873, up to 11*l.* 17s. 6d. in 1878, and 7*l.* in 1879. The four shares realised 55 guineas, 63 gs., 65 gs., and 68 guineas respectively.

KENT ARCHÆOLOGICAL SOCIETY.

The annual excursion of this society took place last week, the *rendezvous* being Headcorn, where a meeting was held, the President of the Society, Earl Amherst, in the chair. The annual report, read by the hon. sec., Canon Scott Robertson, stated that all the papers for the thirteenth volume of "Archæologia Cantiana" were now printed, and the illustrations complete. The balance at the bankers amounted to 292*l.*, all of which and more would be required to defray the cost of printing and illustrations. The number of members continued to increase. Early this year the site of the Premonstratensian Abbey of St. Radegund, at Bradsole, near Dover, had been excavated, and many discoveries made respecting the Abbey church and buildings. Interesting discoveries of Roman and Saxon remains had been made by Mr. G. Payne, of Sittingbourne, upon three different sites,—two in Sittingbourne and one in Milton. The re-election of officers and other formal business having been transacted, a visit was paid to the parish church, dedicated to SS. Peter and Paul, and not long since restored. A notable feature of the churchyard is an oak-tree, said to be 1,400 years old.

Smarden was the next place reached, the visitors on entering it passing by picturesque timber-framed and plaster houses, dating apparently from the time of the Plantagenets and the Tudors. The visitors entered the churchyard by the singular lych passage of timber. When the company had assembled within the edifice, the Rev. Francis Haslewood, rector of St. Matthew's, Ipswich, a son of the late rector, read a very interesting paper on "Smarden Church and Village." The church consists, he stated, only of a nave and chancel, with a square embattled tower at the south-west end, with octagonal turret. It is dedicated to St. Michael, and is popularly known as the "Barn of Kent," on account of the singular construction of its roof, the nave being 36 ft. wide, without side-aisles, and with no tie-beams to support it. In 1869 the whole fabric underwent restoration.

High Halden Church, the next stage reached, has a large octagonal oaken western tower, on which is a square spire, covered with shingles of the same material. The base is of massive oak trunks, in the smoothing of which on their removal from the neighbouring forest no great amount of labour appears to have been expended. There is a western porch and a southern porch exhibiting good specimens of carving, and the time-worn surface of the wood is of a charming silvery colour from the lichen growth which covers it. The date is 1430, and it is estimated that there are not less than fifty tons of timber in the tower, spire, and entrance.

Woodchurch, the next point, was reached through winding lanes. The church has an Early English chancel, with Purbeck marble shafts to the windows.

Tenterden, the centre of the excursion, was reached in time for dinner in the Town-hall. In the evening a meeting was held in Freeman's Auction-room, in the High-street, where a temporary museum of much interest had been arranged, under the direction of the Rev. F. Haslewood, the Rev. Treas-Beale, Mr. J. Ellis-Mace, jun., and Mr. Willsher. To this museum the corporation contributed largely, lending, among other things, the borough maces; the old charter of Elizabeth and copy of charter of Henry VI., copied in the reign of Elizabeth; and old documents of the fourteenth and fifteenth centuries. Then there were Roman remains selected from the discoveries made at Bayford, near Sittingbourne, by Mr. G. Payne, jun., F.S.A., during last winter; a large contribution of coins of different dates and nations, Roman remains, ancient vases, and other objects, sent by Mr. W. Young, Lodge, Godinton Park; fine old lace of the seventeenth and eighteenth centuries, sent by Mrs. Curteis Whelan; rubbings of brasses, sent by Mr. R. H. Oyler, the Rev. Tress-Beale, and Rev. F. Haslewood; copies of wall-paintings from the crypt of Canterbury Cathedral; and other objects too numerous to mention.

"The Early History of Tenterden" was the subject of an interesting paper read by Mr. R. Turley. The Rev. R. Cox Hales read a paper entitled "Brief Notices of the Hales Family," and Canon Jenkins one on the "Guldeford Family."

The *rendezvous* of the second day's excursion was Appledore, where the vicar, the Rev. M. D. French, acted as *cicerone*. The route was next

towards the Isle of Oxney, and after paying toll for passing the tiny ferry-bridge, Stone Church was reached, whose embattled tower of three stages, with beacon-turret, commands an extensive view of the surrounding country. The Rev. E. M. Mriel, rector of Ruckinge, here read a paper. He stated that the edifice is dedicated to St. Mary, and consists of nave, north and south aisles, chancel, and north and south chapels. The entire architecture is Perpendicular. The whole has been recently restored. From the church the company proceeded to the vicarage garden, to see an ancient Roman altar-stone. This altar, according to Hasted, was removed from the church and made a horse-block of, by which means it was much defaced and cracked; but Mr. Gosling, who was vicar from 1753 to 1777, had it repaired and placed upright where it now stands. The altar is of stone, with a basin hollowed in the top, and the figure of an ox carved on the sides; one side is now tolerably perfect, the other much defaced. Wittersham, Rolvenden, Newenden, and Losenham Manor-house were visited in succession. The ancient earthwork, about a mile from Losenham, attracted much interest. Mr. G. Lambert, F.S.A., suggested that this and similar mounds in various parts of England served for the erection of beacons, or as places of refuge for cattle on the occurrence of floods. The excursion was a very pleasant and successful one.

IMPROVEMENTS IN HOUSE PLUMBING.

In response to an invitation from the New York Board of Health, a number of architects and sanitary reformers have been discussing Proper Regulations for the Plumbing of Houses. The *American Sanitary Engineer* gives an account of the proceedings, which may be usefully reprinted:—"The discussion, especially of the most point whether a trap should be placed on all main drains to disconnect the house from the sewer, was animated and vigorous. Mr. James G. Bayles read a written statement of his objections to this appliance, of which the following is a summary:—

1. They obstruct the flow of drainage and cause accumulations of foulness in house drains.

2. Air admitted by ventilation above the 'seal' and passed all through a trapped house-drain, is found by experience to be fouler than air drawn from a sewer.

3. The trap does not offer any effectual resistance to air from sewers when there is a pressure.

4. That the danger of disseminating contagion originating within them, through tenement and apartment houses, is probably greater with a trapped house-drain than it would be from an open connexion with the sewer.

This view was sustained by Mr. W. E. Partridge, and by Messrs. Mead and Manny, while arguments in favour of such a trap were advanced by Walter G. Elliott, Thos. J. Nealis, Engineer of the Board of Health, Chas. F. Wingate, and others.

Further details of house-plumbing were then discussed, and it was agreed that the following requirements should be enforced by the Board:—

1. All plumbing work to be of good materials.
2. Only good workmen to be employed.
3. All soil-pipes to be of iron.
4. All soil-pipes to be accessible throughout their entire length for inspection.
5. All soil-pipes to extend through the roof and to be of undiminished calibre.
6. All sewer-pipes to be of iron.
7. That sewer pipes be above the cellar floor and not buried.
8. That all joints in sewer and soil pipes be gas and water tight, and that they be caulked with either lead or with iron filings and sal ammoniac cement.
9. That traps be provided for all basins, sinks, bath-tubs, and water-closets.
10. That all traps be ventilated by special pipes through the roof.
11. That there be no traps on vertical soil-pipes.
12. That the 'safes' under basins and refrigerators be drained by special pipes not directly connected with the sewer.
13. That all service pipes be so placed as to be beyond danger of freezing.
14. That their be no pan water-closet, but either hopper or improved water-closets.

This concluded the discussion, which it is to be hoped will be fruitful in good results, both in awakening householders to an appreciation of what constitutes good drainage, and also in compelling house-owners and plumbers to carry out such provisions.

The Board of Health already possess abundant powers regarding the drainage of dwellings, which have hitherto been exerted mainly in a few particulars, viz.: carrying soil-pipes to the roof; putting traps on all fixtures, and ventilating privy vaults. It is to be hoped that they will, as now proposed, extend their jurisdiction still further, so as to include all the requisites of good drainage, and see that these are strictly enforced.

If this is done, to the extent set forth in the above memorandum, we trust the days of the 'jerry' builder will be numbered, and that 'crooked plumbing' will be hereafter less common than hitherto, if not wholly abolished."

PLUMBERS.

Sir,—Having seen several articles in your valuable paper about the bad workmanship and unscientific manner in which water-closets, soil-pipes, &c., have been fixed, I should like to mention two things that would seem almost impossible for any man in his right mind to do, but such is the case. I went about a month ago to see to a sink in a house on the first floor. There was such a horrible stench in the place that it was almost unbearable. I examined it and found that it came from the waste-pipe from the sink, which went into the soil-pipe, right into the top of it, without any attempt at a trap, excepting a very small bell-trap in the sink, which was lost. When I took the closet-seat down I saw it at once. That pipe into the soil-pipe was exactly like an air-pipe put in to carry all the foul gas into the living-rooms; and in my opinion the man that put it there ought to be in jail. The other instance was in a large house, where the waste water and all slops from a sink were conveyed into the standpipe in the large cistern of drinking-water on the first floor, as well as from a large bath that was frequently used. The people in the house could not make out for some time why the water was so muddy and discoloured. So they sent for some one to go to see to it, and I went and found it as I have described. Now, sir, that waste-pipe from the cistern was completely choked, and all the water and slops from the bath and sink had been running into the cistern for some time, until it got so bad that the people in the house could not drink the water, and one day it overflowed after some one had used the bath, which helped them to find something amiss. How long it had been so, I do not know, but the cistern was covered with black slime, just like mud. Now, sir, these are only two solitary instances. I could tell of many similar in some of the largest mansions in South Belgravia. There are a large number of them that I have found to have no ventilating-pipe at all, and the sinks and bath wastes all go either into the soil-pipe or closed trap. I suppose they will have them altered when there are one or two killed by sewer-gas or fever. Why are houses left in this state when the consequences are known, and why are they allowed to remain? I have no doubt a great deal of it is caused by workmen who have no idea what sewer-gas is. They know it smells badly, and that is about all. I am only a young man, and cannot pass much opinion; but I think that plumbing is left in the hands of men a good many times that do not understand what they are doing, and ought not to have the name of a plumber. I know of a small shop now where the foreman was never anything but a boy in a builder's yard, and worked himself into where he is by being deceitful and always telling tales about the other men. What right had he to go about to see to such work when he could not even wipe a joint and is quite illiterate in such matters? Why I write this is to strengthen the opinion expressed by one of your readers, who said that every plumber ought to pass a sort of examination before he is engaged, especially on inside work, and I hope this will be considered by master plumbers and others. A Plumber.

"COMPETITIONS": EXETER HALL.

Sir,—As there was a note in your issue of the 24th ult. giving the names of three gentlemen who were invited to send in designs for alterations to the above, it may interest the profession to know the terms which were offered to three other architects for designs to be sent in for competition. Two of those named,—Mr. Pite and Mr. Bell,—were originally invited to submit designs with Mr. Paull, Mr. St. John H. Hancock (Furnival's Inn), and Mr. Maberley (architect to the late owners of the hall), on these terms:—25*l.* for each set of drawings *except the successful one*, and the owner of the selected design, if other than Mr. Pite, to share his commission with that gentleman, with joint supervision of the works. The last-named three gentlemen declined these terms, as the result shows, and were not offered any other. Inquirer.

WORKING-MEN'S HOUSES AT THE WEST END OF LONDON.

HIGH RENTS AND UNHEALTHY DWELLINGS.

A crusade has been started, at the instance of members of the working classes employed in the western districts of the metropolis, against what are designated excessive rents and unsanitary dwellings, and on Sunday evening a meeting on the subject was held at the Democratic Club in Rose-street, Soho, when statements of a grave character were made as to the unhealthy condition of the houses in the district, whilst the rents were stated to be enormous. It was said at the meeting that the working-class population of the West End made all sorts of articles of luxury, to produce which they were compelled to reside in the neighbourhood, and occupy houses for which they were forced to pay high and exorbitant rents, whilst the houses themselves were scarcely fit to live in. The consequence was that the industrial classes in the locality were both plundered and poisoned. Several of the speakers complained of the systematically-oppressive conduct of the "house-farmers" to whom these exorbitant rents were paid for houses scarcely fit for occupation. In the course of a discussion it was suggested that the co-operation of other metropolitan organisations should be solicited, inasmuch as there was not a part of London unaffected by the grievances of which they complained in the West End, and this course was resolved upon. "A Provisional Committee for Rental and Sanitary Reform," was formed, and the secretary, Mr. Edward Dunn, was requested to communicate with all the working-men's organisations in London, with the view of their sending delegates to the committee. The objects of the organisation are summed up in the following resolutions:—"That the exorbitant rentals obtained for certain classes of houses, create a powerful interest opposed to all sanitary reform, promote the maintenance of slums, and hinder the progress of public improvements." Also, that "the Building Acts are flagrantly evaded in the newer districts, and in the old quarters whole tracts of land are depopulated and left unoccupied till house-farming capitalists build thereon." It was stated at the meeting that one of the rules of the house-farmers is to the effect that if a tenant complains of the unsanitary state of the house, or insists on his tenement being repaired and put in order, process of ejectment is at once resorted to by the house-farmer.

CASE UNDER THE NEW BY-LAWS OF THE METROPOLITAN BOARD OF WORKS.

Mr. T. J. Neale, of 33, Aylesbury-street, Walworth, builder, was summoned, on the 22nd, before Mr. Ellison, at the Lambeth Police Court, for an infringement of the new by-laws issued by the Metropolitan Board of Works, under the Metropolis Management and Building Acts Amendment Act, 1878, in using bad mortar in the erection of a new building in the rear of No. 80, Old Kent-road.

Mr. George Lansdown, district surveyor of East Newington and part of St. George the Martyr, Southwark, appeared in support of the summons, and explained that the builder had received notice to amend under the Building Act, as well as under the by-laws, but had neglected to amend, and had left the work. The defendant pleaded guilty. The magistrate fined him 5*s.*, and 2*s.* per day for each day since notice to amend, and 2*s.* costs; total, 27*s.*

The penalty in case of the breach of any of the provisions in the by-laws is a penalty not exceeding 3*l.*; and in each case of a continuing offence, a further penalty, not exceeding 30*s.* for each day after notice thereof from the Board or district surveyor.

Since the hearing, the building has been entirely taken down.

EMPLOYERS' LIABILITIES.

RAHTSKE *v.* EDWARDS AND OTHERS; CARROLL *v.* SCOTT AND EDWARDS.

These were two actions (heard at the Liverpool Summer Assizes, before Lord Justice Bramwell) to recover damages for the death of plaintiffs' husbands, which resulted from the fall of a scaffolding, caused, as the plaintiffs alleged, by the defendants' negligence. As the cases arose out of the same facts and the same firm were defendants, although the names appeared differently on the records, both actions were tried together.

It seemed that the two deceased men were employed in the construction of a new bridge on the Cheshire Lines Railway, and were killed by the falling of a staging which had been erected for the purpose of riveting. The scaffolding was erected by the defendants, who were the original contractors for the work, and the deceased men were in the employ of a Mr. Pargiter, who was the sub-contractor for the ironwork. It was admitted that the

scaffolding was incomplete and unfit to bear the weight that was put upon it, and the real question was, by whose fault the deceased were set to work on a dangerous stage. The plaintiffs' case was that Pargiter and his men were at work on the day before the accident, with the knowledge and approbation of Cornish, the defendants' engineer, and that he had told them that it was all right, and they could go on working. It was shown that Pargiter had been pressing Cornish to get the staging completed so that he might go to work. On the other hand, Cornish denied that he had ever told them the stage was ready, and also that the men were at work on the preceding day. According to him, the stage was entirely incomplete, no part of the flooring having been put on until just before the accident, and he was about to make it fit for use by adding another upright. In this view the accident was caused by Pargiter ordering his men to go to work on the stage before it was fit.

His Lordship, in summing up, told the jury that if Cornish, by word or deed, represented that the staging was fit for use, they ought to find for the plaintiffs; but if Pargiter, on his own responsibility, chose to send his men to work before it was safe to do so, the defendants were not liable.

The jury found for the defendants.

PROVINCIAL NEWS.

Wordsley, near Stourbridge.—New offices, seed warehouse, and a manager's residence, are being erected by Messrs. Webb & Sons, at their extensive seed establishment, near Stourbridge. The former comprise, on the ground-floor, an entrance-hall and staircase, with general waiting-room attached; a ledger-office, 60 ft. by 24 ft., with manager's office at one end; fireproof-room, cloak-room, and lavatory, and a private staircase to the upper floor, on which are arranged a suite of offices for the Messrs. Webb and heads of the several departments, together with sample-room, cashier's office, and a spacious reading-room and library for the use of the *employés*, which is approached from the entrance-hall by a staircase of polished pitch-pine. The seed warehouse is in continuation of the present buildings, and is five stories high, each floor having an open space of 88 ft. by 40 ft. Steam lifts and staircases are provided, together with offices for warehousemen, lavatory, &c. The communications betwixt the new and present warehouses are to be closed by fireproof doors. Speaking-tubes are provided to all the offices, and the telephone is to connect them with the seed warehouses, which are on the opposite side of the courtyard. The buildings are being carried out by Mr. Lovatt from designs prepared by Mr. J. R. Veall, architect, Wolverhampton. The materials used are red pressed bricks, with Hollington stone dressings. The cost will be nearly 7,000*l.*

Garston.—The Mersey Conservancy Commissioners have given notice of projected improvements at Garston Docks, which are to be commenced within two months after notice. The object of such works is to form an improved river front and approaches to the company's docks. The proposed wall will project on to the foreshore of the Mersey, and will not impede or interrupt the tidal water to the river, but on the contrary it is stated that the excavations for the approach to the dock will more than compensate for the abstraction of any tidal water arising from the construction of the wall. The secretary of the company states, for the information of the Commissioners, that the South Garston Dock and Warehouse Company is formed for the purpose of constructing an important dock at Garston, with warehouses attached, which will supply the urgent demand for additional accommodation on the Mersey, and thus meet the requirements of Liverpool, Manchester, St. Helens, Wigan, and the surrounding districts in the county of Lancaster. The area of the dock property comprises about thirty acres; the water area will be about seven acres, with about twenty-three acres for warehouses, sheds, quays, and railway sidings.

COAL-GAS EXPLOSION.

Sir,—In your number of the 24th ult. you touch, among other matters, on the explosive nature of coal-gas in coal mines, where boreholes are made to tap the workings for gas. In order to neutralise the explosive nature of the above gas in mines, it has often struck me that whenever danger is expected therefrom, jets of steam might be applied effectually for that purpose. Miners at work must certainly be sufficiently sensible to know when this gas is accumulating too fast. I propose, then, when such is the case, that a copious supply of steam be immediately sent down from above, through the air-shaft. I am not aware that steam has ever been so employed in coal-mines.

J. T. Lockhart.

A QUESTION IN VALUATION.

Sir,—A railway was made some twenty years since through an estate running along the side of, and near the bottom of, a hill which is loaded with large quantities of green sands, through which the head-water above percolates. In making this railway those green sands were cut into from 15 ft. to 20 ft. in depth for a length of nearly a quarter of a mile, and the consequence is that those sands have been constantly running out ever since to a very considerable extent, and in all probability will continue to do so for years to come. The result has been that, as those sands discharge themselves from the bowels of the earth, a space is thus formed, and after a while the upper stratum, or top crust, breaks away and settles down, and so very materially interferes with the cropping of the land and the vegetation thereon, as well as destroying several orchards of a thriving and excellent kind.

An action was recently brought against the Company for compensation for the damage so done to the lands by the landowner. The damage was set by the landowner's surveyor at so much, based as follows:—The *original* agricultural annual value of those portions where the slips and subsidences had taken place having been put at what they were fairly worth, had no disturbance of such lands occurred, at the usual thirty years' purchase for the fee-simple thereof, against this the *present* value was obtained by taking the same portions of lands at what they were considered worth for agricultural purposes at the present moment per annum, and the value in fee of the same reckoned at from thirteen years' to twenty years' purchase, according to the nature and dangerous state thereof.

The railway company's surveyor objected to this mode of computing the value of the alleged damage as made by the landowners' surveyor, on the grounds that it was inconsistent and an unknown basis to go on; that having reduced the agricultural value in the first instance, the landlord's surveyor had no right to lessen the year's purchase also thereon. The landowner's surveyor contended that, inasmuch as those affected portions of land were not stationary, but movable and in a running away state, they ought to be treated more like house-property than otherwise.

It would be a matter of great satisfaction to have the opinions of some of your readers,—being experienced, and I may say expert, land surveyors, on this matter,—as to which of these two surveyors may be considered correct in his theory.

A Constant Reader.

FRENCH WORK AND WAGES.

Sir,—Herr Carl Behr, in your issue of the 31st ultimo (page 131), referring to the rate of wages paid to makers of artistic furniture in Paris, mentions that some of the workmen at M. Henri Fourdinois' well-known establishment in that city are paid as much as five francs (4s. 2d.) an hour.

Whilst in Paris, in October, 1878, preparing a report at the instance of the Exeter Chamber of Commerce, I visited a great many of the principal establishments there, and amongst them that of M. Fourdinois. That gentleman, in the most courteous manner possible, placed his premises at my service, and I had more or less conversation with nearly every workman in his employ. I find, upon reference to my notes, that, when in full swing,—trade was so dull that all hands were upon "half time" during the time I was there,—the regular hours were from 7 a.m. to 7.30 p.m., with one interval only between,—from 10.30 till 12,—for breakfast. On Saturday the time worked was the same as on other days. Most of the cabinet-makers and joiners working there were in receipt of 5 francs a day (4½d. an hour), though a few were paid at a rather higher scale. The carvers' wages varied, every man being remunerated according to his ability. The highest money any one was at the time receiving was 15 francs a day, *i.e.*, 1s. 1½d. an hour. I had these quotations from the men themselves, and afterwards what they had told me was verified by the cashier. Herr Behr goes on further to say that the best work is executed in Paris by German workmen, but that, unfortunately, as his countrymen at home will not pay the long prices paid in Paris for wages, these skilful men are lost to Fatherland. I certainly was not impressed by the preponderance of German art-workmen in the shops I visited, and my impression is that in my perambulations I met with very few of them indeed. The Berlin cabinet-makers are at the present moment out on strike. They demand more money and a lessening of the hours of labour. Their present wages are about 5s. per diem, or, so far from being less than their French neighbours, about 1d. an hour more than the majority of M. Fourdinois' cabinet-makers receive, and seem content with, in Paris! In some of his statistics, as well as in his comparisons, Herr Behr is assuredly in error.

Harry Hems.

THE USE OF MARBLES IN LONDON.

Sir,—In a notice of Mr. Benson's "Business Premises" in your last issue (page 155) polished marbles are inferentially recommended for external use in London street architecture. Allow me to raise a word of warning. There is ample evidence in the streets of London itself to prove that no marble (compact altered limestone) will retain its polish out of doors for any length of time in a humid atmosphere like that of England; and in large towns a year or two at most will find all its beauty gone. The Devon and Irish marbles, being comparatively soft and uneven in texture, yield quicker than others, like the Sicilian, of more uniform texture and greater hardness. They are very beautiful under polish and when wet, as one sees them commonly in the streets of Plymouth; but wherever they are exposed to dust and damp their charms are very ephemeral. Serpentine, being an igneous rock, keeps its polish longer, but it is not permanent in large towns. The granites, carefully selected, are the only building stones that can be relied upon to retain their lustrous polish out of doors in a damp, dusty, smoky atmosphere.

I venture to recall attention to this question of the durability of polished stone, because, regarding the *Builder* as a safe authority, many men might be tempted to embark in a decoration at first so pleasing, but that leads to results satisfactory neither to the architect nor to his employer.

Thos. C. Sorby.

HOW TO DIMINISH RAILWAY ACCIDENTS.

Sir,—I venture to submit the following scheme for your approval:—Give the companies a direct inducement to adopt every means and precautions to avoid accidents by converting the passenger-duty into a tax on *preventible* accidents to trains, whereby passengers are killed or injured. Thus, any company which has no such accident in a quarter of a year shall be entitled to remission of the duty for that quarter, and so on.

Among the means of improvement are these:—(*a*) Strengthening bridges (many have been swept down lately), keeping the permanent way in the best condition possible, continuous brakes, block system, interlocking apparatus; (*b*) additional parapets where bridges cross rivers, extra siding accommodation, guard-rails, &c.

The passenger-duty brings in about 800,000*l.* per annum to the revenue; perhaps my scheme might cause a loss of half that. It might be a tentative measure for five years. If the companies spend all that is remitted in adopting extra precautions, their net gain will be the cost of accidents avoided.

R. Varley.

Sale of Prisons and Barracks.—At the Auction Mart, on Wednesday, a sale of a very special character was held by Messrs. Edwin Fox & Bousfield, acting on the instructions of the Home Secretary and Prison Commissioners; and of the county authority for Middlesex. The property offered comprehended the six prisons of Bath, Wisbech, Bury St. Edmund's, Southwell, Mould, and Beverley, which were described as freehold estates now available for building, being no longer required for their original purpose, in consequence of the alterations effected in the administration of justice under the Prisons Act of 1877. They comprise altogether about 17¾ acres, were offered in six lots, and the total amount at which the lots were knocked down was 17,850*l.* The principal lots were sold. The barracks situated at Hampstead, not now wanted for militia purposes, in consequence of the head-quarters being removed to the depôt under Lord Cardwell's organisation scheme, comprised about one acre of land suitable for building, and were sold for 5,500*l.*

IRISH ARCHITECTS AND PUBLIC BUILDINGS.

At a conference of Irish architects that has just concluded in Dublin, under the presidency of Mr. J. M'Curdy, the following resolutions were unanimously adopted:—

"That general and well-grounded dissatisfaction prevails among architects practising throughout Ireland as to the system which sprang up under late Governments, and which is apparently being perpetuated and extended, under which the designing of public buildings has not, as in former times in Ireland (and is still customary in England), been entrusted to independent architects of eminence and repute, and that thus a considerable amount of valuable and honourable employment is unduly withdrawn from the profession in Ireland. That this meeting views with considerable alarm the practice now adopted by the successive Governments of the country of handing over to departmental officers such works as should naturally form one of the most essential elements of ambition in the architectural profession, viz., the designing of Governmental works of importance; and that the withdrawal of these works from the profession generally is an injustice that it can hardly believe the various Governments can have foreseen, and which they are led to hope need only to be brought fully under their notice to have rectified. That it should be respectfully urged on the present and successive Governments that this system, prejudicial to the public service and the credit of the country, should, wherever practicable, be relaxed and reversed; and that such buildings as museums, colleges, custom-houses, post-offices, law courts, Government schools, prisons, &c., should, under any system of selection that may be deemed judicious, be entrusted to independent architects, as formerly. That, in view of the proposed buildings of the Science and Art Department, the present is a suitable time to urge the consideration of the foregoing resolutions on her Majesty's Government. That steps be taken to make representations on the basis of these resolutions to the Lord-Lieutenant, the Chief Secretary for Ireland, and the Treasury."

WOODEN CHIMNEYPIECES.

SIR,—Architects and district surveyors would do well to see that the Building Act is not infringed by the erection of wooden chimney-pieces where the wood ingrounds are fixed against the stove without any marble whatever. There should be some precaution taken, otherwise there will be a serious fire, and then the insurance companies will insist on flimsy wooden chimneypieces giving place to something better.

J. H.

BRICKMAKING.

SIR,—Referring to the letter signed "Brickmaker," which appears in your issue of the 31st ult., I have pleasure in handing you per this post a pamphlet entitled "Bricks and Brickmaking." Your correspondent will find some information in it which may be of use to him; but if he requires further particulars or advice, I shall be pleased to give it him if he will communicate with me. I am acquainted with nearly every brickmaking machine, and would tell him which would be the most suitable for the kind of clay he wishes to work.

J. W. IVERY.

West Bromwich.

SIR,—In reply to "Brickmaker," there is a later edition of Dobson's "Brick and Tile Making," which gives a good elementary knowledge of brickmaking. Brickmakers will gain a great deal of useful practical knowledge by visiting a brickyard laid out on the most modern system for making bricks, tiles, &c. We shall be pleased to show him, or any reader of your journal, over several of such yards, or to give them any information on the subject.

Bury, Huntingdon. ARMITAGE & ITTER.

PLUCKLEY.

SIR,—Permit me to rectify an omission in my paper on "Brick and Tile Making at Pluckley," which is quoted in your issue of the 17th ult. I should have stated that these works were designed and erected by Mr. Henry Ward, C.E., of 61, Old Broad-street, who is engineer to the Company.

A. J. BURROWS.

Sunday Visits to Picture Galleries.—On Sunday last the Exhibition of the Society of British Artists, and the Summer Exhibition at the Grosvenor Gallery, were open to the public under the auspices of the Sunday Society. The visitors were admitted by tickets, which had been procured on written application. Each exhibition was open for two hours and a half. At Suffolk-street the number of visitors was 1,317, and at the Grosvenor Gallery 2,250.

CHURCH-BUILDING NEWS.

Hardrow (Yorkshire).—The new Church of SS. Mary and John, Hardrow, has been built at the cost of the Earl of Wharncliffe, on his property near Hawes, in Wensleydale, to replace a dilapidated modern structure. The style is of a very simple type of the Transitional to Early English, following the characteristics of the Yorkshire style of that period. The plan consists of a nave, chancel, and porch, with a triple bell-cot at the west end carried on projecting buttresses. The stone is from a quarry just above the church, and is used in coursed facing for both the inside and outside, the dressed stone being from Leyburn and Barnard Castle; great care has been taken, by building the walls hollow, by the use of Settle lime, and by other precautions, to resist the entrance of damp, the place being subject, so it is stated, to the severest weather in all England. The work has been executed by local contractors, under the architects, Mr. R. Herbert Carpenter and Mr. Benjamin Ingelow, of London, Mr. Smith being the clerk of works.

Exeter.—On Tuesday, the 27th ult., the first stone of the enlargement of St. James's Church, Exeter, was laid. The church was built in 1836, but, owing to increase of population, has long needed enlargement. The work was commenced in 1877, under the direction of Mr. R. Medley Fulford, architect, and the first portion of the new work completed consisted of the chancel, with choir, north and south aisles, and priests' vestry. Prominent as the chief feature of the new chancel is the east window, erected in memory of the late Rector, the Rev. A. Buckeridge. It is a triple-light window, filled with stained glass by Messrs. Clayton & Bell. The window contains a representation of the Crucifixion, the Blessed Virgin, and St. John. The work now taken in hand is that at the west end of the church. Mr. J. R. Gibbard is the builder. The portion now to be added will consist of an extension of the nave and side aisles. Exclusive of the porch, it will extend outwards, from east to west, about 22 ft., and 17 ft. from the centre of the old frontage; the extreme width of the transverse section, from north to south, being about 33 ft.,—upwards of 12 ft. wider than the original edifice. The porch will have four buttresses. Three entrance-doors will give access respectively to the nave and to the north and south aisles. On each side of the porch there is to be a two-light window. Above it two two-light windows will be placed; then, a rose window; higher still, a small three-light window; and the whole will be surmounted by a spire, the height of which, as already indicated, will be 108 ft. from the ground to the top of the vane. In the spire provision is to be made for three bells. The spire will be of wood, covered with lead and ornamental slating. Stone from the Pocombe quarry, near Exeter, is the material used in the building, with Ham-hill dressings. In the interior of the edifice monoliths of granite will support the arches separating the nave from the aisles. The old west gallery will be set back. In its complete form the church will afford accommodation for 1,050 persons. The cost of the work now commenced will be 2,500*l.*

Pinhoe.—St. Michael's Church, Pinhoe, near Exeter, has been re-opened by the Bishop of Exeter, after restoration. The church until recently has been in a deplorable state of decay. It has a nave and north aisle, a chancel and a vestry, a south-west porch, and a western tower. The tower is embattled, and has a square turret at its north-east corner. All the rough-cast that covered it, many inches thick, for very many years, has been removed, and the stone beneath has been pointed. The belfry windows have been cared for, and the parapet made good. The porch is entirely new, but occupies the same position as did the former one. The new dressings are of Ham-hill stone, and the apex of its gable is crowned by a cross. The chancel has been almost entirely rebuilt, and a new vestry, upon the north side, has been added. The roofs are of English oak, covered in by slates. The chancel roof is clearly defined by a ridge in Ham-hill and Bath stone courses alternately. In the interior of the church the nave and north aisle are divided from each other by an arcade of four bays. This arcade, like the stonework of so many of our Devonshire churches, is of Beer stone. The windows are three-light ones, surmounted by flowing tracery. They are filled with geometrical glazing of dull cathedral colours. The glazing has been done throughout by Mr. F. Drake, of the Cathedral-yard, Exeter, by whom also the decoration of the chancel roof was carried out. The western window in the tower is only of a temporary character. Mr. Drake has received orders to put a good painted subject therein. In the nave the ribs have, at their springings, carved angels bearing shields. Two old decayed precedents for these remained. These angels have been carved by Mr. Harry Hems, of Exeter. To indicate where the new chancel roof commences, an ornamental cusped rib has been introduced. The nave and aisle roofs have also had some colour placed upon them, but merely as a ground-work for future decoration. The old rood-screen, consisting of eight wide bays, had fallen into so bad a state of dilapidation that it was feared it was almost past repair. It was removed to Mr. Harry Hems's establishment, where the defective parts have been delicately repaired, and all that was deficient has been made good. The old pulpit was also placed in Mr. Hems's hands, and, having been partially restored by him, has been replaced *pro tem.* The unique old poor-box represents the figure of a man with staff and books, dressed in the costume of 1700 or thereabouts. This is supposed to represent the poor man of Pinhoe. Mr. Fulford has designed the surroundings in character with the statue. The restoration of these old works is by Mr. Harry Hems. The nave and aisle are laid with old memorial stones, the spaces between being filled with coloured tiles, as also is the floor of the porch and under the tower. The chancel floor and the sanctuary are laid with encaustic tiles, from Messrs. T. & R. Boote, of Burslem, Staffordshire. The tower contains four bells; but Mr. W. Aggett, of Chagford, has received instructions to prepare a cage for six. The works have been carried out in the main from the designs and under the superintendence of Mr. R. Medley Fulford, architect, Exeter. This applies to the restoration of the nave, aisles, vestry, porch, and tower. The chancel has been restored under the direction of Mr. Ewan Christian, architect to the Ecclesiastical Commissioners. The foreman who has had charge of the work throughout is Mr. James O. Fenning. The total cost of the above work is about 2,000*l.*

DISSENTING CHURCH BUILDING NEWS.

Ryton-on-Tyne.—The foundation-stone of a new Wesleyan Methodist chapel at Ryton-on-Tyne was recently laid. A new circuit, called the Tyneside Circuit, has been formed, embracing Ryton, Crawcrook, West Wylam, Prudhoe, Prudhoe Station, and the neighbourhood, with Ryton as head-quarters. About half an acre of land has been purchased, and on this site a chapel is now being erected. The Early Pointed style of architecture has been adopted, and the chapel will consist of a nave, two side aisles, and transepts. The nave will be divided from the aisles by a series of pointed arches, springing from ornamental cast-iron columns, which will carry a clearstory wall. At one end of the nave there will be a pulpit platform of pitch pine, stained and varnished, and the seating will be by means of open benches of the same wood. The building will be built of stone, and the walls on the outside faced with thin courses of blocking. At the north-west angle of the chapel will be a lofty tower, covered with a slated roof. In the rear of the main building there will be rooms for the caretaker to dwell in, and underneath will be a chamber for a hot-water apparatus. The peculiar character of the plot of ground necessitated an unusual height of foundations, and advantage has been taken of this to provide a large room under the whole area of the chapel. It is intended that the transepts shall not be seated for the present, but he divided from the chapel, and formed into a schoolroom and four vestries. The architect has provided in his plans for an extension of the building, and, when the requirements of the congregation demand it, the transepts will be opened out to the other portion of the chapel, and a lecture-hall and school, with class-rooms, vestries, and other accommodation, will be erected at the rear of the present works, in harmony with the original building. The chapel, as now arranged, will seat 280 persons, and with the extension referred to, 230 more sittings will be obtained, making 510; and the accommodation is arranged to be still further increased by the erection of a gallery in each transept, which will bring up the sitting

accommodation to 620. These extensions may be made by easy and gradual stages, to meet the growing requirements of the congregation. The contractors for the works are,—Mr. W. Lishman, Ryton, mason work; Mr. John J. Salter, Ryton, joiner's work; Mr. J. Rutter, Ryton, painting; Messrs. C. & G. Nicholson, Newcastle, slating; and Messrs. R. B. Charlton & Co., Newcastle, plumbing and ironwork. The building, as now planned, is estimated to cost about 2,950*l.* The architect is Mr. Joseph J. Lish, Newcastle-on-Tyne.

Lostwithiel.—The memorial stones of a new Wesleyan chapel and school were laid on the 14th ult. The site of the new premises adjoins the Restormel-road. The architect is Mr. James Hicks, of Redruth, and the builders are Messrs. Philp & Brown, of Lostwithiel. The building will be Gothic in style, with central gable flanked by pinnacles, and with, at the angle where the school joins the main building, a tower and spire. Attached to and at right angles with the chapel the school will be built, for about 150 children. In design it will correspond in the main with the chapel. The tower, which will rise at the angle, above the entrance, will consist of three stages, terminating in a spire. Crocketed pinnacles at the four corners will match with similar relieving features at the buttresses. In the body of the walls the local shale will be used, faced with killas slate from the Derrycombe quarry. For the plinths, steps, quoins, and copings, granite will be used, and the mouldings will be of Bath freestone. It is hoped the buildings will be completed by next Midsummer. The total cost of the work is estimated at about 1,750*l.*

SCHOOL BOARD SCHOOLS.

Liskeard.—The Liskeard School Board has just opened new schools at Dobwalls and Trewidland. Trewidland school is situated on a ridge of steep rising ground; the style is Queen Anne, with bold gable-framing and half-timber work, and panelled barge-boards. The dressings to windows and doorways are Bridgewater facing-brick, with cills to former also formed with purpose-made bricks. The roofs are slated with red tiles fixed on the ridges. A bell-turret, or flèche, of pleasing design, covered with cleft oak-shingles, is placed over the school-room roof. Accommodation is provided for about eighty children by means of a school-room about 34 ft. by 17 ft., and infants' room 15 ft. by 13 ft., fitted up with a gallery. The roofs of these rooms are open-timbered, being plastered on faces of rafters; the plastering of the walls inside is protected by a dado extending to a height of 4 ft. The usual separate porches for the boys and girls are provided with the necessary offices and yards. A convenient house for the master is attached to the school, containing six rooms and offices, with a small garden in front. The Dobwalls school is similar in external treatment and accommodation to Trewidland, without master's residence. Mr. Skentelbery, of Looe, is the architect, and Mr. Whale was the contractor. The contract for Dobwalls schools amounted to 372*l.*, and that for Trewidland (with the school-house) to 649*l.*

STAINED GLASS.

Chislehurst (Kent).—A two-light memorial window, to the memory of a lady deceased, has just been erected in the Wesleyan Chapel of Chislehurst. In the centre of each light is an enriched boss which displays a lily entwined by a riband, bearing a Scriptural legend; the one being, "The Lord is my Shepherd," the other "My Sheep hear my Voice." By instruction, no figure subject is introduced, but instead the lights display a variety of foliated ornament richly treated. The window is designed and executed by Messrs. Powell, Brothers, Leeds.

William's College, New York.—At special services on the 4th of July a window by Messrs. Ballantine, of Edinburgh, commemorating Albert Hopkins, Professor of Astronomy, was unveiled in presence of the trustees and alumni of the college. The design appropriately represents the Psalmist surveying the heavens and uttering the 19th Psalm, from which fit quotations are made. In reference to the devout Christian character of Professor Hopkins, there are introduced the cross, and the passage, "He that turneth many to righteousness shall shine as the stars for ever and ever."

VARIORUM.

Although we take little delight ourselves in imitations of woods and marbles, there are many who do, and many, consequently, who desire to attain skill in the art. These will find advantage in consulting a book published by Crosby Lockwood & Co., entitled "School of Painting for the Imitation of Woods and Marbles, as Taught and Practised by A. R. and P. Van der Burg." It includes numerous patterns in colour, and other illustrations. Some of the working-men's clubs should give their young men the opportunity to study it.——"Journals and Journalism; with a Guide for Literary Beginners," by John Oldcastle (Field & Tuer), contains a considerable amount of information which will be found useful by the aforesaid beginners. The writer shows that he is ignorant of the position of the *Builder* in the world of letters, but that shall not prevent us from recommending the little book. It will interest others besides those who are looking to distil a fortune through a quill.——"National Industrial Insurance and Employers' Liability," by Geo. Howell (P. S. King, King-street, Westminster), treats the questions involved with moderation and good sense, and deserves the candid consideration of those who are seeking to arrive at a fair settlement of them.——A Special Midsummer Edition has been published of "Bevis's Builders' Price Book" (8, St. Martin's-place), and the author claims to have revised the prices up to that date.—— Part VI. of Letts's "Popular Atlas" brings us to the first half-mile stone of the first year's issue, and inasmuch as we know from indisputable authority that a very large circulation is necessary to enable the work to be produced at so low a price, we are sure our readers will pardon us if we again direct their attention to its merits. Eighteen maps are now before us, and we do not hesitate to say that no similar number of maps at such a price has ever been offered to the public; not only for their cheerful appearance, but for the very varied and useful information they one and all contain. Take, for instance, the present part. Whenever has Russia presented to our *mind's* eye anything but a dreary waste of unpronounceable names? Now we have quite another impression conveyed to us: we can realise the great extent of the corn-growing districts; we can read and understand that though twenty times the *size* of the British Isles, its population is but one-eighth that of this country; and that high as Mont Blanc is, there are at least two peaks in the Caucasus *thousands of feet* higher. And this is only an isolated case. Messrs. Letts, having put their hands to the work, have used their heads too, and considered that if a thing was worth doing at all it was worth doing well.——The new number of the *Fortnightly* includes an article entitled "Friendly Societies: their Position and Prospects," by Mr. James S. Randell, in which the writer, who has given much attention to the subject, urges strongly the desirability of establishing a national benefit society. Mr. Randell says in the course of his paper:—"Mr. Blackley, in an able article in the November number of the *Nineteenth Century* for the year 1878, and in another article in the *Contemporary Review* of July last, proposes that every young man shall be compelled to insure against want by the purchase of the minimum of 8s. per week for sickness up to seventy years of age, and 4s. per week pension for life after seventy, the title to payment being, not destitution, but sickness, or having attained the age of seventy; and Mr. Blackley estimates that if everybody insured, as a third would not claim, the payment of 10*l.* would be sufficient to provide the necessary funds for payment of the claims of 8s. per week during sickness up to seventy, and 4s. per week for life after seventy; and he proposes that beyond this minimum the purchase price shall be 15*l.* for every 8s. per week during sickness up to seventy, and 4s. per week for life after seventy. . . . . Waiving for a time the discussion of the subject of compulsion, why should not a national association be organised embodying these several modes of assurance? At any rate, surely the matter is worth attention and a crucial investigation. To start with, an inadequate scale of payment would be most undesirable; for, unless self-supporting, the plan would not be satisfactory or command respect. At the same time, it must have a national guarantee, the same as the Post-office Savings Bank, and while no expense to the State, it would give the arrangement an undoubted security, making it as safe as the English funds. The industrial classes are generally manifesting a desire to make some provision for the future. The large number yearly joining friendly societies; the 1,400,000*l.* paid last year to one London office for life assurances, of small amounts per policy; and the 30,000,000*l.* on deposit at the Post-office Savings Bank, on the 31st of December, 1878, of which 3,360,636*l.* were deposited during the year 1878, in amounts averaging 2*l.* 16s. 5d. to each depositor,—these evidence both their anxiety and their efforts to secure their future, and we rejoice to know that this amount of 30,000,000*l.* is in safe keeping. Why should not the millions now paid yearly to tottering friendly societies be paid into keeping equally secure with the Post-office Savings Bank, to the advantage of those who struggle to pay, and whose future is dependent on the produce of their payments?"

Miscellanea.

A Gothic Shrine.—The Geneva correspondent of the *Times* writes:—"The Historical-Antiquarian Society of Grisons have lately added to the treasures of their museum one of the few Gothic altar shrines that still remain in Eastern Switzerland. It was formerly in a chapel belonging to the Mesocina family, and has been purchased by the society from the present proprietor of the château, of which the chapel forms a part. The shrine is divided into three parts. On the plinth is a painting in oil of the handkerchief of St. Veronica held by two angels, and on the triptych and side shrines are portraits, also in oil, of St. Stephen and St. Anthony. The inside of the shrine is gilt, and the gilding is in excellent preservation. The interior contains figures carved in wood of St. Nicholas, St. Maria, and St. Catherine, their names being indicated in the later Gothic characters. Two other figures are carved on the reverse part of the side shrines, but the names of the saints whom they are intended to represent are not given. On the crown of the shrine are carved seven busts, supposed to be those of the founders or patrons of the chapel. The barets of two of the number mark them out as priors of St. Victor; two others wear clerical costumes, the remaining four being habited as civilians. With the exception of some slight damage to a few of the figures, which can easily be made good, the shrine is exceedingly well preserved. The carvings and paintings are well executed, and belong to the same style of art, and probably to the same age, as the decorations of the cathedral altar of Coire and the altar of the Church of St. Lucius at Cburwalden."

The Telephone.—It is well known that if a long dry tube, open at both ends, be held over a jet of burning hydrogen, a musical sound is produced, the pitch and quality of which vary with the length, thickness, and diameter of the tube. It has been proposed to adapt such a tube to the safety-lamp underground, and to place it near a telephone in communication with another telephone in the manager's office on the surface. The alteration of the sound, due to a greater or less admixture of gas with the air of the mine, would warn the manager of the state of the atmosphere in the workings.——During the Sunday School Centenary service at Swansea, the strains of the chorus in the music-hall were distinctly heard at the end of a telephonic circuit of nearly a mile in length. The apparatus was fixed by Mr. J. Legg, who is about to connect the Velindre Waterworks with the Town-hall, a line nine miles in length. We hear that the same gentleman has just received an order from Madame Adelina Patti to put up a line between her castle (Craig-y-nos) and Penwyllit Railway Station, so that orders for carriages to meet guests may be given. The telephone used is the Gower Bell, which gives great satisfaction.—*The Electrician.*

Proposed Cathedral, Douglas, Isle of Man.—A statement is made that it is in contemplation by certain persons shortly to present land in Douglas as a site for a cathedral for the Isle of Man.

Samaritan Free Hospital.—Messrs. H. Saxon Snell & Son have been requested to prepare a design for the new Royal Samaritan Free Hospital on the site of Dorset House, St. Marylebone.

A Gallery of Casts.—The *American Architect* eays,—"An offer bae been made to the Metropolitan Museum of Art, which its friende cannot be too prompt in enabling it to accept. It ie propoeed to furnish the Mneeum, not only with a complete set of caste from all the principal collections of eculptnre in the world, bnt with moulde for casting duplicatee, provided sufficient money shall he contributed to pay for the work and material. A little reflection ie neceeeary to enable non-profeecional persone to comprehend the value of this offer, and the importance of eeizing at once an opportunity which can never occur again in eo favourable a form. It ie well known that the marble antiqnee which fill the galleriee of Enrope are eteadily deteriorating under the combined influence of the acid vapours which load the atmoephere of modern citiee, and the ducting which ie necessary to keep them clean, eo that within a yeer or two the authorities of the British Mneenm have been compelled to ehnt up eome of their bas-reliefs in glaes cases, and to varnisb others witb ellicatee in order to prevent their total ruin. Ae it is, the caste now made are inferior to the ones taken twenty yeare ago, and those of twenty yeare hence will be still woree, eo that not a moment ehould be lost in eecuring a collectiou of moulde before the exquicite texture and surfuce of tbe original hae been further attacked. The completeness of the collection which ie now within onr reach givee it also immence valne. It must not he forgotten that worke of eculpture are not only examples of art, bnt historical documente, and that au incomplete collection of caste, however well eelected from the artistic point of view, ie as useless to bietory, compared with a more comprehensive one, as would he a eelection of manuscripte of the Angustan age alone, compared with the riches of the Vatican Library."

At the Astley Bridge Local Board Offices, on Tuesday, the 14th of July, Mr. J. T. Harrison, C.E., on behalf of the Local Goverument Board, held an inqniry as to the application of the Astley Bridge Local Board for permission to borrow the eum of 3,076*l*. After the explanatione of the chairmau of tbe Streete Committee (Mr. Leuch), the snrveyor (Mr. Lomax, and the clerk (Mr. Marsden) ae to the purposee for which the eum was reqnired, the inquiry closed. There was no opposition. At the conclnsion of the proceedings, Mr. Harrison made several inquiries into the working and conetruction of the eewage worke, and made the following statement:—Some time ago, witbont the knowledge of the Astley Bridge Authority, be made an inspection of their eewage works, examining the inlets and the outlete for the sewage, and the construction and working of the tanke and filter for the purpoee of eatiefying himself npon the efficiency of their working, which he approved, the principle of the works being good. Still farther to eatisfy himself that the results were such ae to warrant his recommendation of the principle on which they were conetructed, he took six eamples of the effluent water before it passed into the river, and sent them to Dr. Frankland, the analytical ohemist of the Local Governmeut Board, for analysis. Dr. Frankland'e report to the Board was highly satisfactory; for he etated that, although there was a qnantity of organic matter in the water, it was of such a qnality that it might be turned into any waterconrse, and that it came within the standard of purity required.

The Water Supply of the Metropolis.—The Select Committee appointed to concider the question of the water eupply of the metropolis bave agreed upon their report. It ie understood tbat it recommends the creation of a Water Trust, to be elected from the Corporation of the City of London, the Metropolitan Board of Worke, and the other bodies representing water districte outside the jurisdiction of these corporations. The Committee arrive at the conclnsiou that "the agreemente" with the water companies accepted ae a basie of Sir Richard Croes'e scheme for the purchase of the existing waterworks ehould be placed ont of court. They do not oppoee the purchase of the waterworke upon reasonable terme, bnt suggest that favourable consideration ehould he given to the poesibility of obtaining a enpply from other sonrce.—*Morning Post.*

Mr. Stephen Tucker, Rouge Croix Pursuivant of Arms, has been nominated by the Duke of Norfolk, Hereditary Earl Marshal, to the Patent Office of Somereet Herald in Ordinary, held in recsut years by the late Mr. Planché.

Balsall-heath Local Board.—A epecial meeting of thie Board wae held on July 27, Mr. Parcone presiding. The chairman, in explaining the object of the meeting, eaid they bad been called together to sanction an application to the Local Government Board for the borrowing of 22,000*l*. for eewerage works. The Board, who had already applied for a loan of 15,000*l*., were now in a peculiar poeition, inaemnch ae tbe eewerage worke committee knew nothing whatever about the matter. He was astonished at the amount now asked for in connexion witb the sewerage works. A few montbs ago Mr. Nicholls, the engineer to tho Board, eaid au expenditure of 23,000*l*. would meet the case, whereas according to him at tbe preeent time the coet would he 37,000*l*. The Board were astonished, when the work wae about three parts finished, to find they required a eum of 13,000*l*. as extras for the completion of No. 2 contract, which amounted to 16,000*l*. The following resolution wae carried:—"The Board strongly complaine of the conduct of Mr. Nicholle, the engineer, in not letting the Board have his estimatee of the amonnt required to complete the eewerage echeme earlier than twenty minutes before the Government inepector held hie late inquiry, which left the committee in such a poeition that they could not examine their correctneee before they were laid before the inepector; and the Board requires immediate detaile as to how Mr. Nicholle makee ont hie estimate of 13,041*l*. upon Mr. Palmer'e contract of 15,456*l*., ae the Board was led to helieve that Mr. Nicholls nndertook to carry out the echeme prepared by Mr. Barnee; that be then only estimated the extras at 686*l*., eubject to the nenal contingencies of treacherous grnnd; and the Board cannot nnderetand why the extras shonld exceed that eum except for reasonable eums for converting old sewere for etorm-water use and hazardoue grouud."

The Armstrong Park, Newcastle-on-Tyne, has been opened. Mr. W. H. Newton, Chairman of the Parks Committee, in the conree of the proceedings stated that some two yeare ago the Corporation purchased two properties for the purpoeee of pnblic parke: the firet was at Elewick and the other at Heatou. They bad ecarcely handed over the Heaton purchaee to the committee to be laid ont wheu their distinguished towneman, Sir Wm. Armetrong, signified hie approval of the actiou on the part of the Corporation by supplementing the 22½ acree at Heaton hy 28½ aoree, making a total of 50 acree at Heaton for park purpoeee. Some 6,000*l*. have heeu expended in laying ont the park (under the direction of Mr. Fowler, the horongh engineer). The Corporation had recognieed a wise obligation in promoting district parke and recreation-grounds, and had testified tbeir gratitude to Sir Wm. Armetrong in what he trusted wonld he a most agreeable form, for thie property would be known hereafter hy the name of the Armetrong Park. It wae a pleasing reflectiou that, while the name of Sir Wm. Armetrong would he handed down as the greatest artillery and hydranlic engineer of his age, the people of Tyneside wonld associate hie name and hie memory with one of the greatest pnblic hoone which it wae poesible for a community to enjoy.

Compensation.—Under-Sheriff Burchell presided last week at the Sheriffs' Conrt, Red Lion-square, over a special jnry, in the compensation ouse of "Jones *v.* The Midland Railway Company," in which a olaim wae made of between 5,000*l*. and 6,000*l*. for four very old freehold wooden houses in Royal Mint-street, Tower-hill, required by the railway company. Evidence wae given hy the claimant, Robert Jones, who wae a coal-dealer in one of the houses, where he had carried on husinsss for eighteen yeare; the other honcee he let in weekly tenements. He bought at the present time the beet coale delivered to him at 18s. per ton, and by selling them in small quantities he made 12s. per ton profit; he made 7s. a chaldron on coke, 2s. 3d. per eack on charcoal, and a good profit on firewood. His net profits exceeded 300*l*. a year, besidee the profit on the honses; and as he cönld get no premiees near Mint-street, 900*l*., being three years' purchase, wae asked for the husinese. The freehold for building purposes in the neighbonrhood had nearly donbled in value. Surveyore estimated the value at from 4,525*l*. to 4,800*l*. After the case had occnpied abont five honre (the jury having made a personal inspection of the premises), a verdict by consent was taken for 4,000*l*.

Sewage in the Thames.—At the last meeting of the Woolwich District Board of Worke, Mr. Tuffield referred to the nuicance caneed hy the diecharge of the eewage of the metropolis into the Thamse. No one, he eaid, could go to London by boat witb any degree of comfort. At high water the river was black, and emitted an abominable steneb, whilet eewage matter conld he eeen floating on the top. The meu on tbe pier said that the nuieance arose from the men at the outfall eewers discharging the eewage into the river before the high tide. The conseqnence wae that the diecharged sewage floated up to Woolwich and Greenwich. If the London sewage could not he ntilieed profitably, it ought to be utilised nnprofitably. It had become a nuieance never contemplated by Act of Parliament. Woolwich parieh had a good eyetem of drainage before the Metropolitan Board of Worke forced the exieting scheme npon tbem. They were charged vast enms of money for being afflicted with an intolerable nuisance. Government conld never have contemplated the Thames at Woolwich being converted into an open eewer, or they would certainly have pnt a veto on the present system of drainage for the eake of the health of the troops. The chairman said that he fully endoreed the etatements of Mr. Tuffield. He never knew the river to be in euch a etate as at the present time. The Thames was infinitely worse now than before the construction of the northern and southern outfalls. It was recolved to write to the Metropolitan Board, asking for immediate attention to be given to the present filthy condition of tbe river. Capt. Behenna eaid that notices were pnt np at the outfalle that the elnicee ehould be opened at a certain time after ebb. Instead of theee orders heing obeyed, tbe eluices were opened when the flow wae going on, and before the flood had attained ite height.

Iron and Steel Institute.—The detailed programme of the annual meeting of thie Institute, to be held at Düeseldorf, on August 25, 26, 27, and 28, ie now publiehed. On the 25th there is to he in the morning a general meeting of membere at the Tonhalle, where the Institnte will be received by the local authorities; in the afternoon a visit to the exhibition, and to works near Düeseldorf; and in the evening the annual dinner of the Institnte at the Tonhalle. On the 26th and 27th there are to be general meetings in the mornings for the reading and discussion of papers; the afternoone are to he devoted to exoursione by special trains to variouc iron and steel worke in the neighbourhood of Düeseldorf, followed hy concerts in the evenings. The whole will be brought to a cloee by a Rhine exourcion ou the 28th, to Cologne, *viâ* Rolandseck, Bingen, and Coblentz.

TENDERS

For the erection of a parsonage-house, in the parish of Holy Trinity, Esclnsham, Wrexham, for the Rev. L. W. Davies. Mr. J. E. Lash, architect. Quantities by Mr. W. Lunn:—

B. Owen, Wrexham	£2,356	0	0
Bleakley, Birkenhead	2,332	0	0
Samuel, Wrexham	2,050	0	0
Rogers, Rossett	2,031	0	0
Hughes & Owen, Wrexham	1,997	10	0
Davies Bros., Wrexham	1,893	3	8
Phennah & Davies, Rhostyllen	1,769	6	0

For the erection of new boys' school in Clyde-street, Edward-street, Deptford, for the School Board for London. Mr. E. R. Robson, architect. Quantities supplied by Mr. T. Thornton Green:—

Harris & Wardrop	£4,497	0	0
Hart	4,437	0	0
Atherton & Latta	4,417	0	0
Hunt	4,340	0	0
Cox	4,269	0	0
Kirk & Randall	4,209	0	0
Tongue	4,193	0	0
Jerrard	4,074	0	0

For the enlargement of schools at Olga-street, Groveroad, Hackney, for the School Board for London. Mr. E. R. Robson, architect. Quantities supplied by Mr. T Thornton Green:—

Brass	£3,994	0	0
Higgs & Hill	3,940	0	0
Shephard	3,910	0	0
Kirk & Randall	3,865	0	0
Sargeant	3,845	0	0
Boyce	3,770	0	0
Wood	3,745	0	0
Williams	3,542	0	0
Stimpson	3,320	0	0
Grover	3,284	0	0

For new offices, 57, Moorgate-street, and ground floor and basement, 76, Coleman-street, for Messrs. W. & J. R. Hunter. Mr. Henry Dawson, architect. Quantities by Mr. C. N. McIntyre North:—

Roberts	£5,825	0	0
Bangs & Co.	5,730	0	0
Kirk & Randall	5,510	0	0
Ashby Bros.	5,489	0	0
Ashby & Horner	5,444	0	0
Colls & Sons	5,250	0	0
Woodward	5,093	0	0

For new residences, New Warwick-road, Milverton, for Messrs. H. C. Passman and Geo. Rogers. Messrs. Brown & Albury, architects:—
Mills (accepted).

For new show-room, Broad-street, Reading, for Messrs. Wellstead & Co. Messrs. Brown & Albury, architects:—

Higgs	£913 0 0
Woodroffe	830 10 0
Searle	800 0 0
White	785 0 0
Denton	689 10 0
East	660 0 0

For bronze shop-front and revolving shutters for the above:—
Bunnett & Co. (accepted) £148 10 0

For new entrance-lodge and alterations to residence of Capt. Beaumont, Calcot-place, Reading. Messrs. Brown & Albury, architects:—

Simonds	£539 0 0
Denton	507 0 0
Wornham	490 16 0
Wigmore (accepted)	451 0 0

For industrial dwellings in The Forbury, Reading, for Mr. Robert Tomphins. Messrs. Brown & Albury, architects:—

Carter	£2,303 0 0
Searle	2,244 0 0
Weaver	2,240 0 0
Simonde	2,197 0 0
Kingerlee	2,145 0 0
Lewis	2,110 0 0
Denton	2,077 0 0
Wornham (accepted)	1,895 0 0

Fireproof Flooring.

Dennett & Co.	£290 0 0

For cleaning and renovating internally and externally St. Stephen's Church, North Bow:—

Robey, Bow-road	£210 0 0
Barrow, Malmesbury-road, Bow	189 0 0

For the erection of Sunday schools, class-rooms, caretaker's house, &c., in the rear of Walworth Wesleyan Chapel, Camberwell-road, for the Building Committee. Mr. Charles Bell, architect:—

Kirk	£2,934 0 0
Hall, Beddall, & Co.	2,894 0 0
Woodward	2,854 0 0
Smith	2,749 0 0
Downs	2,734 0 0
Hickinbotham	2,698 0 0
White	2,690 0 0
Hobson	2,615 0 0
Tarrant & Son	2,489 0 0
Goad (accepted)	2,485 0 0
W. & H. Castle	2,456 0 0

For alterations and additions to 15, Upper Wimpole-street, Marylebone, for Mr. Horace J. Semple. Mr. Maurice H. Pocock, architect:—

Sharp & Evered	£850 0 0
Griggs	833 0 0
Strong Bros.	780 0 0
McCormack	725 0 0
Higgs	673 10 0
Holloway	672 0 0
Goad (accepted)	563 0 0
Robertson	421 0 0

For the erection of four houses, Ruabon-road, Wrexham, for Mr. Thos. Griffiths. Mr. J. E. Lash, architect:

Cannah & Co., Marford	£1,480 10 8
Samuel, Wrexham	1,468 0 0
Rogers, Rossett	1,218 0 0
Price & Evans, Wrexham	1,165 0 0
Thos. Jones, Wrexham	1,164 0 0
Owen, Wrexham	1,120 0 0
Roberts & Giffins, Rhos	1,120 0 0
S. Jones, Coedfroeth	1,110 10 0
Phennah & Davies, Rhostyllen	1,090 10 0
Davies Bros., Wrexham	1,089 0 0
Oliver, Wrexham	1,075 0 0

For new vicarage at Ruislip, Herts. Mr. A. T. Nutt, architect. Quantities by Messrs. Arding, Bond, & Buzzard:—

Carless	£3,420 0 0
McLachlan & Sons	3,045 0 0
Elder	3,010 0 0
Kearley	2,893 0 0
Kendal	2,809 0 0
Fassnidge	2,783 0 0

For additional pianoforte factory, Grafton-road, Kentish Town, for Messrs. John Brinsmead & Sons. Messrs. Spalding & Evans, architects. Quantities by Mr. Geo. Fleetwood:—

Brass	£2,864 0 0
Roberts	2,823 0 0
Manley	2,790 0 0
Perkins	2,777 0 0
Dove Bros.	2,755 0 0
Outhwaite	2,625 0 0

For erecting additional stories to buildings, 258, Euston road (exclusive of ironwork), for Messrs. Wailes & Co. Messrs. Ernest George & Peto, architects. Quantities by Messrs. Stoner & Sons:—

Longmire & Burge	£1,130 0 0
Simpson & Son	1,099 0 0
Manley	1,079 0 0
Burford	1,075 0 0
Perkins (accepted)	1,067 0 0

For pulling down and rebuilding a wing to the Vicarage, Rudgwick, Sussex. Mr. Owen Lewis, architect:—

Beals, Battersea	£635 0 0
Peters & Co., Horsham	537 0 0
Port, Ewhurst (accepted)	510 0 0

TO CORRESPONDENTS.

Stoke Newington (writer should have sent his name).—Clericus (when a person writes a libel he should, at any rate, have "the courage of his opinion" and sign it).—T. T., Wellington (a view shall appear).—R. G (builder not yet appointed. We do not give addresses).—H. D. (tenders were not enclosed).—A. J. (next week).—O. G. (next week).—P. C. (under consideration).—S. B.—J. H.—R.—T. W. W.—H. H.—H. C. B.—R. V.—A. J. B.—J. E. L.—G. P.—W. C. B.—T. C. S.—O. M. W. S.—A. M.—E. C. S—B. & Son—Mr. P.—B. & A.—G. & P.—C. J. B.—W. S—J. B.—D. W.—O. L—J. W. S.—R. P.—P.—G. & H.—J. E. C.—C. G.—A. C. R.—J. W.—Mr. G.—J. P. & Co.—F. E. T.—M., V. & M.

All statements of facts, lists of tenders, &c, must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

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The Builder.

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ILLUSTRATIONS.

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Thomas Henry Wyatt, Architect.

PERHAPS it is still known only to a few that Mr. Wyatt died on the evening of Thursday, the 5th inst. Though for some considerable period he had remained in a precarious condition, his death was sudden and unexpected. Nevertheless his recent state of health was such, that neither his family nor his intimate friends were ever led to believe in the possibility of any complete recovery from the combination of maladies with which he was attacked. Though during a week and more barely conscious of what was taking place around him, his strength would suddenly revive, and, as lately happened more than once, he would be met paying a visit several miles from London, attending a professional gathering at Greenwich, or seated in the presidential chair of the Architects' Benevolent Society, in all of which positions he would still conspicuously display the grace and geniality that distinguished him through an eventful and a comparatively protracted career.

Born in Ireland, at Loughlin House, Roscommon, seventy-three years ago, at the residence of his father, Mr. Matthew Wyatt, some time a Metropolitan Police Magistrate, he was educated by private tuition, also spending a short time for that purpose at Brussels. Intended by his father for the career of a merchant, he passed a few years of his early life in the Mediterranean, trying, as he once said publicly, to "learn the beauties of cottons, coffees, and calicoes." The business being distasteful to him, he obtained permission to study architecture, and he consequently entered the office of the late Mr. Philip Herdwick, the Royal Academician, assisting that gentleman in the alterations then being made at Goldsmiths' Hall, and in the works at St. Katherine's Docks. It was during his stay with Mr. Herdwick that the drawings were being made for the great Doric entrance to the London and North-Western Terminus at Euston-square. One or two old friends remember Mr. Wyatt at that time, often dining with him at his mother's house (she having been left a widow) at Hackney, where he was district surveyor,—an appointment which he held for a short period only, as his other professional engagements began early to engross his full attention. It is now nearly forty-five years since he first moved to Great Russell-street, where, at No. 77, he resided to the moment of his death. In 1838 he entered into partnership with Mr. David Brandon, F.S.A., and after the dissolution continued the practice of his profession alone until about twenty years ago, when he admitted his son (Mr. Matt. Wyatt) into partnership with him, though the latter was never formally introduced as his father's partner. Among a long list of pupils who have served their articles in his office, may be mentioned two distinguished men who have preceded him to the grave,—the late Sir Digby Wyatt, who was his younger brother, and Edward Barry, whose sudden death at the council table of the Royal Academy occurred only a few months ago. The catalogue of Mr. Wyatt's executed works presents a formidable appearance, and compares not unfavourably with that of his colleague the late Sir Gilbert Scott. That one man could have, unaided, designed and superintended so large a number of buildings as those described in the subjoined list,—even during the space of a generation,—is not probable, and it was Mr. Wyatt's invariable habit to acknowledge the help rendered to him by his pupils and assistants. When in 1873 he received the Royal Gold Medal from the hands of Sir Gilbert Scott, who took occasion necessarily to refer to his colleague's works, Mr. Wyatt said, "I know well how little these works in themselves deserve this honour, and no one can know so well as I do how much I am indebted to others for what there is of interest in those works,—I mean to faithful and attached assistants, who have been long with me." On the same occasion he begged the critics to bear in mind the relative advantages that the younger architect of the present day had over those of a passing generation. But neither this mild deprecation, nor the modest avowal that preceded it, can alter the fact, with those who know, that the well-known church at Wilton, near Salisbury, erected for Mr. Sydney (afterwards Lord) Herbert, was exclusively Mr. Wyatt's design; and considering when it was erected, it suffices to place its architect high among the artists and adapters of this century.* Wilton Church has been truly described by the late Sir Gilbert Scott as a magnificent building "of a noble style,—the early style of Lombardy, with all its richness of material and workmanship." But in spite of the large practice to which, until within a few months of his death, he gave constant personal supervision, he held several honorary appointments. He was honorary architect to the Institution of Civil Engineers, and had a seat at the Council; to the Athenæum Club, of which he was a member; to the Middlesex Hospital; and to the Governesses' Benevolent Institution. He was also consulting architect to the Commissioners in Lunacy, the Incorporated Society for Church Building, and the Salisbury Church Building Society. He was also President of the Architects' Benevolent Society, and it was due to his personal exertions that the funded property of that society was raised to more than 5,000*l.* By Mr. Wyatt's appeal to a comparatively few professional brethren, more than 1,600*l.* was subscribed in a short time, the effort having been initiated by Mr. Godwin, who offered a sum of money conditionally on fourteen others subscribing a like amount. It was also largely due to the advice and exertions of Mr. Wyatt that the business of the Benevolent Society was transferred to the office of the Institute of Architects, and to some extent affiliated to the corporate body.

Probably very few also are aware of the interest with which Mr. Wyatt viewed the formation and progress of that body. When all England was burning hot with Parliamentary Reform, there was just a little sympathetic smouldering and smoking going on among the architects as to the necessity of education, of archæological inquiry, and of united action. An institution,—called the Architectural Society,—then existed, the objects of which were the advancement and diffusion of architectural knowledge, by promoting the intercourse of those engaged in its study. Started in 1831, it was not till 1833 that the members felt the necessity of hearing "Papers" read, and the first of a series of essays read before the Society is now preserved in the library of the Institute. It is the work of Mr. Wyatt,—a manuscript written by himself,—which treats of: (1) "The advantages we may derive from the observance and interchange of our mutual thoughts and acquirements;" and (2) of "The advantages of friendly intercourse amongst the members of a profession deemed polite and liberal." Some may smile at the theme, but the spirit breathed in it is that of Tom Wyatt, young, middle-aged, and old; and while the arguments he used still hold good, the complaints he uttered are still unanswered. In his essay he alluded to the superior organisation of the French "Public Works," and of the superior training of the French student of architecture,—allusions which, during the remainder of his life, he must have heard others continually repeat with more or less force and with equally just premisses. The Architectural Society, however, gave way to a more important institution, though meanwhile Mr. Wyatt had been its Vice-President, and his great friend Mr. George Mair, its Honorary Secretary. In 1838 the former became a Fellow of the Institute of British Architects, and in 1842 the Architectural Society became a part of the Institute founded, as every architect knows, in 1834, though the charter was not obtained until three years later. In the year of the junction Mr. Wyatt was elected a member of the Council, and of that Council (all distinguished men) only two now survive,—Professor Donaldson and Mr. Mair. From that date to this Mr. Wyatt has been associated with the proceedings of the Institute. Elected President in 1870, his presidential addresses were

* A brief description of this church, by the conductor of this journal, will be found in the *Journal of the British Archæological Association*, for 1859, under the heading "Early Christian Buildings and their Decorations."

eminently characteristic and practical expositions not only of the events of the period, but also of past and future circumstances connected with architectural affairs. In 1873 he received the Royal Gold Medal, and a few years afterwards took a conspicuous part in the pursuit of those inquiries which led to what is now known as the reform of the Institute, done in that year of grace 1877,—euphoniously described by a member as The Year One, N.S.,"—when the nucleus of the present Council was formed. The death of Mr. Cockerell led, in 1879, to the appointment of Mr. Wyatt as Honorary Secretary, an office which he filled with undoubted advantage to both the general body of members and the Council, and which he resigned but a very short time ago. The respect and affection entertained for him by those colleagues with whom he was immediately associated will be perfectly well understood, and we need not go out of our way to describe those feelings. The following letter, however, which we are enabled to publish, is not without interest at the present moment:—

"Royal Institute of British Architects,
9th August, 1880.

My Dear Sir,—I am instructed by the Council of the Royal Institute of British Architects to inform you, as the elder son of the late Thomas Henry Wyatt, Past President, and until within a few days Honorary Secretary, of the great grief they feel at the sudden though not unexpected death of your lamented father. In the letter recently addressed to him personally, the Council expressed most inadequately their thanks for the services he rendered to the Institute while holding the office of Honorary Secretary, and they afterwards learned,—from messages sent to individual members,—that he was gratified with the sincere and unanimous feeling which prompted the conveyance of that expression. His death now serves to recall the memory of numberless other services he has rendered in the course of a comparatively long life to the profession of which he was one of the most respected members, and to the corporate body of architects, of whom he was a distinguished President. Indeed, on looking through our records, I find that Mr. T. H. Wyatt was elected a Fellow of the Institute so long ago as the year 1838, and that he was first made a member of the Council in 1842. Elected president in 1870, important and varied business, seriously affecting the welfare of the Institute, was then successfully transacted,—a success, moreover, largely due to the tact, energy, and courtesy with which he occupied the presidential chair.

It is impossible to conclude this necessarily short reference and imperfect letter of condolence without unfeignedly deploring the severe loss which the Council have sustained by the death of an adviser so wise and a colleague so sympathetic as the late Mr. Wyatt proved himself to be during an intimate connexion of eight-and-thirty years.—I am, my dear sir, your very faithful servant,

(Signed) WILLIAM H. WHITE, Secretary.

Matt. Wyatt, esq.,
77, Great Russell-street, Bloomsbury, W.C."

Thomas Henry Wyatt was buried on Tuesday last at Weston, a quiet village some seven miles from Basingstoke, at a church restored and rebuilt from his own designs, and partly at his own expense. Laid in the same grave as his wife, who preceded him by five years, the spot in which his body rests could not be more beautifully surrounded. Besides several members of the family, there were present at the funeral one of his oldest friends, Mr. C. H. Gregory, the distinguished engineer; Mr. Hannen, the well-known builder, and some of Mr. Wyatt's assistants and pupils. The Royal Institute of British Architects was represented by Mr. Whichcord, F.S.A., the president, who was accompanied by the secretary; and if a large number of engineers and architects were not among the followers to the grave, an explanation may be found in the fact that, as Mr. Wyatt had early expressed a wish to be buried in the strictest privacy, no notices of his death were issued other than the letters sent to his family and a few of his friends. By his will, Mr. Wyatt's practice and his library of architectural books are left to his eldest son, while amongst other legacies, he has bequeathed sums of money to the Incorporated Society for Church Building, the Architects' Benevolent Society, and to the Library of the Institute.

The Wyatts have furnished a goodly share of practitioners in architecture and the kindred art of sculpture,—for instance: James Wyatt, Surveyor-General of H.M. Works, President of the Royal Academy, and a restorer of Windsor Castle; Benjamin Wyatt, architect of Apsley House, Sutherland House, and Drury-lane Theatre; Lewis Wyatt, who was employed at Hampton Court and Kew, and was Architect to the Board of Ordnance; Samuel Wyatt, of Chelsea Hospital, the Pantheon, &c.; Jeffry Wyatt (afterwards Sir Jeffry Wyattville), the much-abused restorer of Windsor Castle, architect of Chatsworth and Longleat; Thomas Henry Wyatt, whose death we deplore; and the late Sir Digby Wyatt, well known to the present generation. The sculptors are Matthew Coates Wyatt, Richard Wyatt of Rome, and Edward Wyatt.

Though the friend we have lost can scarcely be described as a great architect, though he was neither a brilliant wit nor a powerful leader of men,—professionally his advice was sought by some of the best men in England, and socially he had few equals. One great point with him was that he could rough out a sketch-plan with a facility that astonished both his clients and his assistants; another point was that he could write a business letter which a client could read with interest and understand without difficulty. As a member of the Corporate Body of British Architects he must be regarded as eminently successful in his professional career; as a member of the Council his advice was sought and his opinion received with respect such as few other members inspired. He was conciliatory and politic; always modest and a gentleman. The words he wrote in 1833, when called upon to prepare the first of a tentative list of essays for the Architectural Society, were not unlike what he often uttered towards the close of his life; and at a time when the test of examination is about to be enforced on all candidates for admittance to the ranks of the only chartered architectural society in Great Britain, those words, after the lapse of half a century almost, may not inappropriately be inserted here:—"Gentlemen," said Mr. Wyatt, "I have wandered far from my subject, and trespassed, I fear, still further on your patience. But I would prove that in the establishment of our society a foundation has been laid upon which may be raised, by our own energy, an Institution alike important to ourselves and to society, though to effect this end sacrifices and efforts of no ordinary nature must be made. There must be the sacrifice of all self-conceited opinions, there must be the entire abandonment of every petty cause of dissatisfaction in our mutual anxiety to promote one common object; there must be the effort made to judge rather less favourably of ourselves and more charitably of others than is perhaps in strict accordance with human nature."

The following is a list of the works carried out by Mr. Wyatt since the year 1848; some of them, of course, when he was in partnership:—

Assize Courts.—Winchester, Devizes, Usk, Brecon, Cambridge.

Gaols.—Usk, Cardiff, Monmouth, Swansea (addition).

Hospitals, &c.—Middlesex (alterations and additions); St. Mary's (alterations and additions); Small Pox, Stockwell; St. Luke's; Brompton Hospital for Consumption (new block); Malta Hospital for Incurables; Malta Asylum for the Aged and Infirm; Norfolk and Norwich (in conjunction with Mr. Boardman; Cancer Hospital, Osnaburgh-street (alterations); Fever Hospital, Stockwell (new wing); Salop Infirmary (alterations and additions); Salisbury Infirmary (additions); Essex and Colchester Hospital (additions and alterations); Tetbury Cottage Hospital; Basingstoke Cottage Hospital; Wilts Lunatic Asylum; Buckingham Lunatic Asylum.

Public Buildings.—Exchange Buildings, Liverpool; Knightsbridge Cavalry Barracks; Recreation Hall, Theatre, and Mess-Rooms at the R.A. Barracks, Woolwich; Militia Stores, Wilts; Railway Station, Florence; Devonshire Club (alterations); Monmouth Club; Adelphi Theatre; Hull Orphan Asylum and Schools; St. Aidan's College Birkenhead; Governesses' Benevolent Institution; Town Hall, Ringwood; Town Hall, Crickhowell; Polytechnic Institution; Institution of Civil Engineers (alterations); Lecture Hall, Warminster; Crown Hotel, Sevenoaks, Oatlands Park Hotel, Surrey.

Markets.—Merthyr Tydvil, Brecon, Newport (Mon.), Chepstow, Warminster.

Mansions, &c.—London: Park-lane (Sir Dudley Marjoribanks, M.P.); Audley-square (Lord Arthur Russell, M.P.); Queen-square, Westminster (Sir Chas. Forster, M.P.); Berkeley-street (Sir Baldwin Leighton, M.P.). Poland (Prince Woronzoff); Cascaes, Lisbon (Duke of Palmella); Llantarnam Abbey, Monmouth (Mr. Reg. Blewitt); Malpas-court (Mr. T. Protheroe); Llandogo Priory (Mrs. Gough); Orchardleigh Park, Somerset (Mr. W. Duckworth); Crewkerne (Mr. H. Hoskins); Capel Manor, Kent (Mr. F. Austen); Tunbridge Wells, Kent (Lady Selina Bidwell); Fonthill House, Wilts (Mr. J. Morrison); Llangattock Park, Brecon (Duke of Beaufort); Brockenhurst House, Hants (Mr. J. Morant); Tilgate, Sussex (Mr. G. Authruner); Carlett Park, Cheshire (Mr. J. Torr, M.P.); Stepleton, Dorset (Mr. W. C. Lambert); Matverleys, Berks (Mr. J. Forster); Barcote, Berks (Lady T. Guest); Cherkley Yews, Surrey (Mr. A. Dixon); Nantleys, St. Asaph (Mr. P. P. Pennant); Evancoyd, Radnor (Mr. B. Mynors); Palmerston House, Dublin (Earl of Mayo).

Mansions (Alterations and Additions).—London: Pall-Mall (Marquis of Ailesbury); Berkeley-square (Marquis of Lansdowne); Wilton-crescent (Earl of Kinnoul); Bruton-street (Earl of Carnarvon); Portman-square (Hon. W. B. Portman); Portland-place (Earl of Lythom); Hill-street (Earl of Durham); Stratford-place (Lord Odo Russell). Gloucester: Badminton (Duke of Beaufort); Lydney Park (Rev. W. Bathurst); The Abbey, Cirencester (Mr. J. M. Masters); Lyppiat Park (Mr. J. E. Dorrington). Burnham Paddox, Leicestershire (Earl of Denbigh). Lancashire: Lathom House (Earl of Lathom); Croxteth Park (Earl of Sefton). Deene Park, Northants (Earl of Cardigan). Wilts: Clarendon Park (Sir F. Bathurst); Wilton House (Earl of Pembroke); Estcourt House (Right Hon. T. S. Estcourt). Arley Hall, Cheshire (Mr. R. E. Warburton). Somerset: Sutton Court (Sir E. Strachey); Pixton (Earl of Carnarvon) Cranmore Hall, (Major Paget, M.P.). Downing, Flintshire (Viscount Feilding. Cornwall: Pensandane (Mr. R. F. Bolitho); Trelawne (Sir J. Trelawney); Cardew (Colonel Tremayne). Hants: Malshanger Park (Mr. Wyndham Portal); Sydmonton Court (Mr. W. H. Kingsmill). Surrey: Burr Hill (Mr. F. Bircham); Fairholme (Mr. H. Rogers). Monmouth: Cefn Tilla (Lord Raglan); The Hendu (Mr. J. A. Rolls, M.P.); Bryn Glas (Mr. T. Cordes, M.P.). Berks: Ascot (Admiral Greville); Harewood Lodge (Rev. N. J. Ridley). Moreton-in-the-Marsh, Cambridgeshire (Major Bird). Brethy Park, Derby (Earl of Chesterfield). Lyswaye Hall, Staffordshire (Sir Charles Foster). Kiplin Hall, Yorkshire (Capt. Hon. W. C. Carpenter). Pontryffydd, N. Wales (Capt. Mesham). Kent: Stansfield Lodge (Mrs. Duncan); Honor Oak (Mr. C. Marquardt. Bredenbury Court, Hereford (Mr. W. H. Barnaby). Castle Rising Hall, Norfolk (Hon. Greville Howard). Isle of Wight: Swainston (Sir Barrington Simeon); Languard (Col. Atherley). Odiham Priory, Hants (Right Hon. G. Sclater Booth); High Legh, Cheshire (Col. Leigh). Portland Lodge, Dorset (Mr. H. Vizard). Ireland: Abbey-leix, (Viscount de Vesci); Rosmfort (Mr. S. Ram). Hants: Kempshott Park (Sir Nelson Bycroft); Oakley Hall (Mr. W. W. Beach, M.P.); Llangattock Manor, Monmouthshire (Mr. J. A. Rolls).

Schools.—Swansea, Glamorganshire; Llandynil, Montgomeryshire; Brynford, Gorsedd, Flintshire; Brockenhurst, Basingstoke, Hants; Lullington, Somersetshire; Cobham, Kent; Newton, Gloucestershire; East Woodhay, Berks; Brecon, Gravely, Breconshire; Warminster, Westbury, Dilton, Wilts.

New Churches.—Wilts: Wilton, Crockerton, Westbury, Chilton, Steple Aston, Charlton, Fisherton, East Harnham, Cadley, Laverstock, Bemerton, Winterbourne Earls, Fonthill Gifford, St. Catherine's, and Christ Church, Savernake Forest, Cholderton, Semley, Hindon, Didmarston, Christ Church, Warminster (chancel). Dorset: Stourpaine, Langton, St. James's Shaftesbury, West Cranmore, Chidiock Okeford. London: St. Matthias, Bethnal Green; Trinity Church, Haverstock-hill. Cambridgeshire: St. John's, March. St. Peter's, St. Mary-in-the-Fen, Wimblington. Ireland: St. Bartholemew's, Dublin; Abbeyleix. Flintshire: Tryddyn, Gorsedd, Brynford, Pantasaph, Nannerch, Prestatyn; Llandynil, Erryrys, Montgomeryshire; Corwen, Merionethshire; Glangwseo, Carnarvonshire; Brymbo, Denbigh; Merthyr, Glamorganshire; Dunmore, Stirling; Jedburgh, N. Britain; Wolverton, Bucks; Woolwich Garrison Church, Kent (in conjunction with Sir Digby Wyatt); Eastwoodhay, Berks; St. Martin, Lincoln; Badminton (chancel), Gloncester; Dalton, Lancashire; Wheelton, Yorkshire; Bredenbury, Hereford; Newnham Paddox (R.C.), Leicestershire; Weston Patrick, Hants.

Church Restorations and Additions.—Llandaff Cathedral (in its earlier stages); Wimborne Minster. Wilts: Great Bedwyn Church, Codford St. Peter, Newton Tony, Wylye, Melksham, Combe Bissett, Woodford, Barbage, Froshnie, St. Peter's Marlbro', Shrewton, Downton, North Bradley, Chilterne, Horningsham, Boyton, Alvediston, All Cannings, Bower Chalke, Little Lasgford, Ogbourne St. George, South Newton, Wishford Magna, Fovant, Winterbourne Houghton, Bratton, Wilsford, Winterslow, Wroughton, Chilmark, Little Badwyn, Sopworth, Shroton, Chitto, Charlton, Burbage, Upavon, Sherston, Witshury, Bishop's Fonthill. Dorset: Tarrant Gnnville, Tarrant Keynston, Swanage, Spetisbury, Corfe Castle, Winterbourne Zelstone, Preston, Mere, Tolpuddle, Iwerne Minster, Cerne Abbas, Buckland Newton, Sutton Waldron, Dewlish, Parva, Holt, Affpuddle, Stalbridge, Oxon: Nettlehed, Sherburn. Bucks: Worminghall. Gloncestershire: Shipton Moyne, Newnton, Tormarton, Old Sodbury, Acton Turville, Dyrham. Lullington, Somersetshire; Bodvan, Cornwall; Castle Cacrenion, Montgomery. Kent: Horsmonden, Shorne, Chalk, Cobham (chancel). Hants: Oakley, Basing, Rotherwick, Silchester. Yorks.: Tanfield, Londesborough; Deene, Northants. Monmouth: Raglan, Trevethin, Usk, Llangattock, Llantihangel. Bray, Berks. Notts: Shelford, Burton Joyce. Brethy, Derby; Bromlin, Hereford.

Parsonages.—Wilts: Burbage, Upton Scudamore, Alvediston, South Newton, Broad Chalke, Broughton Gifford, Little Langford. Dorset: Tincleton, Stourpaine. Prestatyn, Flintshire. Denbighshire: Rhydymwyn, Brymbo. Hants: Plaitford, Weston Patrick. Shipton Moyne, Gloucestershire; Cobham, Kent; Ashampstead, Bucks; Horringer, Suffolk; Borough Green, Cambridgeshire; Jedburgh, N. Britain.*

IRON *v.* STEEL.

IF the long-standing dispute with regard to the rival advantages of using iron or steel for resisting tensile strains had been going on before a law-court, it would have been the best case for the lawyers that ever gladdened the heart of attorney or barrister. No sooner does the weight of evidence lead to a verdict for the plaintiff than some unthought-of defect turns the balance in favour of the defendant. Those who best know the facts and merits of the case are often the most deeply perplexed when called upon to account for the vagaries of the vigorous rival of wrought-iron. Theoretically it has everything in its favour. Pure metallic iron, with the amount of carbon combined that fits it for resisting the particular strains to which it is intended to be subjected as a finished structure, is the ideal product of the metallurgist and the practical ironmaster. When this result has been approximately reached by improved methods of manufacture, the typical metal is all that could be desired. With the proportion of carbon

* Illustrations of many of these works will be found in our previous volumes, including:—Theatre Royal, Adelphi (1855, p. 871); Memorial Church to Geo. Herbert, at Bemerton, Wilts (1861, p. 266); Memorial to the Countess of Pembroke in Wilton Church, Wiltshire (J. B. Phillip, sculptor), (1864, p. 45); the Newsroom of the intended New Exchange, Liverpool (1865, p. 191); Church of St. Bartholomew, Dublin (1865, p. 314); New Liverpool Exchange: Exterior View (1866, p. 47); Sir Dudley Coutts Marjoribanks's House, Park-lane (1870, p. 587); New Barracks, Knightsbridge (1878, p. 112); Hospital for Consumption, New Building (1879, p. 1294).

that consists with the maximum of ductility, steel is the successful rival of wrought-iron. The specimen bar or plate of mild steel produced by the Siemens-Martin process can stand an amount of torsion and hard usage which would break the best piece of malleable iron that ever was forged. Nor is this only the case in specimens produced under special supervision. Where great attention has been bestowed upon the manufacture, the average output of a large establishment seems amply to justify the preference of the shipbuilder and the boilermaker who determines upon the employment of steel as the best available material for his purposes. But no sooner does success seem to follow the change up to a certain point, than unaccountable failures of particular plates, giving way in a manner unknown to previous practice, suddenly throw discredit upon the whole system, and suggest the wisdom of again recurring to the old and long-tried products of the puddling-furnace.

If the gradual spread of the manufacture of mild steel as a substitute for wrought-iron had led to its being produced in works provided with unsuitable plant, and deficient in the element of skilled workmen, its occasional failure in cases where the faults could be traced to such an origin would throw discredit only on the parties especially responsible. As matters stand, however, the works where it is produced are comparatively few, and the capital involved in their reputation is so great that no effort would be spared to find out the causes of failure and remedy the defects if it were possible to do so. In the face of such a well-known fact, engineers who suffer in purse and reputation from the rupture of a boiler-plate will naturally ask themselves the question, if they are justified, for their own sake and in the interests of their clients, in making use of a material which is susceptible of such unaccountable vagaries. Stories are being told of cracks occurring in steel boiler-plates during the process of flanging that are new as regards their appearance and direction to practical boiler-makers. Although the makers may be ready not only to supply another plate, but to pay for the loss arising from the labour wasted upon the one that failed, something more will be needed to convince engineers that they are justified in bestowing implicit confidence on the new one, or, in fact, upon all or any that have been produced by the same process as that which has failed unaccountably. We have already taken frequent occasion to point out in the pages of the *Builder* the failure on the part of science to provide a means for informing us as to the actual strength of materials without subjecting them to excessive strains. The most reliable method of dealing with the parts which go to make up the whole of an iron structure is to make certain that they have been produced from materials and by processes that are in every way identical with those that have been employed in the production of iron that has stood a standard strain. In the case of the puddling process there is every reason to believe that this certainty with regard to similarity of materials and treatment is a sufficient guarantee, and it is enough to mention the uniformity of a few well-known brands, such as Lowmoor or Farnley, to justify this belief. It is different, however, in the case of a material which is evidently susceptible to influences from which wrought-iron is apparently exempt. It is, perhaps, well in the long run for the future of mild steel, as a successful substitute for malleable iron, that the much-talked-of failure of the boilers of the S.S. *Livadia* should have made the subject more notorious than if the occasion had been one that attracted little or no attention from the public and the engineering profession. It will make an inquiry into the causes of failure on the part of the steel-makers imperative, and it is to be hoped that in this way the source of the evil may be traced. Meantime, the confidence of those who are free to choose their materials cannot fail to be somewhat shaken, and for a time, at least, the preference may again be given to the long-tried and apparently defeated rival which is the product of the puddling furnace.

Russian Churches.—According to a recent report from the Holy Synod, there are in Russia, besides the cathedrals, about 35,000 churches, of which 30,000 are parish churches. The total amount contributed by the State for maintaining churches in Russia is about 5,200,000 roubles (about 780,000*l.*).

THE ARCHITECTURAL EMPLOYMENT OF TERRA COTTA.

It has been a complaint on the part of those who are interested in terra cotta that English architects have not given to the architectural treatment of this material the degree of attention and experiment which it deserves; and the complaint has not been without reason. In London, especially, it may be observed that while there has long been a cry for some material more interesting than mere brick, and more able to resist the deteriorating effects of London atmosphere than stone, some of the very persons who have made the demand (for it has come partly, though not entirely, from the architects) have neglected to give a sufficient trial to a material which seems to possess more of the qualities desired than perhaps any other one at present available. Recently we have seen signs of a growing favour for this material, stimulated probably by the unquestionable practical, and in most ways architectural, success of the large terra-cotta building at Kensington. We have a good deal of ornament which partakes, architecturally, of the nature of terra cotta in the cut and moulded brickwork which has come so much into use in the new fashion of London house-architecture; and we may perhaps soon see among our street buildings many specimens not merely of terra cotta applied as ornament, but of terra-cotta building; one or two are to be seen already. But a further sign of the increased attention which is likely to be given to terra cotta as a building material is to be found in the fact that we have received more than one special request from the other side of the Atlantic to advise as to where detailed information may be found in regard to the capabilities and treatment of terra cotta as a building material. We do not profess to supply to every individual the particular information he happens to require, but we may reasonably make the requests referred to an excuse for summing up some of the qualities which belong to terra cotta, and which should characterise terra-cotta architecture; and if we repeat some things which are familiar to our English readers, it must be understood that our remarks are in part especially addressed to architectural readers in America and our colonies, to whom the use of the material is less familiar, and who appear to be, in some quarters at least, interested in it.

"Terra cotta" means, broadly speaking, baked earth (*cotta*, literally "cooked"), and is an expression which, therefore, would seem to include a great variety of clay productions, from common brick to china and porcelain. Ordinary building-brick is, therefore, only the roughest and cheapest form of terra cotta, made of comparatively coarse material, and subjected only to a low heat. China and porcelain are productions of special clays of very fine nature, not obtainable in large quantities, and specially suitable in their texture and appearance for ornamental production on a small scale, and of a fine type. What is now understood by the term "terra cotta" is something which may be said to be midway between brick and the fine productions in china and porcelain. The material is one found in large quantities, and not in itself costly, often differing little in its original state from the best ordinary brick-clay,* but which is subjected to treatment which gives it a very different character from brick, the essential difference being in the manipulation of the clay, partly in fully grinding or kneading it, partly in the admixture of some other substances with it, so that it will bear a great heat without flying or twisting, and acquire thereby a surface of the most durable and impermeable description.

Manufacturers are divided in opinion and practice in regard to the compounding of the material for terra cotta. One of the largest makers in England,—Mr. Blashfield, of Stamford,—mixes his clay with a considerable amount of other material; and Mr. Charles Barry, the architect of the new buildings at Dulwich College, where the terra-cotta work was executed from his designs by Mr. Blashfield, adopts this view, and in a paper on this subject as illustrated by the Dulwich building, which he read before the Institute of Architects, expressed decisively the opinion that "terra cotta is something more than baked clay": that it is clay combined with vitrifiable substances, such as ground flint, granite sand, &c.; and in Mr. Blashfield's practice this we believe it is, and this produces a finely-surfaced terra cotta of rather a lighter tone than what has generally been used in terra-cotta buildings in London. But at the same time, it must be said that other authorities of equal practical experience do not recognise any necessity for the use of these foreign materials in terra cotta. Messrs. Doulton, of Lambeth, employ simply the fire-clay from the beds in some of the southern counties (Dorset and Devon chiefly) mixed with a certain proportion of old terra cotta broken up and ground to a fine powder. In former works at Lambeth (which has been for more than a century a home of pottery manufacture) this system was used, though it appears that the combination of the clay with fine sand and ground flint was also practised. What is certain is, that with the combination of ground pottery only it is possible to produce a material of most agreeable colour, and which has all the appearance of being as completely indestructible as any terra cotta that could be made. The ground pottery mixed with the clay is termed in the manufacture "grog"; the proportions in which it is used depend very much on the nature of the clay employed, which varies in regard to the proportion of ground material which it requires for a satisfactory result; and this has to be determined in special instances by the burning of test pieces variously compounded. There is one distinct and unquestionable advantage in this employment of the same materials and in as nearly as possible the same proportion always: the behaviour of the material under firing, and its degree of contraction, may be counted upon to be always pretty much the same, whereas varied mixtures and combinations produce varied settings and contractions, and as the liability of terra cotta to contract and twist in the kiln is one of the great practical difficulties in connexion with the use of the material, it seems best to compound it so as to at least reduce these difficulties to a minimum. As far as shrinkage is concerned, the amount is pretty constant, and is well known. The material shrinks in burning one-twelfth of its original bulk, and this shrinkage is inevitable, and must always be counted on as a necessary stage in the manufacture. Twisting is not inevitable, though for a very long time it was practically nearly so; but it is a difficulty which has now been in the main got over, but the avoidance of which can only be secured by great care and attention.

The first operation with the clay consists in stacking it to dry in sheds, where it has to remain for a good many weeks, the time of course varying according to circumstances, state of the atmosphere, &c. When sufficiently dry it is pulverised and mixed with the other pulverised ingredient, whatever it be, which the manufacturer selects to add to it, and the two are then thoroughly ground together in a pug-mill, under the action also of water, which is added to facilitate the thorough reduction and mixture of the substances. It is this necessary addition of water at this stage of the manufacture which causes one of the difficulties arising from subsequent shrinking in the kiln, the shrinking arising simply from the driving off of all the residue of water under the intense heat to which the material is subjected in that final stage. Consequently, the quantity of water admitted into the pug-mill is carefully adjusted by rule to the proportion of the solid material, as with the same proportion of water there will be always the same proportion of shrinkage. After the mixture in the pug-mill is thoroughly effected, there is another danger to which the material may have been subjected, the retention of air within it, which if overlooked and not attended to would be fatal to the pieces when in the kiln, as they would inevitably burst. To avoid this danger, after the clay comes from the pug-mills and is sufficiently dry to be cut into lumps, it is so cut with a wire into slabs or "wedges," and these are successively slammed down on each other with sufficient force to compress any cavities that may have been left in them and drive out all the air contained therein. The clay is then ready for use, either in modelling or moulding. If the object which is to be produced is to be a single one of its kind, or only a pair, then it may not be worth while to make a mould. If there is only a single one it certainly would not, provided the operation of firing is considered perfectly safe; but if the object modelled be of a very complicated description, and involving necessarily

* Not differing at all from fire-brick clay; the base and principal constituent of terra cotta being, in fact, simply fire clay.

varying thicknesses of clay, and if it be artistically valuable as representing a high class of art-work, it may then be worth while to have made a mould for it, and produce it in that way, in order to save the entire loss of the artist's work and the necessity of designing it all over again, if there should be any accident in burning. But whether the artist's original work be placed in the kiln, or whether a mould he formed from it into which the clay is pressed, the important point is to get the hulk or thickness of material nearly the same in every part, otherwise twisting, from the heat not reaching all the material equally and simultaneously, is the certain result. Thus when a mould is used it is not filled up with clay *en masse*, but the clay is pressed against the sides only, the moulder following the varying surfaces of the mould so as to leave as nearly as may he an equal thickness of clay in every part; and if the mould is so large that a hollow shell of clay could hardly be trusted to retain its shape properly till burned, "struts" of clay are left from one side of the interior to the other, so as to hold the clay better together till burned, and at the same time give what in a large object would perhaps be a necessary increase of strength to the object after burning. The best average thickness is about an inch, unless the object is so large as to require greater thickness for the sake of strength. This necessity for even thickness applies equally to ornamental terra cotta or to blocks for building purposes. In the latter case the even thickness is easily attained; the block becomes simply a hollow piece of terra-cotta with walls of equal thickness. Whether it would he left hollow in building would depend very much on how and where it was to he used; if the block had to be placed in such a position that great weight had to come on the hollow portion it would then he necessary to fill it up with cement or concrete or other material, care being taken that nothing should be used which swells in drying (as Portland cement), as the burned terra cotta is absolutely inelastic, and any swelling of the filling material moans merely the bursting of the block. In the case of ornamental work, and especially of statues, there is more difficulty in securing the even thickness of the material: the work has to be carefully hollowed out at certain parts so as to reduce the material where it is thickest, and want of care in this respect may lead to the loss of a valuable piece of work. There is also danger of the piece cracking before it goes into the kiln from unequal drying, hy which one side or portion is contracted and pulls on the other portion which has not so quickly dried. Mr. Blashfield mentions another difficulty which he has had to guard against. The moulded objects are finished up by hand after moulding, and if the finisher leaves the surface at all unevenly finished, one part less smooth than the rest, which may happen sometimes from some partial tooling arising from an afterthought after the cast is partially dried, this unevenness of surface will be another source of distortion in the kiln; the moisture being naturally driven off most freely through the less smooth and more porous part of the surface, so as to contract soonest in the neighbourhood of that portion. Thus it will he seen that in terra-cotta work there is emphatically many a slip 'twixt cup and lip, and it is only hy long attention and experience that the terra-cotta design has been brought to its last stage in the kiln with a good chance of getting safely through. If it survive that fiery trial, and come out *totus, teres, atque rotundus*, it may thencefortb be said to have nothing to fear but absolute breakage by violence. Frost, rain, cold, or heat, have no further effect upon it; it has come out, after much difficulty and risk (rendered, however, less and less by long experience), an indestructible piece of work: provided always, he it remembered, that the firing is complete. As to the heat used in the kiln, all makers seem to agree in saying that they know nothing positive; the heat of the kilns is not gauged in any way (it surely might he), and all that can be said is that the object is to produce the greatest heat which the productions will bear without cracking; and this seems to amount to absolutely white heat.

In English terra-cotta work the clays most used are from Dorsetshire and Devonshire, where, as well as in some other southern counties, there are large deposits of clay especially suitable for the purpose. In some foreign terra-cotta work there are rather different materials and mixtures used; thus Boni, an eminent terra-cotta manufacturer of Milan, uses two kinds, one close and hard, for the most durable work, consisting of a whitish clay and powdered quartz, which bakes to an ash colour (a much inferior colour to the red tone of the Lamheth terra cotta, as far as effect is concerned); the other of two clays and a sandy lime which acts as a disjunctive, and keeps the material porous, for such purposes as demand a porous rather than a close material. For building terra cotta, however, the great advantage is the close and absolutely impervious character of the material. Of the ornamental and artistic treatment of terra cotta we will speak separately: in treatment as a building material it combines best with brick, along with which it can be entirely used as a facing material with a sufficient number of through tie-pieces to bond it into the wall. Mr. Waterhouse has also used it (Natural History Museum) as a screen and protection to internal iron columns, thus giving them a fire-proof casing susceptible at the same time of very artistic treatment. The putting together of the material, to make the best possible work, requires some care and consideration: the pieces may, if desired, he flanged and rebated so as to hold together almost without the assistance of mortar; but this, of course, requires a good deal of care and consideration in the making. The outer surface of good and well-burned terra cotta should he almost proof against any ordinary tools, which can merely scratch the skin of the material: and from this fact arises one of the difficulties in the way of the general introduction of the material in building. Alterations cannot he made in it as the work proceeds, not only because the pieces cannot be cut, but because considerable time is required for the modelling or moulding and burning, and the material cannot therefore be furnished at short notice like stone or brick. It is therefore necessary that the architect should have well matured his design in detail before the work is commenced, all the pieces having to be ordered a good while beforehand, and made precisely for the situations they are to fill. Considering the tendency in the present day to design everything in a hurry, and to get up details as they are wanted as the work proceeds (often in a very hasty manner), it may be said that in this respect the adoption of terra-cotta building ought to he a very good discipline for architects, and compel them to give more deliberate thought to the design of a building than is generally given at present; but we fear very few English architects like to take this amount of trouble: indeed, we have heard it urged as an objection, and it certainly fits very ill with the habits of the day, buildings being apparently always now required in a hurry, and the object being not to build well, but to build quickly. No permanently satisfactory architecture can, however, he produced in a hurry, and from this point of view, therefore, it might seem that the extensive adoption of terra cotta might be highly favourable to the development of good architecture; but before this can be generally considered a recommendation, there must be a general feeling on the part of the public that good architecture is a thing worth giving time for, which at present hardly any one does think.

It must be observed that terra cotta cannot be made in very large pieces, and therefore it cannot imitate, and should not aim at imitating, those features of stone architecture which require large blocks, such as large projecting cornices, &c. These can only be safely made in terra cotta by the assistance of concealed artificial supports, making the thing a sham. Terra cotta has much more of the nature of brick than of stone architecture; but this point may be better considered in speaking of the artistic treatment of the material. In regard to its cost as compared with that of stone, terra cotta, as fixed in the building, costs (in plain walling) a little less than the same cubic amount of soft building stone (such as Bath), and 35 to 40 per cent. less than Portland. In regard to comparative strength, some of Mr. Kirkaldy's experiments gave the crushing-weight of a 12 in. cube of Bath stone as 88 tons, that of Portland stone 283 tons, and that of a terra-cotta block of the same size as 442 tons; in comparison with brick, a good stock brick crushed under 17 tons (though we have seen a brick resist three times that pressure), and a terra-cotta block of the same size under 125 tons weight.

We have hitherto been speaking of unglazed terra cotta as a material of homogeneous colour. Its aid to polychromatic effect is, however, capable of being developed in a very elaborate manner. Variety may he obtained in unglazed terra cotta hy what is called "slipping," mixing two clays of different tones together in water to produce a third tone. This may he said to take in terra cotta the same place as pot-metal in coloured glass. But in glazed terra cotta or "stoneware" the material can be painted in a great variety of colours, which are then fixed, and at the same time rendered more brilliant in effect. The glazed ware is formed by throwing salt into the fire when at a certain heat, which decomposes under the heat in the form of vapour, the soda suspended in which incorporates itself with the surface of the ware which is at a white heat, forming a glaze which allows the most delicate markings to appear without any obliteration. Thus any design in colour is rendered both brilliant in surface and indestructible, without the least injury to its artistic effect. Various mineral colours are used, and the main colour of the ground is also influenced by the nature of the fuel, as has been ascertained hy experiment. How far this is the case may be judged by the statement of Mr. Doulton, in a short pamphlet on the use of terra cotta, where he says,—"The delicate blue colour of the ground in ancient Rhenish productions is due to the use of wood as the fuel in firing. We passed a piece of old Rhenish ware through our Lambeth kilns, with this result, that the body was changed to a similar colour as the Lambeth, while the applied colour lost much of its intensity." Stoneware is very largely used for drain-pipes and other such practical purposes, but it is also a very important element in the architectural and artistic capabilities of terra cotta, of which we will speak in another number.

THE SANITARY CONDITION OF THE GOVERNMENT OFFICES.

Fever in Westminster is not a novelty. But the bulletins of the fever which has been running its course, within the past few days, in Downing-street, have been read with anxiety over all the civilised world. At the time at which we write there seems reason to conclude that the apprehensions entertained by some persons of the typhoid character of the fever that attacked Mr. Gladstone were unfounded. We wish it were as easy to dispel any apprehension that the district in which the most important public services of the State are mainly conducted had been so wisely cared for by the sanitary engineer that we might honestly say we had done our best to ward off the attacks of preventible disease.

So far, however, is this from being the case, that we think a very small amount of reflection will be enough to lead to the conclusion that a reconsideration of the drainage of Westminster is a matter of primary importance in the behalf of the public health. This view is founded on two considerations, or orders of data. The first of these regards the condition of the low-lying parts of Westminster before the accomplishment of the main drainage of London. The second regards the principle on which that main drainage has been carried out through the district in question. As to the first, we can speak from personal knowledge, extending over a considerable area, and for many years. As to the second, we rely on the unquestionable evidence of Sir J. Bazalgette, from whose paper on the main drainage of London, read before the Institution of Civil Engineers on March 14th, 1865, we cite those facts to which we feel bound very seriously to object.

The official statement on which the whole project of the main drainage of London was originally based was as follows:—"The London main sewers," says Sir J. Bazalgette, "fell into the valley of the Thames, and most of them, passing under the low grounds on the margin of the river before they reached it, discharged their contents into the river at or about the level, and at the time, of low-water only. As the tide rose it closed the outlets, and ponded back the sewage flowing from the high grounds. This accumulated in the low-lying portions of the sewers, where it remained stagnant in many cases for eighteen out of every twenty-four hours. During that period the heavier ingredients were deposited, and, from day to day, accumulated in the sewers; besides which, in times of heavy and long-continued rains, and more particularly when these occurred at the time of high water in the river, the closed sewers were unable to store the increased volume of sewage, which then rose through the

house-drains, and flooded the basements of the houses."

To no district is the above true description more applicable than to that which skirts the River Thames from a little below Charing Cross to Millbank Penitentiary, extending in an irregular triangle to Buckingham Palace. The whole of the area in question lies within the contour line of 10 ft. above Trinity high-water mark. And it must be remembered that this level no longer represents the extreme height attained by the water of the Thames at spring tides, especially when any body of water is coming down the river. If northerly gales and land floods occur during the equinoxial springs, the river may rise 4 ft., or 4 ft. 6 in. above the Trinity mark, and a rise of from 2 ft. to 3 ft. above that level is not uncommon. Running directly westward from Westminster Bridge,—in the line of Great George-street, and through St. James's Park,—a distance of 1,500 yds. is traversed before we cut the 10 ft. contour level, as shown on Mylne's map of 1851. This area, bounded by Victoria-street, the Mall, Spring-gardens, and the river, contains about 1,000 acres; and as the 10 ft. contour line runs to the west of Victoria-street, it is obvious that the eastern portions of the district in question must be considerably below this contour line, as regards the natural surface of the ground. Below this we have to descend 8 ft. or 10 ft. to the basements, and below the basements lie the drains. As these originally were laid out (as before cited) to empty at low water, we have the proof of the existence,—at least some fifteen years ago,—of a network of drains and sewers, not to say possibly of cesspools, which could only be thoroughly drained by an outfall as low as low-water mark, that is to say, lying at 20 ft. below Trinity high-water level, the lowest ebb of the tide below which, occurring on January 21st, 1878, was 23 ft. 2 in., or 2 ft. 2 in. above the zero of the tide gauge. And in order to obtain a thorough cleansing of this ancient system it would have been necessary either to examine, empty, and fill up with concrete, all these possible pounds of offensive and dangerous fluids, or to connect them with a through main line of sewer, the bottom of which should be laid at least as low as the bottom of the Thames itself. With the proof of the former low level of the sewers, and with the more than probability of the existence of old and unremoved cesspools, made before the sewers were allowed to carry anything but water into the river, it is clear that no main drainage of Westminster could be effected without going below the low-water mark for the permanent outfall of the district.

The above is not a question of map and section alone. We can speak from personal experience of the intolerable state of the basement stories of houses in the vicinity of the Park and of Downing-street before the main drainage was effected. In some of these houses it was possible to tell, without an almanac, the time of high-water at London Bridge. It is unnecessary to go into detail: we can appeal to residents and to visitors, to members of Parliament who took houses for the season, and to others. And although, much more recently, when on being consulted as to an evil odour in a house belonging to one of the great departments of the Government, an engineer recommended an appeal to the Metropolitan Board of Works, that body replied that the sewers were in perfect order, it is certain that within the last eight or ten years that ancient and menacing smell which was familiar to the old inhabitants of this part of Westminster was distinctly perceptible in the house to which we refer.

What, then, we may ask, have been the measures taken for the efficient drainage of a part of London that presents considerable difficulty to the surveyor, and that contains so many of our public offices, and the residences of so many persons whose lives are scarcely less precious to the nation at large than they are to the members of their immediate families?

The reply to this question involves a statement which might well be received with incredulity if it were made on any less indisputable authority than that of the engineer of the main drainage himself.

From Chiswick to Limehouse the main line of western sewer runs approximately parallel to the Thames. To the south of Walham-green, where the sewer cuts off a bend and runs nearly a mile to the north of the river, it receives the Fulham branch. About 500 yards below the great railway bridge over the Thames, where the line of the sewer has again come close to the bank of the river, it receives the Acton branch. The sewer carrying the united sewerage then skirts the river, and crosses the Ranelagh storm overflow, near Chelsea Hospital. A low-level area of eleven square miles, and a further area of about fourteen and a half square miles, are thus drained by this sewer at Chelsea. But at the Grosvenor Canal, Pimlico, commences a work which is ironically called the "low-level sewer." It is the level chosen for this work which is to us so incomprehensible, and to the adoption of which, we think there can be no doubt, the unsanitary state of the Whitehall district is directly due. "The western subsoil of London," says Sir J. Bazalgette in the paper cited, "is so low that its sewage has to be lifted at Chelsea a height of 17 ft. 6 in. into the upper end of the low-level sewer." As to what reasons may be adduced in favour of this rise of 17 ft. 6 in. at this point in the conduit that drains the twenty-five and a half square miles before mentioned, we have nothing to say. On reaching Abbey Mills the contents of the sewer are again pumped up for 36 ft. in height. There may be some sound reason for dividing the total height; and there may be, though we cannot imagine how, a sound reason for doing a part of this pumping at Pimlico.

But that, if the western suburb sewage be rightly carried on at an artificially-attained height of 17 ft. 6 in. above the level of the main sewers, past Westminster Palace and Whitehall to Limehouse, Westminster itself demands a very different outfall, we hold that no engineer can seriously doubt. A section of the Thames Embankment, showing the subway and "low-level" sewer, is appended to the paper by Sir J. Bazalgette which we have cited. No scale is attached, and the only dimensions written on are those of the sewer, which is 8 ft. 3 in. in diameter, and of the semicircular-arched and straight-walled subway, which is 9 ft. wide, and 7 ft. 3 in. high. But taking these dimensions as indicating the scale of the drawing, the centre line of the "low-level" sewer is about 13 ft. below Trinity high-water level. The bottom of the concrete on which the quay-wall stands is as much below the bottom of the "low level" sewer as the centre line of that sewer is below the high-water mark. Or, again, the bottom of the invert of the sewer is about 17 ft. 6 in. below Trinity high-water, or 2 ft. 6 in. above the low water level, at which the old sewers of the district discharged. But the invert does not give the level of the outfall. If the sewer runs two-thirds full, we have to add 5 ft. 6 in. to the invert level. This gives the drainage level dependent on this sewer at 9 ft. above the old line of lowest outfall of the district. We do not speak to an inch, from want of scale or dimensions. But that something close on the 17 ft. 6 in. which was lost by the lift at Pimlico is absolutely demanded for the salubrity of Westminster, he must be a very bold man who will deny.

It is the more unaccountable to us why this high level should have been adopted for the culvert, from the fact that the excavation for the quay-wall was carried so much lower. If the level of the bottom of the excavation had been adopted for that of the invert of the culvert, it would not, we venture to think, have been quite low enough. But there would, at all events, have been a workman's reason for the level adopted. As it is, we can see no reason whatever. As to that, indeed, as we said before, we offer no criticism as far as the through drainage of the western suburb is concerned. There may be reasons, good in themselves, though unknown to us, for that part of the scheme.

But that the sanitary safety of Westminster did and does demand a main outfall-sewer that deserves the name of a "low level," a sewer of which the invert shall be at the least 5 ft. or 6 ft. below low-water mark,—that is to say, 25 ft. or 26 ft. below Trinity high-water mark,—appears to us to be altogether incontestable.

We offer no opinion as to the mode in which what may be called the live sewerage of Westminster is connected with the "low-level" sewers. We shall gladly learn that this part of the matter has been effected with all the skill and care that were possible, when so serious an error had been made in the main outfall-level. In no other terms can we speak of it. On no testimony less direct and conclusive than that of Sir J. Bazalgette could we have accepted the fact. It is the more deplorable from the circumstance that the line taken by this high-level sewer, erroneously called "low level," is the very one on which it would have been most convenient to construct a really low-level sewer, that might have rendered the district safe, sweet, and clean.

We are not now expressing any opinion upon the advisability of pumping up sewage. The question is a very important one, and one of which the gravity is likely to increase rather than to diminish. But the pumping is an essential part of the actual Metropolitan system. We must take the fact as it is. The whole of the sewage that runs through the 8 ft. 3 in. barrel drain in the Thames Embankment is, Sir J. Bazalgette tells us, pumped up 36 ft. at Abbey Mills. It has previously been pumped up 17 ft. 6 in. at the Grosvenor Canal. Therefore, to have continued the low level past Whitehall, so as to provide for the efficient drainage of the district in which our public offices stand, would not have added appreciably to the pumping undertaken by the engineer. There would, probably, have been additional difficulty and cost in making the sewer, in the first instance, at its proper level. Those who remember the rush of water towards the river in many places, notably at Somerset House, while the Embankment was in progress, will readily admit the difficulty of the case. But, on the one hand, is a little more or less of cost; on the other hand, as we regard it, is an absolute sanitary necessity. To have searched the whole area in question; to have emptied and eliminated all ancient drains, cesspools, or soaked and sodden foundations; to have laid the whole area in concrete; and then to have made a new system of sewers, 12 ft. higher than the old ones, would have been a very costly process. We do not say that it would have been a more effective one than that of carrying the outfall sewer, in the first instance, at the proper level. But either that, or the construction of a new and independent low-level sewer for official Westminster alone, will, in our opinion, have to be attempted. We cannot afford to have typhoid germs, like poppies in a cornfield, springing up every year from the undrained soil of Westminster.

What was done, some little time ago, at Marlborough House, is a case in point. Our readers will not have forgotten it. It proved necessary to have a special system of drainage, with its own lift, applied to the area of that palace, in order to ensure its inmates from a recurrence of the fever that had attacked more than one of them. What was done in detail for Marlborough House would have been unnecessary but for the facts we have indicated. It will have to be done for the whole area. The sooner this necessity is recognised, the safer for the town, and the more satisfactory for the nation. It is even now a case of shutting the stable-door after more than one steed has been stolen.

We are very reluctant to say anything that may throw any slur on the accomplishment of a very important work, or that may, however impliedly and tacitly, seem to accuse any professional man of want of due care and forethought. We admit beforehand that there may be much said to excuse, if not to justify, the arrangement to which we object, as far as the through sewerage goes. But the facts are too plain to need comment; or at all events they are too plain to persons who can learn what the earth hides by the use of the methods of the engineer. Level is one of those things which is not to be explained away. In this case, moreover, the explanation is, to a certain extent, given. The ground west of Pimlico was so low that the sewers necessary for its drainage were put in 17 ft. 6 in. lower than the level afterwards adopted for the discharge of the sewage.

The increasing range of the tides of the Thames is a fact not to be left out of sight in regarding the question of the proper drainage of Westminster. That range has now reached the considerable maximum of 30 ft. The action of the river is peculiar, as the ebb reaches as low a level at London Bridge as it does at Sheerness, while at the intermediate station of Gravesend it actually descends yet lower than at the latter spot. Any action of the ebb in draining the subsoil of Westminster, however, must to a very considerable extent be checked by the masonry of the Embankment. That there may be an under-drainage, checked or aided in its flow by the pressure due to the height of the river, is possible. But this, even if it affect the subsoil, can hardly be of any service to any old drains. And in proportion

to the facility with which any subsoil water can escape into the river at the ebb, will he the effect of the inoreased and increasing height attained by the flood. Witbont attempting now to ascertain how far the original connexion between the pervious parts of the snbsoil of Westminster and the tidal movement of the river has been interfered with by the works of the Embankment, it is clear that it ie of the utmost importance to provide for the drainage of the snbsoil, as well as for tbe thorough drainage of any remnants of the older drains, sewers, or cesepoole, the existence of wbich in the district there is so much reason to suspect.

Cost, no donbt, will have to be incurred. But that cost muet be looked in the face. The one cost which it ie inexcusable knowingly to incur ie that of human health and human life. We ask any engineer who ie made aware of the facts now brought together whether the drainage and sewerage of Westminster are in a condition such as the importance of the district demands?

REPORT OF THE SELECT COMMITTEE ON WATER SUPPLY.

The Select Committee of the House of Commons hae arrived at the only conclusion at which, so far back as the 13th of March last, we intimated the conviction that any competent and impartial investigator could arrive. They have declared the entire inadmissibility of the terms for the purchase of the water companies' property which were embodied in the Bill introduced into Parliament by the late Government. They have in tbis reepect done ample justice to our forecast. Nor have tbey been content with the mere expression of opinion. They have pointed out that the annual cost involved to the ratepayers would be 1,210,763*l*. On the 13th of March we gave the figures as 1,252,259*l*. The Committee has taken no heed of the intereet and working expenses that would accrue on the necessary extension of works during the twelve years contemplated. They have, hy some arithmetic peculiar to themselves, called the payment in question the equivalent of 33,018,846*l*., apparently forgetting that, at the price of 96 for a three per cent. stock, it is equivalent to 30,704,416*l*.

Our readers are aware that in February last, when commenting on the great rise in the price of the water companies' shares that followed the announcement that the Government intended to purchase those undertakings, we pointed out the vague and altogether incorrect estimates which had been made as to the cost of the purchase. On the one hand, altogether inadequate estimates of the capital had been given from *quasi* official sources. Twenty-six millions sterling was the figure named. On the other hand, utterly ridiculous estimates of the saving to be effected were gravely brought before the House of Commons. We pointed ont that these statements were wholly deceptive. Then came the Bill, prefaced hy the statement that the maximum outlay would be 31,000,000*l*. We pointed out, on the 13th of March, that it would exceed 38,000,000*l*. The Committee have now endorsed this figure; indeed, to a somewhat higher amount, when the value of money is taken into account. Thus far, then, they have discharged their dnty; and we may hope to hear little more of the regret expressed by one of the morning papers, that the admirable bargain made by Mr. Smith was not at once signed and sealed.

With regard to that second question whicb the Committee have put at the head of their report, we see in the recommendation a very natural outcome of the handling of engineering questions by persons who are not familiar with their nature. That the water supply of the metropolis should he brought under the control of a central body, ie one of the points which it may now be safe to regard only as a question of time. It ie a step in accordance with the whole course and principles of modern legislation. Whether it he more or less advisable, it may be said that it is a point on which public opinion ie tolerably pronounced. If one thing more than another can tend to throw discredit on the constitution and working of such a body, it would be to entrust to their management those matters which ought to be settled prior to their appointment. These are twofold,—firstly, the hydraulic questions; secondly, the negotiations with the companies.

The idea of the late Government, viz., that the negotiation ought to be privately effected in the first instance, was sound and good. It failed of practical success, because of the neglect of a prior requisite step, *i.e.*, the preparation of a proper report, showing the state of the companies' property, the means at their disposal for future extension *without fresh Parliamentary powers*, and the outlay which would be required, in the way of capital, for providing for the future growth of London. Of all this matter the Government, and their negotiator, appear to have been totally unaware. There can be no doubt that the possession of such a report, even if it had lost a year in preparation, would have placed the Government in a position that would have enabled them to reduce the sums mentioned in the Bill hy at the very least 30 per cent.

The Committee have attributed to the mode of private negotiation the ill effects which were due to the commencement of misinformed negotiation. The companies knew their strength, and told it ont-lond. They also knew their weak points, and held their tongues upon them. Dealing with what they heard alone, the Government necessarily were immensely outwitted. They were like a man who "saved the commission of an architect,"—a five per cent.,—on the cost of a house, and had in consequence to pay a bill of 30 per cent. hy way of extras.

The Committee propose to get ont of the difficulty hy taking even less procaution than the Government took. Let us have an "Authority," they say; everybody agrees that an "Authority" is the thing, a "Central Authority." Then let this authority settle everything,—source of supply, chemical purity, cost of work, and haggle out the purchase with the companies. We cannot but think that to commit, first the physical inquiry, which can only be conducted hy competent and impartial experts; and then the negotiation, which should also he conducted hy a well-instructed expert, to some undefined municipal body, would lead to a more unfortunate result than even that from which the Committee have recommended that London should he protected.

We come back to the primary requirement,—the scientific definition of the limits of the case. The whole question of the water supply of the Thames Valley must be placed in the light of an incontestable truth before any bargain can he made that would not be like buying a pig in a poke. Of course such an inquiry ie only a part of the general inquiry into the sources of the water supply of the kingdom. If the initiative, taken more than two years ago by his Royal Highness the Prince of Wales, had been followed out, if the recommended action arrived at by the unanimous voice of the conference on the subject of water supply, which met, in May, 1878, at the rooms of the Society of Arts, had received from the Government of the time the attention that it merited, we should now be in a position to talk of negotiating. Nay more, we might be in a position in which a central water authority might properly enter on its functions.

But to ignore this first necessity, or to commit the dnty of attending to it to the wholly improper care of a municipal board,—to attempt to do in detail what has first to he done in principle, and then to open to the world a free fight as to the transfer of the property of the water companies, may seem very well to a committee who only regard the wants of the metropolis, without any notion how these wants are to be met. But to any one who really understands the requirements of the case it is evident that it is a proceeding akin to that of a man who, being asked "Is it going to rain?" applies for guidance as to his reply to the first man that he meets in the street. The Committee are at sea in the matter, so they think that a new authority must necessarily be able to set them straight. That it may do so if called into existence at the proper time, and provided with the requisite information, we do not doubt. Let us understand first, to what sources are we to look for the water supply of London, not the next year, nor the year after, but next century and the century after. We must have a poor outlook for the prosperity of England if we think this question can be blinked. With this information sure, it will be comparatively easy to offer terms which the companies may, as advised, accept or reject. And then will be the point of time at which a well-constituted Water Board might advantageously be entrusted with the supply of the water service of London; such supply being only a case, though a very important one, of the general problem of the water supply of England.

SCULPTURE COMPETITIONS.

BY A SCULPTOR.

When we see the numerous appeals from, and the frequent reversals of, the judgments of courts of law, and when we notice the extreme opposition of political opinions, even among men of the highest standing, and of similar courses of training, we may not marvel at the diversity of views in regard to the lesser province of competition for public sculpture. Yet while so much less in extent, it possesses, in one respect, an importance peculiar to itself, inasmuch as the great durability of the materials of the art of sculpture may perpetuate its productions beyond the time that even the memory of important judicial decisions, or of the periodical contests of political parties may endure. Thus those who choose statues for the public may well bear in mind that they are not deciding for their own day alone, but for future years,—not only for themselves and those around them, but for generations to come. The permanence of the products of this art is apt to be less reflected on than it merits, or, possibly, those who have the selection of such works would pay more sincere attention to objects of such longevity. This would be for the better, for there is abundance of native talent in this country to execute anything that may be required of this art; and any shortcomings that may have arisen, or may occur, in our public memorials, are to be set less to the account of the artists than to that of those who control them.

Unfortunately for art in this country, there is but little demand for public sculpture, except in the form of portrait statues. A great and good man passes from among us, and, deprived of his presence, we seek to be supplied with a "counterfeit presentment" of him, which shall be as permanent as marble or bronze can render it, and at the same time be a record of our own affection for him, and of the regard and respect in which he was held at the time when he lived. Funds are collected for the purpose, and a committee is formed to apply them and carry out the views of the subscribers, and to obtain the best possible statue of him whose memory they revere. And then the question comes, how is this to be effected?

To use a familiar phrase, there seem to be "three courses open." The first of these is to apply to some one sculptor of repute, in whose competence to execute the work worthily there is full confidence; the second is to select a limited number of artists, and invite them to compete with designs; and the third is to announce a public competition open to all comers. Each mode has, perhaps, its advantages, and each, also, its unfavourable contingencies. We will take and consider these modes in an inverse order, the last first.

Without a doubt an open public competition recommends itself *primâ facie*. It seems so free and liberal. By its means every sculptor has a chance. There is nothing narrow in it, and a generous welcome is held out for the display of genius, from the youngest aspirant, and even from the lowest rank, and the most unexpected quarters. Without question, competitions of this wide and unfettered character are, at times, beneficial to national art and the profession of sculpture. Assuredly, on the other hand, they cannot justly be frequent, and they should not be called for except on occasions of magnitude and high importance, for the following reasons:—

Unless the prize to be competed for be of considerable monetary value, it is a serious hardship to the professors of sculpture to call on them to put themselves to such large charges, and so much occupation of time, as is entailed hy such a struggle for pre-eminence. And if the monetary profit of the prize to the successful artist does not equal the combined expense entailed upon all the other artists by the competition to which they were invited, by the amount of that difference is the profession a loser.

Let us suppose the number of sculptors responding to be thirty, and that is not an unlikely or exorbitant number, who might do so in answer to an unlimited invitation to prepare and contribute designs, including not less than three figures, arranged on a suitable pedestal, in competition for a public memorial. Just to give some definiteness to the idea, we may suppose one of the figures to be a portrait, and the other two emblematic, of which the models are not to be of less scale than 2 ft. high.

Now let us, as they would say on the other side of the Atlantic, "cipher it out." Each of

these competition models, carefully wrought out, will cost its producer, in labour and time, not less than 150*l.* Multiply this by the number of competitors, thirty, and the result is 4,500*l.*, which represents the outlay to the profession for competition models alone.

To repeat, as a mere debtor and creditor account as between the competition and the profession of sculpture, we see that the eventual profits of the successful competitor is all that represents the gain of the profession, as against the loss entailed by the preparation of the whole thirty designs, namely, the above 4,500*l.* Therefore, in this view, in order to justify such a competition being called, the actual profits of the successful competitor, or the money he has "home," after the execution of the memorial which is the result of his success in the competition, should at least equal that amount, or the profession is, as a body, by so much impoverished by a transaction, which, not improbably, by its promoters is viewed as being an encouragement to the fine arts.

The outcome of the consideration of these facts seems to be, that, as no sculptor can expect to realise for his genius, experience, and actual manipulation, more than cent. per cent. on his actual outlay on materials, assistants' wages, &c., which will be found to be the lowest rate at which he can exist, then no competition, such as above mentioned, can equitably be invited for a prize of less amount than double the above-quoted 4,500*l.*, which is the cost of preparing all the designs, namely, for a prize of not less amount than 9,000*l.*

This statement, as will be recognised, represents but the bare pounds, shillings, and pence debtor and creditor balance of account as between the promoters of the competition and the profession of sculpture, with no margin whatever provided towards liberality. So that, taking that into account, and what might be the general sentiment on a question of fine art, we may not be going too far in submitting that no competition, such as the one above described, could be consistently called by those possessing liberal views towards the fine arts, and at the same time cognisant of the bearings of the whole question, for a prize of less amount than 10,000*l.*

It is with some reluctance that we have put the above proposition into figures, for the necessary connexion of art with coin is not a grateful subject, but we see not any other way of making our representation so plain, and thus trust our readers will take in good part the mode had recourse to in the hope of doing so.

That sculptors of ability will occasionally enter into unlimited competition, involving outlay of expense and labour equal to that we have recounted, and with a less prize in prospect than we have quoted, is very probable. But, in respect to this, it must be held in mind that the invitation to such a wide competition, unaccompanied by an adequate guerdon of remuneration, is a taking advantage of the depressed condition into which this noble art has been brought of late years by the neglect of substantial support from our Government, the municipalities of our cities, and the public at large. In the conviction that there is a considerable lack of information in respect to the above bearings of unlimited competitions of the class we have described, we contribute these remarks towards their elucidation.

With these few words in relation to unlimited competition, we will pass on to consider, equally briefly, those which are limited; for which method there is this to be said, that this limitation is, at least in part, usually adopted with the good intent of lessening the amount of expense, and area of disappointment, to the unsuccessful competitors. At the same time, the promoters flatter themselves that this will not impair the likelihood of a satisfactory result, as, in their limited list, they propose to include the best names. It may be noticed, however, that this procedure is of the nature of a compromise, which may not be devoid of some characteristic disadvantages; for, in the first place, it is doubtful if the best men will compete at all; and in the second, it may be that the committee may not make choice of the most fitting persons to be invited.

However, this limited mode of invitation is the only form of this means of obtaining a statue which appears equitable in the case of a competition in which the prize is small. Say, for instance, for a single portrait statue, the funds for which are 2,000*l.*, and, in consequence, the profit of 1,000*l.* to the successful competitor being all he could hope to realise. In this case, also, the number invited should be proportionably limited, unless each of the artists is also to be separately and fully remunerated, or the expense to the profession may exceed the return, and an injury thus be entailed on it. It may be noticed that we are presenting chiefly the financial view of the subject, just because artists are somewhat sensitive in doing so for themselves.

However mitigated the hardship of competitions may be to the artist by their being limited, it still does not escape a certain aspect of lowering the grade and *status* of sculpture in comparison to other professions, to which there would be no attempt to submit a similar proposition, or, if it were done, with any chance of acceptance.

For instance, what, even limited, number of barristers would compete for a brief? or what even limited number of painters would compete, with studied sketches, for the commission to paint the portrait of a respected citizen for a town-hall or other municipal building? When architects and engineers compete, it is not unfrequently for a prize of thousands. But rewards on this scale do not fall to the lot of sculptors, who must be content to glean pence while other professions harvest pounds.

The third mode of obtaining a public statue is the one we mentioned first, as, indeed, it merits; for if the committee are competent to make a just choice of the most suitable man in the profession to design and carry out the work they have in hand, there are several advantages in their so doing. In the first place, it is the cheapest method; in the second, it is also the most speedy; and, thirdly, it does not put the profession of sculpture to needless expense, or waste of thought and time.

It not unfrequently, however, happens in committees on such subjects that there is such a diversity of opinion among the members themselves that there arises a great difficulty in fixing on an individual artist, and that the readiest way which occurs to relieve them from this embarrassment seems to them to be to announce a limited competition, including the principal names of the sculptors before them, and invite each of them to make a design of the subject of the memorial for the committee to select from.

In this case, however, we venture to suggest an alternative mode of coming to a conclusion. Let the committee choose their men, just the same as if for a competition by designs, and let them take especial care that they are all good men, and capable, each of them, to execute the work satisfactorily, if it fall to his lot to do so. We use the word "lot" advisedly, for it is by that means we suggest that the last step should be taken, and the selection concluded; and not by dragging several men of ability through a painful and expensive ordeal.

Whatever may be the advocacy of friends in respect to their especial artist, whom they may hold as the *facile princeps* sculptor of the day, it may be not unreasonably accepted that there are, at the present time, in the profession of sculpture in England, at least ten or twelve men of tried ability who are so nearly on a par in the capability of designing and completing a single portrait statue, to which subject we are at present confining our attention, that the chances are equal as to which would do it best. For obvious reasons we refrain from giving names, but none the less do we hold to our proposition.

In the case, then, of a limited competition being contemplated for the selection of an artist for the execution of a portrait statue, and twelve ten, six, or three sculptors, for instance, being named; instead of their being all called on to make designs, of which only one can be of any ultimate use, let their names, or numbers representing them, be put in a vase, and the fortunate one drawn out by some incorruptible means of perfect chance, which could not fall amiss, as all the names are those of competent sculptors.

The previous announcement of this mode of concluding the selection of a sculptor would possess this advantage, that the list, for Fortune to decide from, would include all the most highly considered names; for no sculptor, it may be taken for granted, could have any objection to his name being on the list, as he could be put to no useless trouble or expense, nor could the chance arise of his being placed below his fellows by the ultimate selection, as the prize would be allotted, not by the judgment of man, but by the *fiat* of Fate.

We submit this method as worthy of a trial. Further support might be presented for the suggestion, were we to go into, and display the conduct and results of some late sculpture competitions. Refraining, however, from this ungrateful task, we may, nevertheless, be allowed to legitimately draw the inference from the general feeling of dissatisfaction prevailing on the subject, that to some method of less hardship to the sculptors, and of better fruits to the art, and to the public, than has lately been in practice, recourse may well be had.

In rehearsal. What we submit amounts to this. Firstly, that, in the case of a public memorial of this nature, unless the sum to be applied to it reaches 10,000*l.*, no general open competition should be invited; and, secondly, in respect to memorials of less amount, if the committee be unable to agree on the one sculptor in whose hands the commission may be safely placed, and therefore contemplate a limited competition, either, provision should be made that each of the sculptors taking part in it should be fully remunerated for his design, or the alternative course we submit might well be adopted, namely, that the names suggested should, without further preamble or delay, be put into a vase, and one of the number selected, not by ballot, but by simple lottery.

THE TOPE OF AMRAVATI.

Persons visiting the British Museum during the past month must have been vastly puzzled at seeing the first landing of the principal staircase a scene of confusion, and a space covering nearly 100 ft. of wall set apart for ancient stonework or marble. Few supposed that the venerable slabs which are now being placed in order have been sculptured some fifteen hundred years ago; but to the initiated they give a singularly interesting picture of religion, life, and manners in Southern India about the fourth century of the Christian era. It used to be supposed that the Hindus had an early special knowledge of the lithic art, which they had cultivated in prehistoric times, but it is shown by Mr. James Fergusson that the Hindus borrowed the idea of using stone for architectural purposes from the Greeks in Bactria about 250 B.C. Previously to this their edifices, above the foundation, were wholly of wood; by degrees stone was introduced mixed with wood; then, about the Christian era, sculptured stones were employed solely for important architectural works; but the style was entirely original and not copied from that of the Greeks, though they possessed great lithic knowledge many centuries previously. Now the slabs which are being placed in the British Museum are singularly well carved into figures representing scenes in life, and exemplifying the religion of the people. When completed it will take its original name,—"The Tope of Amravati." But there is rather a singular history attaching to these ancient remains.

The word *Tope* simply means a "mound," and "*Amravati*" is condensed from the Hindu word *Amaresvaraparam*, meaning "City of the Immortal God." This ancient city was situated on the right or south bank of the Kistnah River, about sixty miles from its mouth, and nearly opposite its junction with the Mooni Air River. Mounds are very numerous there, generally supposed to be the sepulchres of the ancient inhabitants. The Tope first attracted the attention of Col. Mackenzie in 1797, when on a tour of duty in the district. It would seem that two or three years prior to this, the Rajah of Chintapilli, attracted by the sanctity of a temple, dedicated to Siva, under the title of "Amaresvara," determined to erect a city on the spot, and, on looking for building materials, opened this and several other mounds in the neighbourhood, and also utilised the walls of the old city of Durunacotta, which stood half a mile to the westward of the new city. Many of the antiquities perished in the process of removal, and large quantities of stone were used by the Rajah in building his new temple and palaces; but many sculptured slabs still remained *in situ*. These interested Col. Mackenzie so much that he subsequently communicated an account of them to the Asiatic Society of Bengal, and returning to the spot twenty years afterwards, when Surveyor-General of Madras, he employed all the means at his disposal during the two following years, to the elucidation of the principal temple, which he named *Dipaldinna*, meaning "Hill of Lights." The re-

sults of his labours were careful plans of the buildings and maps of the surrounding country, together with eighty very carefully-finished drawings of the sculptures. In 1840, Mr., afterwards Sir, Walter Elliot was Commissioner of Guntur, and he determined to follow up what Colonel Mackenzie had so well begun. He excavated a portion of the monument which had not before been touched, and sent down to Madras a large collection of sculptures, and made an official report of what he had done. The East India House, however, took no notice of his repeated reminders of the circumstances, but these sculptures were allowed to remain in an unsheltered enclosure, exposed to sun and rain, for fourteen years. At length some director, on looking over some old minutes, came across a record of these sculptures, and obtained a resolution ordering them to be forwarded to England. This order having to go through the ordinary slow routine, these ancient slabs arrived in London only in the year 1856. This happened to be at the very period when the Indian Mutiny was going on, and the directors had too much anxiety on other matters to bestow a thought on old marble or stone; more than that, this was just the interval between the death of the old East India Company and the establishment of the Indian Council. There being no room at the Indian Museum, the sculptures, after remaining at the docks for months, were stowed away in the coachhouse of Fife House, where they remained buried under rubbish of all kinds for several years.

There they remained till, in 1867, when Mr. Fergusson being asked to select some specimens of sculptures, in the India Museum, to be cast for the purpose of being exhibited in Paris in that year, recommended four slabs sent home from this Tope by Col. Mackenzie in 1819, as most suitable for this purpose. Having done this, he was not a little surprised when the attendant informed him that if "these were the kind of things he wanted, there were plenty more in the coach-house." And so it turned out. The whole of the Elliot collection were stowed away there. He consulted Dr. Forbes Watson, who was then in high authority in the India House, and with his zealous co-operation these interesting relics were brought out to the light of day, and in order that he might have an opportunity of explaining their value in an historical point of view, he had them all photographed to one-twelfth the size of the original stones, and this was done so exactly that the photographs could be pieced together almost as exactly as a builder could have done by fitting together the original stones.

Giving his own words, Mr. Fergusson says:—"With these materials I set to work to restore the building. Though I had considerable knowledge of other buildings, both older and more modern, I should not have succeeded but that among the sculptures themselves there were numerous miniature representations of the building itself, and its different parts, quite sufficiently correctly drawn to be recognised." With these aids he was enabled to assign the true place to almost every one of the 160 fragments the Indian Museum possessed. He thus obtained two elevations of the outer rail and one of the inner rail, of what is now known as the "Tope of Amaravati." Mr. Fergusson explains that a Tope is generally considered a place where the relic of some Buddhist saint was enshrined, or a mound erected in memory of some sacred event. This is surrounded with an inner and an outer rail, which are essentially the principal parts of the monument, and the mound which is inclosed may frequently be taken as subordinate to the rail, which thus practically may become the monument itself. Now, it is a fragment of the outer rail of the Tope of Amravati that he put together and made nearly complete, and it is the stones from which he took the photographs that are being erected in its original form at the British Museum. The fragments that are now being erected on the staircase are all that remain of six out of 120 pillars of which the great rail originally consisted, with portions of other subordinate rails, belonging to the same Tope. Nearly one-half of these is already in position, and workmen are busily occupied in supplying the remainder.

The credit of accomplishing this is entirely due to Mr. Fergusson, who, after his restorations were complete, exhibited them in Paris, with specimens of the marbles and 500 other photographs of Indian architectural subjects. During the long period he spent poring over these photographs he became familiar with their forms, and acquired a considerable amount of unexpected knowledge of ancient art and mythology, and he thought this knowledge was of sufficient importance to justify him in making it public. In pursuance of this object he exhibited the photographs, and read a paper on them to the Asiatic Society in London, in June, 1867. This lecture was afterwards published in the Society's Journal, but that by no means exhausted the subject, or sufficiently illustrated what he had learned from the ancient monuments. He therefore applied to the Secretary of State for India in Council for assistance to enable him to publish the whole of the photographs, with such explanations as might be desirable. Sir Stafford Northcote became his advocate, and the India Council granted permission and funds necessary for the publication of a quarto volume, entitled "Tree and Serpent Worship," which, in addition to fifty-three plates or photographs illustrating this Tope, contained forty-six plates devoted to the Sanchi Tope, a building of equal, if not greater, importance belonging to the first century of our era. This was accomplished in a comparatively short time owing to the unwearied exertions of the author, who remembered that "Colonel Mackenzie's collection" was allowed to slumber for fifty years before his work was made public. He therefore refrained from waiting for any subordinate extra information to be obtained from the East, and he produced a book of extraordinary interest, in which all the photographs were given, and their architectural history explained; but the high price at which it was published put it beyond the reach of the majority of readers. After the publication of the book, the marbles themselves were first exhibited in the Courtyard of the India Office, Whitehall. They were afterwards removed to the India Museum, South Kensington, whence they were sent, in the spring of the present year, to the British Museum, where they are now being arranged. It need hardly be added that they have suffered grievously from exposure to our climate, and by all these changes. They are, in fact, little more than ghosts of their former selves; but as it is now intended to protect them by glass, it may be hoped that their further decay is arrested.

FROM THE BANKS OF THE SEINE.

At this season of the year when, according to the stereotyped expression which we have all learnt to understand, Paris "is empty," the French metropolis is remarkably full, but of foreigners and provincials, wives and daughters on arm. As for the strangers proper, they can be easily detected, the English especially by their rapidity of movement; indeed, it is no wonder to the more steadily disposed that the impressions of what these travellers see should partake of that nebulous character which is, or appears to be, one of the chief results of the extension of modern travel, and which may explain perhaps in some fashion why it has become "good form" to be very silent when one reaches home on the incidents of one's outing. One hesitates to acquiesce in the enthusiasm of the theorists who picture the moral and material benefit to the world at large by the immense move which now takes place from country to country when the summer months commence. In the hasty manner in which travelling is done,—a gentleman with his family has recently gone round the world in seventy-five days,—it is impossible for even the quickest-eyed and most experienced traveller to really observe the peculiarities of the country or the people through which he may pass, still less is it likely that any estimate can be arrived at of the superiority or inferiority of certain points in the institutions, social or technical, of those countries over his own,—one of the capital points which should be observed in all travelling; and yet this superiority, and with it the inferiority, exists, and becomes strikingly apparent to the eye of the observant resident, even after only a short stay. To return to the emptiness of Paris, the strangers proper may for the greater part be placed, unfortunately, in the class of mere hurried sight-seers, who profit little to their country on their return; but among the number, and particularly among the provincials, more than one stranger in town is observing keenly all that he sees about him. More than one excellent country mayor or prefect bears back with him to his native place the strong impression of his visit, and the features he has observed; and before long we may trust to his rousing his worthy adjunots and co-citizens with some startling changes introduced from the capital. In spite of Paris forming so completely the centre of France, there swells in the red-ribboned bosom of more than one country town, as represented by its excellent mayor, the desire to show what the provinces can do. The result of his visit is soon seen in the amelioration of some institution such as he has inspected in the capital, or some public service more closely considered and set into better working order. Travel of this nature benefits both the individual and the nation. Would that more of our countrymen abroad than at present can be seen could be induced to understand the value of this method of travelling, which, had it been earlier practised, would not have led to the existing horror of the pleasure of real travel abroad being almost destroyed. Why need our own beautiful country be left when idleness, ill-health, or necessity for change leads to a desire to leave home? The statistics of the traffic between England and the Continent that occasionally find their way into the papers are certainly alarming to patriotic souls. England and Ireland suffer from the want of patronage; the Continent suffers from the undue pressure of hasty sightseers. Perhaps one of the chief advantages of lengthy travel or residence abroad—whether this feeling is acknowledged by all we know not—is the love and appreciation one feels on returning for the beauty and interest of one's native country, which one learns thus to more thoroughly understand; and as to what that country is, who that knows England but will admit that few more lovely spots exist in the wide world? Read or re-read, if you have not taken up the delightful volume since your youth, the "Sketch-book" of dear chatty Washington Irving, who saw "Rural England" over so many years ago, but just as it still exists, and described with the delightful enthusiasm of a foreigner who knew well, but at a distance, "the old country," to him almost the mother country. The time is rapidly approaching, if it has not actually come, when the seekers after the untouched charms of nature and of art will find in their own "nice little, tight little island" more of what they are in search of than here on the Continent.

A ramble from the banks of the Seine is a digression which can be excused at this season, when one finds oneself "left alone" in town, after being troubled by one's friends to name the exact spot of the world,—for it is only the world that satisfies us now,—which one intends to honour with one's choice. In reality there is quite enough to occupy the attention, and of food for reflection an ample store. The schools, for instance, have been breaking up for the holidays, and the traditional ceremonies and speechifying have filled columns upon columns of the newspapers. Among these speeches, Victor Hugo's address to the pupils of the "Society of Elementary Instruction" stands out prominently. The text of this oration, as the Americans would term it, and oration it certainly merits to be termed, has been published by the English press, but without sufficient notice being paid to the peroration, a noble piece of advice, one which contains counsel alike for young and old, and which to every good workman,—we all are workmen in some degree,—contains encouraging incitement to progress:—"Advance, let me not hesitate to repeat to my contemporaries, advance. Let no one spare his efforts. I repeat it, the effort of all composes the sum of progress. Let each do what he can. The immense Being will be content. He equalises the importance of the results before the energy of the intention. The effort of the humblest is as venerable as the effort of the greatest. Advance, march forward. Have in your eyes the light of the dawn. Have in you the vision of right, good resolution, firm will, and conscience, which is the great counsel. Have in you, and with this I terminate,—have in you those two things which are the expression of the shortest road of man to truth, rectitude of mind and uprightness of heart."

Almost on the same day, at no great distance from Paris, another interesting institution was closing its course of labours for a few weeks' rest. Amidst the more familiar and fashionable ceremonies of the numerous schools of Paris the quiet distribution of prizes at the "École Professionnelle," the Professional School of Ivry, passed by almost unobserved. But the simple ceremony had in it features which merit attention; among these the speech of M. Emile Laurent, of the prefectural council. In this

speech, M. Laurent told the origin and progress of professional instruction in France, the honour of commencing which he attributed to M. Pompée, the first director and organiser of the École Turgot,—one of the justly famous scholastic institutions of France, and which has served as a model to many other similar establishments throughout the country. M. Pompée was perhaps the first in France to put into practice the method of Pestalozzi on "lessons by things," long known in Germany and Switzerland, and now almost universally admitted over the world; to M. Pompée also can be traced a large extension of the teaching of drawing in the schools. The system which regulates the professional school of Ivry,—a good type of other similar establishments in France,—is of a marked modern character, based on the principle that all professional education to be complete must necessarily comprise two thoroughly distinct elements; in the first place, a general and preparatory education common to a certain number of professions; after this a special education confining itself to the acquisition or increase of the special knowledge necessary in the exercise of a determined profession. Whatever may be the profession the pupil intends to embrace, remarked M. Laurent, whatever be the time he passes at school, and whatever be even the necessity in certain cases to render simultaneous the technical education of the profession and general education, whether the workshop be in the school or the school in the workshop, according to the two methods attempted, distinct in their means, but concurring in the end to attain, those who direct these studies are daily more and more convinced of the importance, not to say the absolute necessity, of the preliminary course of study, at least simultaneously with the professional study and its calculated degrees of progression, constituting a certain superior culture, indispensable later on to each according to his walk in life. Our education, wrote M. Pompée, stops at the point where the apprenticeship commences. We do not wish the professional school to become merely a school of trades and professions in which the pupils learn to forge, to file, to saw, and to plane, &c. We wish to develop harmoniously the physical, moral, and intellectual faculties of the pupil, so as to make of him a man, and teach him all that is specially necessary to know, to make him an agriculturist, a workman, a manufacturer, or a tradesman. In other terms, it was M. Pompée's intention that the preparation for life, not alone the life and duties of a profession, but for every-day life, was to become the principle common to every species of future education,—a view which has been frequently expressed in the columns of the *Builder*.

The interests of hygiene, that burning question of the day,—one which is not destined to come up and pass away as a mere occupation of the hour,—are receiving fervent attention at the present moment. Many important questions connected with the practical applications of hygiene are still in a far from satisfactory condition, requiring examination and discussion. In this direction the congresses and meetings held from time to time render excellent service. This year we learn that the Third International Congress of Hygiene will be held in Turin, from the 5th to the 12th of September next. The first congress, it will be remembered, was held at Brussels in 1876, the second at Paris in 1878. The interest and importance of the consideration of hygiene and its practical application are rapidly being appreciated by every country. Individual research is active, and wonders may be expected from its results. The Turin congress promises to be no less brilliant than those held at Brussels and at Paris, through the activity of the senator Ferraris, the *sindaco* of the city, and Professor Pacchiotti, president of the Italian Society of Hygiene. The King of Italy has, we hear, promised to be present at the opening meeting of the congress. Special committees have been formed in each country, and here active steps are being taken that France shall be well represented, and already a number of well-known gentlemen have come forward with this object. Not only Paris, but Lyons, Bordeaux, and several other large cities of France are to be represented, as also a number of the societies specially interested in the progress of hygienic reform. What England has so far done we have not been able to learn; it is, however, to be hoped that she will not be unrepresented. She was the first country to take up seriously the great question of hygiene, and the world owes much to those who initiated it.

THE KENSINGTON NEW "TOWN-HALL."

The discussion which eventuated in the opening of the new hall in High-street, Kensington, by H.R.H. the Duchess of Teck on the 7th inst., with some trifling ceremony, commenced as early as 1872, when the Vestry were impressed with the belief that the offices accommodation available in the existing hall for carrying on the business of the Vestry was quite inadequate for these departments. Since then the continued growth of the parish, together with the increased work in the clerk's and surveyor's departments, consequent on the abolition of the contract system, and the Vestry undertaking the extensive works of scavenging, dust removal, street watering, and street lighting by the average meter system, necessitated the appointment of additional officers, and rendered extra office accommodation still more requisite. The work was carried on with considerable difficulty and inconvenience, in consequence of the staff of officers being scattered in four different places, viz., the Hall, Old National Schools, stables, Warwick-road, and the depôt, Pembroke-road. Four schemes then came before them,—(1) To alter the present building; (2) to build upon a piece of land on the north side of Kensington High-street over the railway tunnel; and (3) to purchase the site of the National Schools. As regards the first of these plans, the Vestry were advised that nothing short of an Act of Parliament specially passed for the purpose could give the Vestry a title to the present vestry-hall, or to any building that might be erected on the site of it (the parish churchyard), but as the Vestry had an undoubted right of user, and as it appeared the most economical course to alter the existing building, plans were prepared showing certain structural alterations with a view to adapting the hall to the increased necessities of the parish. A draft agreement, to be entered into between the Vestry and the vicar, churchwardens, and overseers of the poor was prepared, by which the proposed alterations were approved by all parties, and the special purposes to which the building might be applied, were set forth. On counsel's opinion being taken, however, certain difficulties arose, and the Vestry decided not to enter into the proposed agreement, inasmuch as the vicar, churchwardens, and overseers had no power to bind their successors.

The site over the railway was offered for the sum of 5,500*l.*, but a right, reserved by the railway company, to enter upon the land for the purpose of repairing the tunnel whenever necessary, was considered objectionable. For the site of the National Schools, the sum of 8,000*l.* was asked, and this the Vestry thought too high to be entertained, but in the year 1874 the Vestry offered 7,100*l.* for it. Two offers exceeding that of the Vestry were made, and some correspondence thereupon ensued between the Vestry, the trustees of the National Schools, and the Charity Commissioners. The trustees, preferring that their land should be used for public purposes rather than as a building speculation, accepted the offer of the Vestry, provided, that in case the land, or any portion thereof, should not be required, for the proposed hall and offices, the trustees should have the right of pre-emption; and the Charity Commissioners concurring, the purchase was completed on the terms mentioned.

The site thus obtained not being sufficient for the purposes required, the Vestry purchased some houses at the rear, No. 14, Church-court, for the sum of 700*l.*, and of No. 13, Church-court, for the sum of 1,000*l.* The site, therefore, was obtained for 8,800*l.*

In December, 1876, the Vestry, by public advertisement, invited architects to send in drawings for the proposed new hall and offices, and offered premiums of 100 guineas, fifty guineas, and thirty guineas for the designs selected as 1st, 2nd, and 3rd respectively in point of merit. In response, sixty-four sets of drawings were sent in, and were exhibited to public view for some weeks in the Old National Schools. The services of Mr. John Whichcord, F.S.A., were engaged for the purpose of advising as to the selection of the three best designs, and as to the probable cost of carrying them out, and to submit a report thereon. His recommendations, however, were not adopted, but the designs of the following architects were selected:—Mr. Walker, Messrs. Thomson & Davis, and Mr. Edward C. Robins. An extra premium was awarded to Mr. Frederick Mew, in consideration of the artistic character of his drawings.

The ground was cleared, and tenders were received for carrying out the work according to the plans prepared by the first-named gentleman, when the district surveyor examined the condition of the houses, Nos. 11 and 12, Church-court, adjacent to the property purchased by the Vestry, and condemned certain portions of the said houses as being dangerous, and notices were served by the district surveyor on the Vestry and the owner of the said premises to take down the party structure and walls, whereupon negotiations were opened with the freeholder and leaseholders of these houses with a view to the same being purchased and added to the site of the proposed new buildings. After a considerable amount of correspondence, the negotiations were brought to a satisfactory termination, and the property was purchased by the Vestry. A site was thus secured for the new hall and offices, having a frontage in Kensington High-street of 97 ft., a frontage to Church-court of a similar extent, and a depth of 110 ft. The acquisition, however, of the additional land rendered it necessary to alter the drawings originally approved. This was accordingly done, and on the 21st day of August, 1878, the Vestry finally approved the amended plans.*

Fourteen firms were selected and invited to compete for building the new hall and offices, according to the original plans, and each of them submitted a tender. The highest tender was 30,158*l.*, and the lowest, that of Messrs. Braid & Co., 23,850*l.*, which was accepted. Upon the alteration of the plans, it became necessary to re-open the question of the building contract, and an arrangement was effected with Messrs. Braid & Co. to amend their tender, so as to include the additional work to be carried out, and on the 30th day of October, 1878, the seal of the Vestry was affixed to a contract with that firm for the erection of the new hall and offices, according to the amended drawings, for the sum of 30,549*l.*

The total cost of the premises and land acquired for the site, and the building to be erected on it stood at that time thus:—

Freehold of National Schools	£7,100	0	0
Freehold of Nos. 11 and 12, Church-court	2,500	0	0
Leasehold interests in Nos. 11 and 12, Church-court	750	0	0
Freehold of No. 13, Church-court	1,000	0	0
Freehold of No. 14, Church-court	700	0	0
Contract for building new vestry-hall and offices	30,549	0	0
	£42,349	0	0
Deduct amount received for old materials of buildings	677	7	3
	£41,671	12	9

The ceremony of laying the foundation-stone was performed on the 12th day of December, 1878, by Lord Kensington, assisted by the Hon. & Rev. E. Carr Glyn, vicar of Kensington, Major-General Boileau, R.E., F.R.S., chairman of the building committee, and a large gathering of vestrymen and parishioners. The foundation-stone consisted of a block of Enderby granite, 4 ft. 1 in. long, 2 ft. 6 in. high, and 2 ft. 6 in. deep, presented by Messrs. Nowell & Robson.

In addition to the amount already stated, the furnishing, gas-fitting, &c., cost 3,223*l.*; the alterations and additions, including lifts, hydrants, counters, &c., are estimated at 700*l.*; the architect's commission, 1,777*l.*; the clerk of works, 350*l.*; legal and other expenses, 350*l.* The furnishings were entrusted to Messrs. John Finch & Co., of 45, City-road, and have met with the approval of the committee. The chandeliers, gas-fitting, and brass work, have been supplied by the local firm, Pardoe & Sons, Silver-street. Sugg's "Christiania" burners are fixed throughout the whole building.

The front elevation is of Portland stone, and includes a central pediment with attached columns, Corinthian pilasters, and the usual features of a front of that kind.

A spacious vestibule, not too light, extends from the front entrance almost to the rear of the building. On the ground-floor, at the right-hand side to the front, are the offices of the vestry clerk, consisting of large office for clerks, the cashier's room, and private office for Mr. Harding. At the east end of the office, adjoining the cashier's apartment, is a strong room,

* The Building Committee consists of Major-General Boileau, R.E., chairman; Mr. R. Freeman, Dr. Daniell, Mr. W. Boutcher, Mr. F. Radford, Mr. H. Smith, Mr. H. Liggins. The chairman of the Vestry is the Hon. and Rev. E. Carr Glynn, vicar; and the clerk of the Vestry, Mr. Geo. Capper Harding; Mr. Weaver is the surveyor.

intended as a day-room for books and documents while in use. The principal strong-room for the preservation of all parish documents, books, &c., is immediately underneath, and is reached by a flight of steps, affording direct communication between the two places. The vestry-clerk's private room is entered from the clerks' office. By a side-door the vestry-clerk will also have access to the council chamber and other parts of the interior. There is also in connexion with the clerks' department, a waiting-room for the public.

On the opposite side of the vestibule from the apartments just described, is a similar suite of offices for the surveyor and his staff. These have strong rooms and appointments similar to that of the clerk's department, with the exception of having drawing-tables instead of desks. Besides the communication by the main entrance and interior, there is a separate entrance to this department from Church-lane.

The council chamber occupies the north-east portion of the ground-floor, the entrance being near the rear of the vestibule. This is 57 ft. long, 30 ft. wide, and 19 ft. high, where the vestry meetings will in future be held. Accommodation has been provided for ninety vestrymen,—a larger number than usually attends. The furniture is of oak, upholstered in maroon morocco. There are three rows of benches along each side of the chamber, with other three across at the entrance. Behind the latter is a "bar," with brass slide or telescope, separating the floor of the chamber from a small space reserved as an auditorium for any of the parishioners who may desire to be present to witness the transaction of the parish business. At the opposite end is a raised table and desk for the chairman, with accommodation on either side for the respective officers. The east-end of the hall is ornamented by Corinthian pilasters, and three arched recesses. In the centre recess, immediately behind the chair, a bust of General Boileau is to be placed. The bust is by Mr. Brock, of Osnaburgh-street, Regent's Park.

Adjoining the Council Chamber is a cloak-room, with massive oak table, mirror, cloak-rails and umbrella-stand, the hatpegs being indicated by ivory numbers. Attached to the cloak-room is the lavatory, with hot and cold water.

On the opposite side of the vestibule from the Council Chamber are the offices of the Inspector of Nuisances and the Medical Officer of Health.

The staircase is on the left-hand side of the vestibule, lighted from the roof by stencilled glass, and also by a brass ten-light chandelier suspended from the centre of the glass roof. The effect of the staircase is damaged by the want of sufficient headway on arriving at the first landing.

The large hall occupies the entire length of the building. It is 91 ft. long, 46½ ft. wide, and 32½ ft. high. It is lighted by seven large windows fronting High-street, three in the west end, and by four semicircular lights in the north side, corresponding with the arched tops of the other windows. The lower windows are filled with plate glass, while the semicircular tops contain likenesses of gifted persons, either natives of Kensington, or who had long resided in the parish and identified themselves with its history. On the seven front windows in the following order are Charles James Fox, William Boyce (Mus. Doc.), Archbishop Whately, Her Majesty Queen Victoria, Earl Clarendon, Sir David Wilkie, R.A., Thomas Gray (the poet). In the three end windows are John Hunter, Addison, and Sir Isaac Newton; and in the four north windows are Thackeray, Wilberforce, Macaulay, and Lord Holland. Some of these, for example, the head of the Queen and that of Thackeray, are very unsatisfactory. At the east end of the hall is a series of Corinthian pilasters with alcoves, the latter being ornamented with shell pattern, inside of which is a cushion bearing the royal crown. A raised platform at the east end is capable of accommodating forty persons. It is made of pitch pine, panelled, and surrounded by a brass handrail. At the opposite end is a gallery, which can be entered either from Church-lane or from the main staircase. Gas-light is supplied by half a dozen brass chandeliers, each having six double branches, and bearing twelve lights. The hall is seated with Austrian bent-wood chairs.

Communicating with the large hall is an ante or waiting-room, and behind it is the supper-room. This is immediately above the Council chamber, and is the same size. The tables are made of pitch-pine, with folding-frames, which can be packed into a small space when not in use.

At the top of the building are apartments for the hallkeeper, and also a laboratory for the analyst under the Sale of Food Act. In the basement, which covers a large area, there is a good deal of accommodation, including the Gas Inspector's offices and a kitchen, which occupies a considerable space, and has communication to the hall by two separate lifts.

LINCOLN CATHEDRAL.

At a meeting of the Architectural Section of the Royal Archæological Institute, held at Lincoln, the Rev. Precentor Venables read a paper on "The Architectural History of Lincoln Cathedral." The following is a general outline of the architectural history of the fabric, and the approximate dates of its various portions:—The first cathedral of Lincoln was erected by Remigius, or Rémy of Fescamp, by whom the see was transferred, c. 1073, from the village of Dorchester, on the banks of the Thames, to the strong-walled city which had succeeded *Lindum Colonia*. The church was entirely completed by him, but it was not consecrated before his death, in 1093. Of Remigius's Church, the only visible remnant is the central and lower portion of the west front. The foundations of the apse, which formed the other extremity of the fabric, and of a portion of the side walls of the Norman Presbytery still exist beneath the stalls of the present choir. Remigius's unadorned façade is broken by three deeply-recessed arches, reaching its whole height. The two lateral recesses still retain their circular arches and plain unmoulded profiles. The arch of the central recess has been removed, and the whole recess raised and finished with an Early English pointed arch. These deep cavernous archways are flanked with smaller apsidal recesses, which occur again on the north and south flank, though no longer visible from without in consequence of the erection of the flanking chapels. There can be no doubt that Remigius intended his west front to be finished with a pair of towers, as at present. These, however, were probably raised no higher than the roof on his death, and it was left to "Alexander the Magnificent" to complete them, in the general repair of the Cathedral carried on by him after the fire of 1141, in which he vaulted the whole church with stone. Alexander attached to the faces of his towers gables richly ornamented with intersecting arches, two of which remain on the north and east sides. Those which finished the western façade, as well as that which crowned the central recess, were removed when the front was heightened, but the weather mouldings of the two latest gables may still be traced on the wall within, behind the Early English screen. The three magnificent Transition Norman portals of the west front are also ascribed to Bishop Alexander, though it is fair to say that the late Sir G. G. Scott deemed that of the north aisle somewhat later. The remains of the works, both of Remigius and Alexander, are but small. Lincoln Cathedral, as we see it, is almost entirely a work of the Early English style, and it is invested with a peculiar interest, by its being the earliest dated example of that style. The foundations of the present choir and eastern transepts were laid by Bishop Hugh of Avalon, in 1192, and these portions of the new fabric, together with part of the eastern side of the great transept, were erected before his death in 1200. The transept was completed, the central tower raised, and the nave and chapter-house built during the episcopate of his successors, William of Blois, 1203-1206, and Hugh of Wells (the brother of Bishop Jocelin, the builder of Wells Cathedral), 1209-1235. To Bishop Grosseteste, 1232-1253, may be assigned the completion of the west front and the rebuilding of the central tower, up to the base of the great belfry windows, after its fall in 1237. The Presbytery, or Angel Choir, to which, in the words of the late Mr. Sharpe, "it would be difficult to find a parallel in refinement and elegance, as well as in the delicacy of finish of, its minutest details," was built in the latter half of the thirteenth century, to receive St. Hugh's shrine, and to accommodate the concourse of votaries that his reputation for sanctity collected. It was commenced soon after 1254, when the dean and chapter applied for the Royal licence for the removal of the city wall, to enable them to lengthen the church, and it was ready for the translation of St. Hugh's relics in 1280. The cloisters were erected through the instrumentality of Bishop Oliver Sutton, 1280-1300. The upper story of the central tower was begun under the patronage of Bishop Dalderby, March 14, 1307, and it was ready for the hanging of the bells in 1311. The south gable of the great transept, with its rose window, is assigned to Bishop Burghersh, 1320-1342. The vaulting of the central and two western towers, the stall-work of the choir, and probably the western windows, were the work of Treasurer John of Welbourne, who died in 1380. The western windows are usually attributed, on the authority of Leland, to Bishop Alnwick, 1436-1449, but they are decidedly of an earlier date. The upper stories of the western towers were, no doubt, the next work executed. There is no record of their erection, but they cannot be very much later than Treasurer Welbourne's time, c. 1400. The three chantry chapels added to the aisles of the choir were erected respectively by Bishop Fleming, d. 1432, Bishop Russell, d. 1480, and Bishop Longland, d. 1521. The principal works of the cathedral may be classed under the following heads:—

Norman Period, A.D. 1066-A.D. 1145.—West front, central part (Early), commenced c. 1075; font (ditto); west front, circular arcade (Late), c. 1140; ditto, lower part of two western towers (ditto), c. 1140; ditto, central doorway (ditto), c. 1143.

Transitional Period, A.D. 1145-A.D. 1190.—West front, north and south doorways (Early), commenced c. 1148.

Lancet Period, A.D. 1190-A.D. 1245.—Eastern transept (Early) commenced c. 1190; choir (ditto), c. 1190; central transept, east side (ditto), c. 1200; central transept, west side (Middle), c. 1215; nave, with north and south chapels (ditto), c. 1220; west front, upper part, and north and south wing (ditto), c. 1125; chapter-house (Late), c. 1225; west porch of south transept (ditto), c. 1220; crossing and central tower, lower part (ditto), c. 1235; two west doorways of choir aisles (ditto), c. 1240.

Geometrical Period, A.D. 1245-A.D. 1315.—Retro-choir with south porch (Early), commenced c. 1256; north, south, and east screens of choir (Late), c. 1280; Easter sepulchre (ditto), c. 1290; cloisters and passage (ditto), c. 1295; central tower, upper part (ditto), c. 1307.

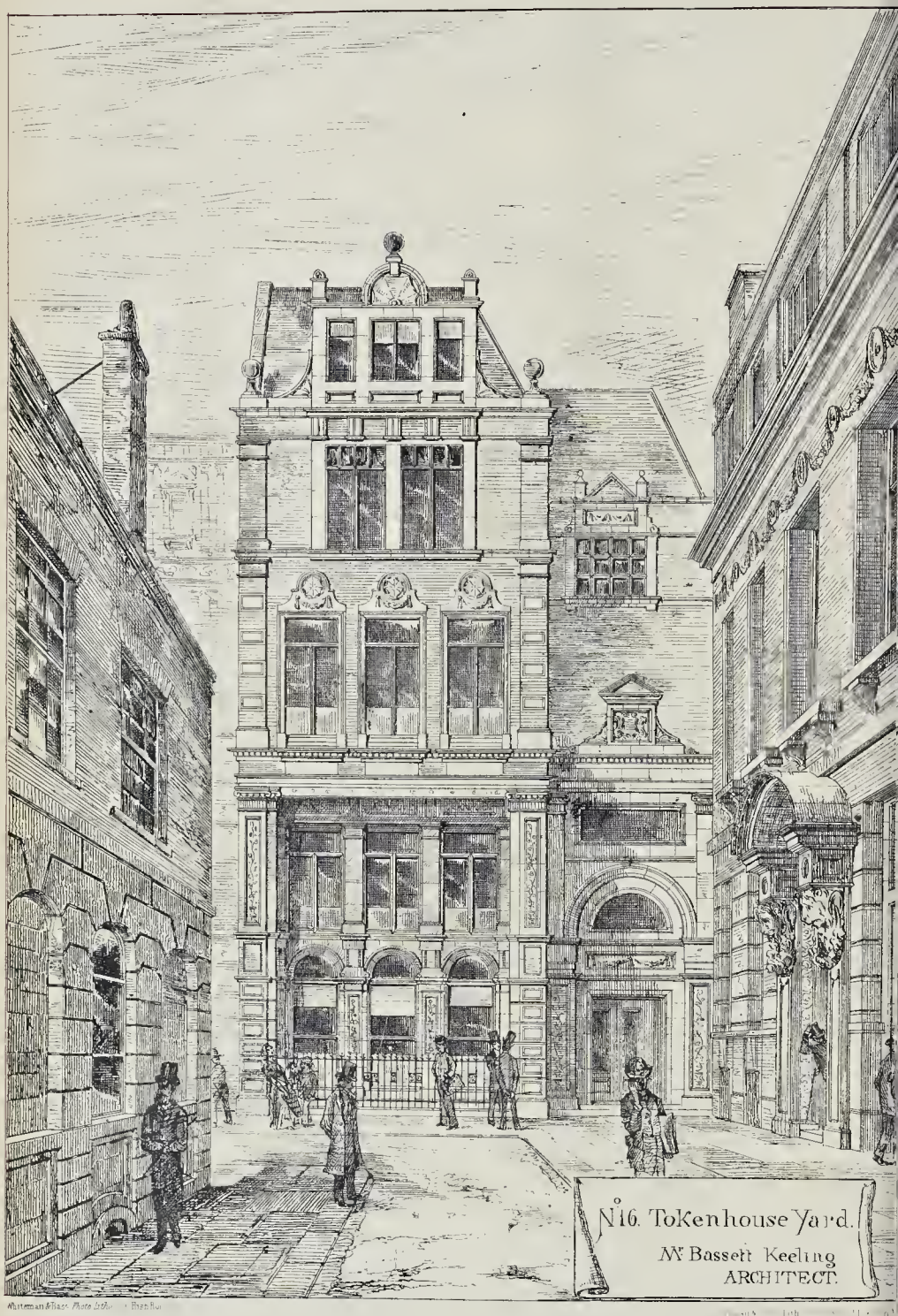
Curvilinear Period, A.D. 1315-A.D. 1360.—South transept, south end (upper part), commenced c. 1325; parapets of west front, nave (south side), and south transept, c. 1325; screen in south aisle, c. 1325; monument in retro-choir (Burghersh) (Late), c. 1356.

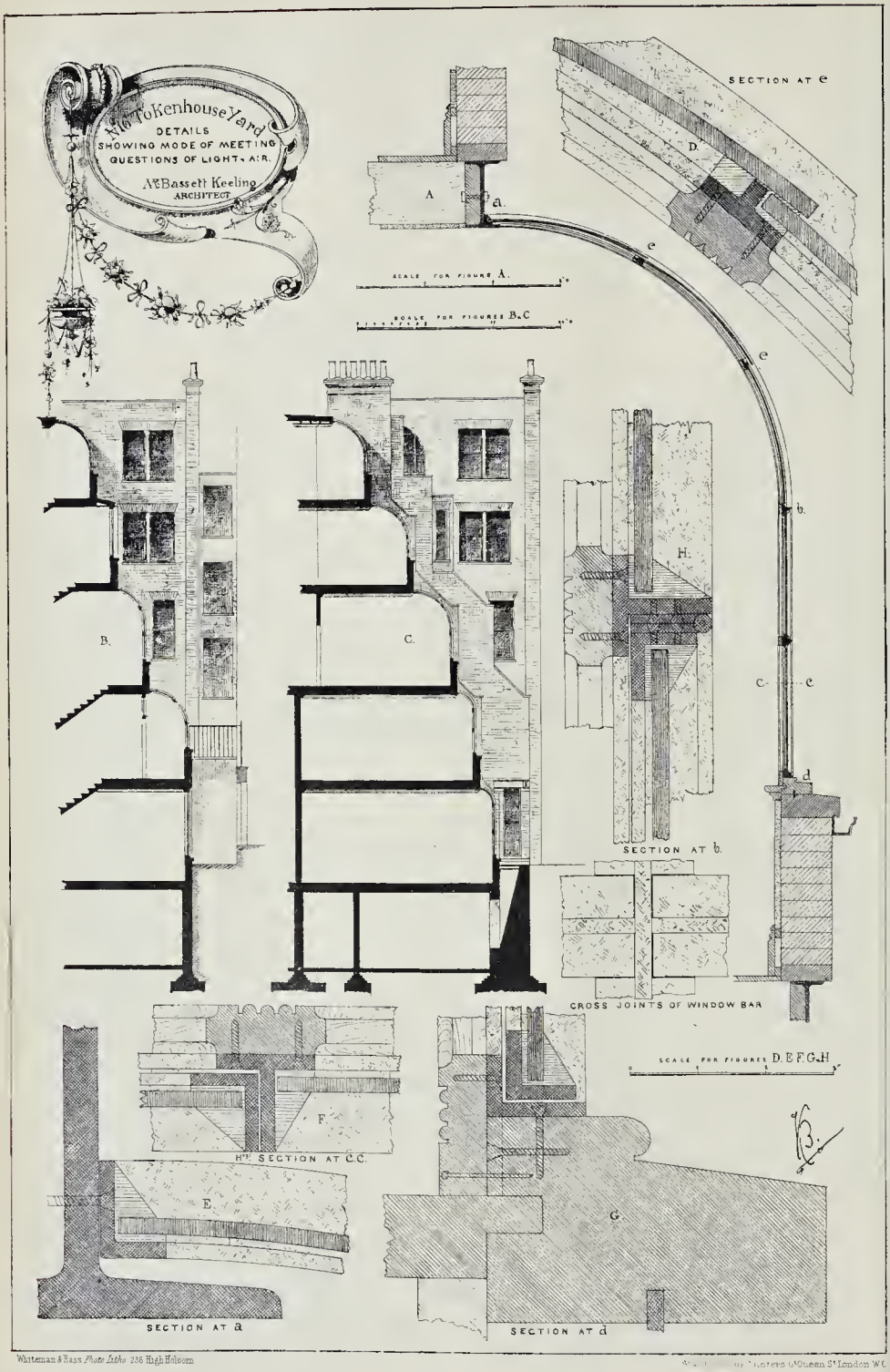
Rectilinear Period, A.D. 1360-A.D. 1500.—West towers (interior of lower stage), commenced c. 1365; monuments (Bishop Fleming), c. 1432; west towers (upper part), c. 1450; west windows of nave and aisles, c. 1440; parapet of west porch of south transept, c. 1450; screens of chapels of north and south transepts, c. 1450; chantry chapel on south side of retro-choir of Bishop Russell, c. 1480; ditto of Bishop Longland, c. 1521.

It will thus be seen that every portion of the history of English architecture is illustrated in this remarkable building; but more especially that part which belongs to the Lancet and Geometrical periods. The Rev. Precentor, at the close of his lecture, expressed his great regret that, in consequence of the melancholy circumstance of the sudden death of Mrs. Blakesley (wife of the Very Rev. the Dean) that morning, it was impossible for him to fulfil his engagement to take the party round the cathedral and describe the building.

THE CAMBERWELL AND PECKHAM IMPROVEMENTS.

The important and costly improvements in the Camberwell and Peckham main thoroughfares, for which the Metropolitan Board of Works some time ago obtained Parliamentary powers, are about to be commenced. The improvements consist of the widening of Camberwell-road, Church-street, Camberwell, and High-street, Peckham, at different points, and involve the compulsory purchase and demolition of upwards of two hundred houses and shops in the thoroughfares named, for which a very heavy amount of compensation has to be paid. The widening of High-street, Peckham, is to be the first proceeded with, and on Tuesday Messrs. Horne & Eversfield sold the materials of a large number of business premises there, which are now being taken down in order to carry out the work.


No 16. Tokenhouse Yard.
Mr Bassett Keeling
ARCHITECT.



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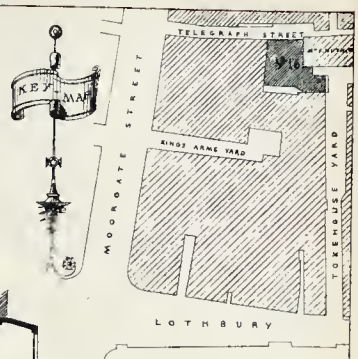
THE NEW PALACE OF JUSTI

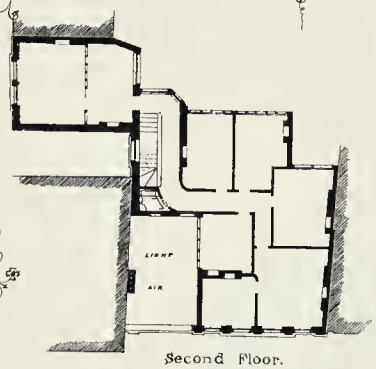
LS.——M. POELAERT, ARCHITECT.

No. 16 Tokenhouse Yard.

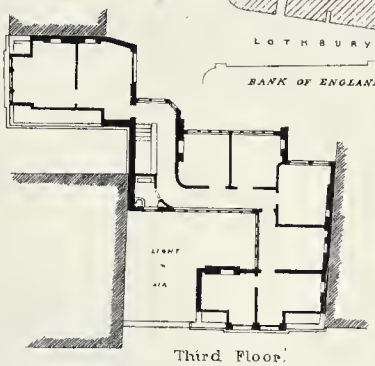
PLANS OF THE SEVERAL FLOORS.

Mr Bassett Keeling
ARCHITECT.

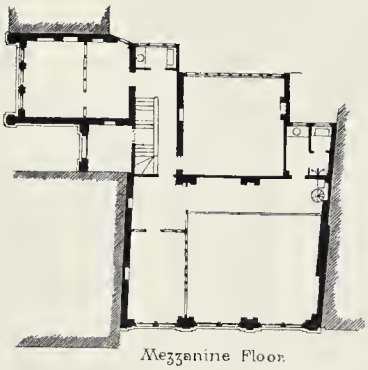




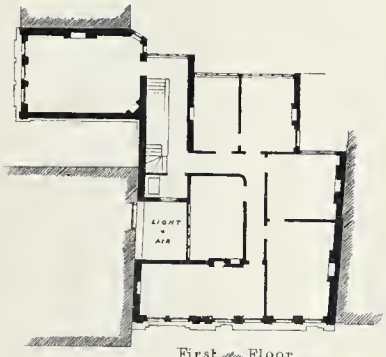
Second Floor.



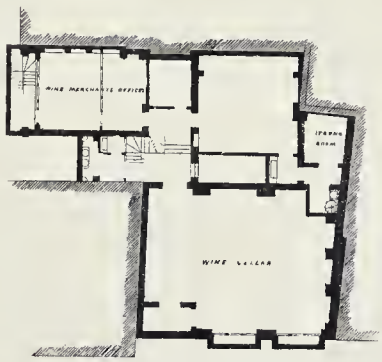
Third Floor.



Mezzanine Floor.



First Floor.



Basement Floor.

Ground Floor.

SCALE 16 FEET TO 1 INCH.

Whiteman & Bass *Photo-litho* 236 High Holborn

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THE NEW "PALAIS DE JUSTICE," BRUSSELS.

Brussels, with its ordinary great attractions supplemented hy the interesting National Exhibition now open there, will doubtless he visited by many of our readers during the coming holiday-time. There are many town-improvements, too, and new buildings now to be seen there, and among the latter none will impress the visitor more than the Palace of Justice, which is getting on towarde completion, and dominates the city. Some nineteen years ago designs for this building were invited in competition, and premiums were awarded to three of the competitore, two Belgian architects and one English firm. In our volume for 1862 (xx., pp. 333, 387, 388), some particulars will he found, with illustrations of the design hy the English competitors. Thie competition, however, produced no result, none of the premiated architects having been employed, and great diesatisfaction with the course pursued on the occasion wes expressed at the time.

The building actually erected is from the designs of M. Poelaert, architect, and we give a view showing its general appearance. It is situated in the elevated part of the city, towards the extremity of the south-east. The Waterloo Boulevard, one of those which form the exterior enclosure of the city, passes close to it. A number of unhealthy houses and a manufactory of chemical products were destroyed in preparing a site for it, and the sanitary condition of one of the old quarters of the capital hae thus been materially improved. The building is placed upon a declivity, so as to involve, especially on one side, next the Rue des Minimes, tbo level of which, as shown in our view, is more than 50 ft. below it, flights of etepe and inclined planes, that materially increase tbe grandiose effect of the whole. The area occupied hy the building itself is about two hectares and a half, and the *place* in which it stands, the flights of steps, and other approachee, occupy about as much more. In form it is nearly a square, the depth being rather more than its width,—that ie, one is 200 mètres, the other, at its widest part, 170 mètres. The palace containe a grand central hall, or *Salle des Pas-Perdus*, and eight conrte of varying sizes, and on different levels, in consequence of the irregular nature of the ground; to meet the difficulties of which great ingenuity hae been shown both within and without. The grand hall is an immense apartment, and the interior of the palace generally includes some remarkahly fine architectural effects.

The foundations, which, in consequence of the difference in level between the site of the building and the Rue des Minimes, were necessarily very considerahle, entailing an expenditure of 60,000*l.*, were commenced in 1866. The worke for the building proper were contracted for in 1869.

LONDON COMMERCIAL BUILDINGS.

PROVISION FOR ANCIENT LIGHTS.

The block of property, No. 16, Tokenhonse-yard, Lothhnry (of which we give four illustratione in our present number), is nearly approaching completion, and will he ready for occupation hy the end of September.

The huildinge demolished to make room for the new structure, were at one time the headquarters of the notorious Royal British Bank, and for the last twenty-one years were the offices of Messrs. Turquand, Youngs, & Co., the eminent liquidators and accountants.

The new building containe, on the basement, extensive fireproof wine-cellars, with a goode entrance only in Telegraph-street, the office and counting-house heing under the Tokenhonse-yard front, with access either down the steps in the area, or through the ground-floor entrance.

The remainder of the basement is ahsorbed by strong-rooms, book-rooms, and lavatories, &c., in connexion with the large chamher on the ground-floor of the Telegraph-street portion. This room hae a floor-area of over 1,200 ft., by a height of over 20 ft., admitting of a mezzanine floor over a certain portion, which can he reached by the spiral staircase communicating with the basement, or hy the principal etaircaee.

Thie portion of the building ie designed to meet the requirements of a hanking, insurance, or financial company, having manager's, board, and waiting rooms, strong-rooms, book-roome, and private lavatories, and accommodation for about thirty olerks in the general office. Tbe remainder of the huilding is arrenged in snitee of offices, of which there are thirty-five roome, exclusive of the basement and the bank.

The whole of the hack elevations are faced with white glazed bricks. Tbe two fronte ere of Portland end Corsehill red eandstone to the height of the first floor, and above the red stone is kiln-burnt red hrickwork.

Important questions of rights of light have necessitated the exercise of considerable ingenuity in the arrengement and conetruction, and of which some details are given in the illustration, es they may prove suggestive in other caeee.

The huilding is constructed throughout in the most suhstantial manner, and the finiehing and fittings will also be of the beet description. All the rooms, paesagee, closets, and the stairoase will he well lighted end ventilated, considering the natural difficultiee of the site and its surroundings.

The general contractors are Messrs. Charlee Aldin & Sons, of Queen's-gate Gardens. The wrought ornamental ironwork is hy Messrs. Welle & Co.; the parqnet and mosaic floors are by Mr. J. F. Ebner. Tbere is no clerk of the works; the foreman for the contractors is Mr. Davis, and the arcbitect is Mr. Bassett Keeling, of Weavers' Hall.

SOUTHWELL MINSTER.

In connexion with the Lincoln meeting of the Archæological Inetitnte, an excursion was made on the 31st ult. to Southwell Minster, where Mr. Ewan Christian, the architect under whose direction tbe reetoration works are being carried out, undertook the office of guide to the party. He said it was his intention to replace upon the nave towers the epires whicb had originally existed there, and to raise the roof of the nave to its original pitch, leaving it open ineide. The stone floor was a matter of considerahle interest, ae he had no doubt whatever but that it remained till the present day in the same condition as when it was first laid down, and instead of being on the level it sank to the eastward, the library floor at present being 3 ft. 6 in. above the level of tbe old floor, while tbe floor of the choir rose, though very slightly, from west to east. It was his intention to maintain the Decorated window in tbe west end over tbo nave door. It was not strictly in character with the Norman work which properly helonged to the huilding, hut much of this Decorated work had been introduced in times past, and he did not think it wise to extirpate it altogether. The roof had been a vexed question, hnt he did not think it prohable that there had been a flat ceiling; and a portion of the ceiling next the central tower was pointed ont hy him as an instance of how the work ought to stand. He also stated that it wae his intention to retain the lantern at the west end, though, of conrse, the window in the reverse side from which it took its name would he closed hy the raised roof. Passing round to the north porch he next called attention to the door, which was not constructed upon ordinary principlee. Instead of the panels heing framed as they would he hy a modern joiner, tbey were hewn out of the eolid wood. Some Perpendicular windows in the nave, dating ahout tbe fifteenth or eixteenth centnry, had been taken out before he had anything to do with the huilding, hut he did not intend to remove any more. They were not in accordance with the original work, hnt they were good of their kind, and were of interest as illustrating the history of the Chnrch. In the transepts he pointed out that there could be no donht about the ceiling in this part of the minster; it should he flat, and he had determined to have it eo. There was evidence also of two eastern apses having existed in this part of the huilding, but the arohways which had connected them with the transepts were now hlooked np. Tbe library, he said, he was going to clear out and reetore to its proper level, also returning it to its old uee as a chapel, and placing the new library ahove. While here he exhibited a remarkably fine and accurate sketch by Turner of the chnrch before the fire, and said that on comparing what was left of the old work with tbe sketch, he found the latter so accnrate in these partioulars that he had arrived at the conclusion that it was equally accnrate as to what had been destroyed, and he had been confirmed by it in mnch of the restoration work which he had determined to execute. The sketoh showed spires on tbe western towers, though none on the centrel tower; a high-pitched roof on the neve, a high-pitched roof on the chapter-house, and many other things whioh he had imagined, before he saw it, must have existed, and of which he was now fully persnaded. In the choir he indicated the signs of the enlargement which had teken place there, as chiefly to be eeen in the difference of the colour of the stone; and then, pointing to the screen, declared it was a lovely bit of work, and nothing would induce him to alter it. One of the members of the Society observing that one of the best-known architects of the preeent day had thought differently, Mr. Christian said he must defend Mr. Street from that. Whet he had said was, that he wonld not hesitete to remove the screen if it were necessary for tbe purpose of public worship; hut even in that he differed from him. Much had been eeid about the removel of the screens which formerly stood along the eidee of the choir. They had not heen removed without the most careful consideration. He had thought of the matter for two or three years before he fully made up hie mind, and he had been finally determined to remove them only by the question of light. If the screens had been allowed to remain, the lower windows wonld be rendered nseless, and the only means of light wonld be from the small windows placed high up in tbe clearstory; eo that the building would not be eeen at all on an average day. He should say, however, tbat when the ecreene were taken down they turned out to be the most patched up and worthless thinge that he had ever seen; so that he was perfectly content with what he had done. Before leaving the choir he pointed out certain small defects in the ancient work, and observed that when the old architects had made a mistake they did not pull the huilding down again, bnt heantified the mistake; in this case they were disguised if not concealed by ornamentation. Tbe chapter-house was the last part of the minster visited, and attention was chiefly called to the carving of the capitals, which is singularly good. Leaving the church hy the south door, Mr. Christian pointed ont tbe framework of his new epire, which was ready to he hoisted to its place on the top of tbe more eonthern of the two smaller towers. He said objection had been made to it on account of its weight, hut it would only weigh 30 tons when complete. He conld put 30 tons on top of a 2-ft. wall, and if he could not pnt it on top of a tower with walls 4 ft. 6 in. thick it was a curious fact. In making a hasty tour of the exterior, Mr. Christian pointed out the excellence of the workmanship everywhere save in the matter of the foundations. The architecte of the period when the church was hnilt had not believed mnch in foundations, the conseqnence being that some years ago fissures commenced to form in the gable of the choir, which necessitated ite heing etrapped. He observed that it would he a very great improvement if he conld pnt a high-pitched roof upon the choir, but he did not ventnre to propoee it, heoause such a roof would rnn eo far up the centre tower as to dwarf the effect of the latter altogether. He intended, however, to pnt the original roofs on the two chapels in the ohoir, and the original conical roof on the chapter-house. Lastly, he conducted the party to the north-west corner of the churchyard, whence Turner mnst have taken the sketch which had been shown.

DWELLINGS OF THE POOR.

The Committee on this snbject appointed by the Charity Organieation Society took up a Report to the Council at the end of last month, but the nnt had been too hard to crack, and the Council eimply came to a reeolution, "That the Report he received as a preliminary report of the Special Committee, bnt that the Committee be reqnested to continue their sittings for the purpose of preparing and presenting a further report." Some eingnlar miscalculations as to the aserted cost of sites obtained under the Artieans' Dwellings Act were set fortb in the Report.

Newcastle Society of Antiquaries.—At the last monthly meeting of this society, Mr. John Clayton read a paper entitled "Further Observatione on Centurial Stonee," in which he replied to some strictures on a paper on the eame subject read before the society in May last.

"OUR ANCIENT MONUMENTS AND THE LAND AROUND THEM."

In the work published under this title,* Mr. Chas. Philip Kains-Jackson gives an account, more or less illustrated, of the various antiquities scheduled in the Ancient Monuments Bill. It is well calculated to increase the interest with which these important vestiges of bygone times are regarded, and to contribute to their reverential preservation. Sir John Lubbock has contributed a preface, a reprint of which in our columns will serve the common cause:—

"The principal sources of the remarkable progress which of late years has been made in the science of prehistoric archæology have been,—

1. The riverdrift gravels.
2. Caves and rock shelters.
3. Shell mounds.
4. Lake dwellings.
5. Tumuli.
6. Megalithic monuments.
7. Fortifications and ruined dwellings.

Of these the last three are dealt with in the present work.

The riverdrift gravels, perhaps, present the most conclusive proofs of the great antiquity of man. The existence of the human race is proved by the presence of rude, but unmistakable, stone implements, and by fragments of bone; the contemporaneity of which with the gravel itself is proved by their identity in colour and condition; while the antiquity alike of the implements, of the bones, and of the gravels, is proved by the presence and nature of the extinct animals, by the changes in climate, and in the physical conditions of the country, which have taken place since the period of their deposition.

The remains found in caves and rock shelters (though doubtless in many cases of great age) offer, perhaps, less conclusive evidence of the lapse of time, though, on the other hand, from the more perfect condition and varied nature of the objects found, they throw more light on the social condition and habits of our predecessors. The shell mounds of Denmark bring us to a somewhat more recent, though still very remote period. They consist of shells gradually accumulated by a race of men who lived principally on the produce of the sea, though partly also by the chase. The lake dwellings of Switzerland have proved even more instructive. Remains of lake villages have been found in our own country, but they are far less extensive than those of Switzerland, and are not in need of Parliamentary protection.

The last three classes, which form the subject of this work,—tumuli, megalithic remains, and ruined dwellings and fortifications,—are, alas! rapidly disappearing. They are, indeed, seldom destroyed to serve any important purpose, but are utilised as manure, road metal, or building material, or perhaps levelled merely because they impede the plough.

Surprise has frequently been expressed that we have confined ourselves in the Ancient Monuments Bill to monuments of this character, and have omitted ancient castles, abbeys, and other similar remains. On consideration, however, it will, I think, be felt that Mediæval monuments require to be dealt with in a different manner. In the first place, the expense would be much greater, and ought to be borne partly by local funds and individual liberality; secondly, as repairs would from time to time be required, questions of style and taste would arise with which no central Commission could, I think, satisfactorily deal, and as to which local opinion ought to be consulted.

Some archæologists are of opinion that we have proofs of the existence of man in Europe at a time anterior to the Glacial epoch, and even in Miocene times. For the latter view the evidence is, in my judgment, as yet very inconclusive. On the other hand, it is, I think, more than probable that the advent of the Glacial Period found man already in possession of Europe. There is still, however, much difference of opinion among archæologists on this point.

From the careful study of the remains which have come down to us, it would appear that Prehistoric Archæology may be divided into four great epochs.

I. That of the Drift, for which I have proposed the name 'Palæolithic'; when man shared the possession of Europe with the mammoth, the cave-bear, the woolly-haired rhinoceros, the Irish elk, and other extinct animals.

II. The later, or polished, Stone Age, for which I have proposed the name 'Neolithic'; a period characterised by beautiful weapons and instruments, made of flint and other kinds of stone; in which, however, we find no trace of the knowledge of any metal, excepting gold, which seems to have been sometimes used for ornaments. For these two periods I suggested in 'Prehistoric Times' the terms Palæolithic and Neolithic, which have since been generally adopted.

III. The Bronze Age, in which bronze was used for arms and cutting instruments of all kinds.

IV. The Iron Age, in which that metal had superseded bronze for arms, axes, knives, &c.; bronze, however, still being in common use for ornaments, and frequently also for the handles of swords and other arms, though never for the blades.

Stone, however, was used for certain purposes, and by the poor not only in the Bronze but even in the Iron period. We are reminded of the use of stone for cutting instruments by the word chisel, the German 'kiesel,' a flint; from which many English place-names are derived, as Chiselhurst, Chiselbury, the Chesil Bank, &c.

In the first or Palæolithic period, the inhabitants of Europe were a rude race of fishermen and hunters. They clothed themselves in skins. Their implements and weapons were made of wood, bone, horn, and stone; the stone implements being rudely, though skilfully, chipped out, but never ground or polished. There is no evidence that the use of pottery was known. Even at this early period Europe was occupied by two distinct races of men.

In the Neolithic period the stone implements are in many cases ground or polished. The hatchets, even when unground, belong to different forms from those of the earlier period; but some of the simple types of stone implements, such as flakes, belong to both periods. In this period man had made considerable progress: he had invented pottery, domesticated the dog, ox, sheep, goat, and pig; he had commenced agriculture, and made for himself rude coverings of woven flax.

The Bronze Age is characterised, as its name denotes, by the use of bronze for cutting purposes, though stone also was by no means relinquished. The pottery is better. Gold, amber, and glass, were used for ornamental purposes. Coins and letters were still unknown.

In the Iron Age the use of that metal superseded that of bronze for cutting purposes. Silver, lead, and zinc were discovered, and letters were invented. At the dawn of history we find Europe already in the Iron Age; with traditious, however, of the earlier periods.

None, I think, of the monuments scheduled in our Bill, nor any of a similar character, either in this country or elsewhere, can be referred to the first period. No bones of a mammoth, of a rhinoceros, or any other extinct animal, not even of a reindeer, have ever been found in any tumulus or dolmen in England,* or in the West of Europe, for it is hardly necessary to say that the representations of the elephant found on some of the Scotch sculptured stones certainly do not refer to the mammoth.

But if our tumuli cannot be ascribed to the Palæolithic period, there can be no doubt that many of them belong to the Neolithic Age; some, on the other hand, are certainly as recent as Saxon times; but from the character of the remains found in them I am disposed to refer those which cluster round Stonehenge or Avbury, and consequently those monuments themselves, to the Bronze Age.

The tumuli, menhirs or standing stones, dolmens or stone chambers, stone circles, and stone rows or avenues, may all, I think, be considered as part of one common plan. The great majority were tombs. Some, no doubt, are memorial monuments; some were temples; but the idea and plan is still that of an interment. We may regard a perfect megalithic interment as having consisted of a stone chamber, communicating with the outside by a passage, covered with a mound of earth, surrounded and supported at the circumference by a circle of stones, and in some cases surmounted by a stone pillar or 'menhir.' Sometimes, however, we find the central chamber standing alone, as at Kits Coty House, near Maidstone, which may or may not have ever been covered by a mound; sometimes, especially, of course, where stone was scarce,—we find the earthen mound alone; sometimes only the menhir. The celebrated stone avenues of Carnac, in Brittany, and the stone rows of Avbury, may, I think, have been highly developed specimens of the entrance passage; in Stonehenge and many other instances, we have the stone circle. In fact, these different parts of the perfect monument are found in every combination and in every degree of development, from the slight elevation, scarcely perceptible to the eye,—excepting, perhaps, when it is thrown into relief by the slanting rays of the setting sun,—to the gigantic hill of Silbury; from the small stone circle to the stupendous monuments of Stonehenge or Avbury.

Even now, the northern races of men live in houses formed on the model of these tombs. Having to contend with an Arctic climate, they construct a subterranean chamber, over which they pile earth for the sake of warmth; and which, for the same reason, communicates with the open air, not directly, but by means of a long passage. In some cases, tumuli, exactly resembling these modern houses, have been discovered. At Godhavn, for instance, in Sweden, such a grave was opened in 1830, and the dead were found sitting round, each with his implements, in the very seats which doubtless they had often occupied when alive. Thus, then, in some cases, that which was at first a house at length became a tomb.

So, again, the tomb in the same way becomes a temple. The Khasias are a primitive people of India, who even now construct megalithic monuments over the dead. They then proceed to offer food and drink to the deceased, and to implore their assistance. If after praying at a particular tomb they obtain their desires, they return again, and if success is repeated, this tomb gradually acquires a certain reputation, and the person buried in it becomes more or less of a deity. When a considerable celebrity has thus been acquired, other shrines would naturally be consecrated to him by those anxious for his assistance, and these would be constructed on the model of the first. No wonder, then, that it is impossible to distinguish the tomb from the temple.

I trust that one result of the present work may be to induce many to visit some of these ancient remains. Wiltshire, from this point of view, is especially instructive. In three days it is easy to see Avbury, the most ancient of the great sacred places of England; Stonehenge, which is probably somewhat more recent; Old Sarum, once our most important city; and, lastly, Salisbury itself. Going down overnight, —say on a Thursday evening,—to the picturesque old town of Marlborough, the visitor would begin with the large Castle Mound, and coming soon within sight of the grand Hill of Salisbury, leave the high road and drive, partly up the ancient 'stone row,' into the venerable circle of Avbury, perhaps the most interesting of our great national monuments.

There he would walk round the ancient vallum, he would search out the remaining stones among the cottages and farmsteads; wondering at the mechanical skill which could have moved such ponderous masses; and at the modern barbarism which could have destroyed such interesting, I might almost say sacred, monuments of the past.

From Avbury he would pass on, crossing the great vallum of Wandsdyke, which he would trace on each side of the road, stretching away as far as the eye could reach, and he would sleep at the ancient city of Devizes.

The next day he might cross Salisbury Plain to Salisbury. On the way he would pass Stonehenge, the sanctity of which is attested, not only by its own evidence, but by the tumuli which cluster reverently around it. At Old Sarum he would for the first time come across real and written history. Lastly, at Salisbury, he would see one of our most beautiful cathedrals, and an excellent museum, which we owe to the liberality of Mr. Blackmore, while for the admirable arrangement of it we are indebted to Mr. Stevens.

No one, I think, who has had the advantage of making such an expedition, and visiting any of these monuments, could see them perish without deep regret. In the eloquent words of Ruskin, with which I will conclude, 'The dead still have their right in them [these monuments]; that which they laboured for, the praise of achievement, or the expression of religious

* London: Elliot Stock, Paternoster-row, 1880.

* As regards Scotland, the case is doubtful, remains of the reindeer having been found in association with some of the Orkney and Shetland brochs.

feeling, or whatsoever else it might be which they intended to be permanent, we have no right to obliterate. What we have ourselves built we are at liberty to throw down, but what other men gave their strength and wealth and life to accomplish, their right over does not pass away with their death; still less is the right to the use of what they have left vested in us only. It belongs to all their successors."

A VISIT TO THE ART-UNION OF LONDON.

In this same month last year the new and handsome home of the Art-Union of London was thrown open to the public, and again this season its galleries are opened for the exhibition of the pictures purchased by the fortunate prize-holders.

The admirable architect who planned this structure is, alas! no more, but his name remains imperishably connected with it. In the annual report of this year, as "*In Memoriam*," the following paragraph appears:—"The world of art has not for a long time lost one of its members for whom so widely-spread and deeply-felt regret has been caused as for Mr. E. Barry. The Council have determined to place in their new building a tablet commemorating his connexion with this structure, not only as being the last work of the lamented architect, and ably fulfilling the requirements of the society, but because the Council feel that,—in the case of public buildings generally in England, there is a lamentable remissness in commemorating the architects who designed them. A painter, as a general rule, takes care to put his name in the corner of his picture, a sculptor cuts his name somewhere on the base of his work, an engraving generally bears both painter's and engraver's names, a poem or a history usually has the author's name on the title-page; but in a building we may in nine cases out of ten search in vain for the name of the individual to whom we are indebted for whatever amount of gratification we may derive from its contemplation." Since then the tablet has been set up, and can be seen by all.

The Art-Union seems to take every year a firmer hold on the public, and its ramifications now extend to all quarters of the globe. We hear that in India, Japan, Natal, Ballarat, Constantinople, some fortunate individual has become possessed of an interesting work of art from the mother country, and the installation of the Art-Union of London in such a home as its present home is more convincing than any verbose article could be that the unceasing efforts of the Committee have not only brought financial success, but have succeeded in diffusing a greater love of art amongst a class who at one time could scarcely have hoped to obtain reproductions of the works of such men as Maclise, Frith, Ward, &c. And the Committee go on hoping that in time it will permeate to a class by whom the knowledge of the high and noble in art is sadly needed, and lead them to seek in art an elevating pleasure. And there is no doubt that if in time the sympathies of what we term the "mass" were enlisted, it would be good not only for themselves, but artists also. The honest spontaneity of sympathy or feeling with the meaning of what the artist wishes to embody in his picture on the part of people to whom art-jargon is unknown might now and then be more valuable than the hyper-criticism of the quasi-initiated. And the constant contemplation of the works of some of the best masters will do more to spread a love of art, pure and simple, than getting bewildered by much of the æsthetic talk of the day.

We would now take a glance at the present exhibition itself, and we turn naturally first of all to the 200*l.* prize won by Mr. Webb, and selected by him from the Society of British Artists. It is by George Cole, the father of a better-known son, and is a very charming picture. A group of cattle are reposing on some low-lying meadows near a stream; the sun is setting with a deep golden light in the evening sky. There is a calm and repose quite refreshing about it. In nice contrast, on the opposite side of the room, is the 150*l.* prize, "In a Welsh Valley," by F. W. Hulme. The tints are here more sober; you feel the air is cool and tempered; a little stream breaks up, brawling amidst broken pieces of brown rock, and the angler prepares his line. Wales, indeed, seems to offer never-ending temptations to the painter, and we are not surprised to find some more excellent subjects from this favoured spot. The "Torrent Walk, Dolgelly," by R. Harwood, is especially noticeable. The stream which has left its home (seen in a misty bloom in the far distance), as it rushes on its course swirling over the rocky stones, is lashed into a perfect torrent of foam, rendered with a truth and lightness scarcely to be looked for from white paint. For the 100*l.* prize, we have "Near Tintagel, Cornwall," by Thos. S. Croxford, from the Royal Academy. We pass on from Cornwall to "Hart o'Corrie, Isle of Skye," by Alfred W. Williams. We turn to have a look at the "Market Boats on the Maas, Holland (by G. S. Walters), lying lazily, "Dutchily," on the sunlit water, a thorough contrast to the lively time the "Ramsgate Lifeboat (by T. R. Miles) seems to be having. "Early Morning in the Tyrol" makes one long to be off from August in London. Through a veil of fleecy-white clouds the rose-tipped mountains are seen, and a brawling rivulet released "from Winter's icy chain" rushes past a little group of pine-trees. "San Giovanni Paolo, Venice," by Alfred Pollentine; "the Limpid Stream," by A. de Bréanski; some itinerant merchants wandering down a country road whilst night is coming on, by Leopold Rivers; two pleasant *genre* pictures: one a Grecian girl defending "Love's Messenger,—a dove, by C. J. Durham; the other, a pretty girl singing "A New Song," by F. Slocombe, are all good. Startling (as the head seems to stand out from the frame) though not so pleasant, is a "Study from Life," by F. Bramley. Time and space only permit us to give a few words to the water-colours. "The Leaden-road, Lincoln," by John O'Connor, is excellent; "St. Barnabas, Venice," by William Callow; "A Pool on the Glaslyn, at Beddgelert," by Jackson Curnock; "Monteleone," by C. Vacher, are all deserving of praise, and we are sorry space does not admit of noticing more at length the various works grouped together. We can only, in addition, wish the Art-Union ever-increasing success in its high aims and in its energetic work.

Carleon.

WOOD PAVING AND SCAVENGERING.

In a published report on wood-paving works proposed to be carried out in the parish of Kensington, dated 24th May, 1880, some statistics are given which may be useful to inquirers. The surveyor (Mr. Weaver) says:—

"The advantages of wood-paving,—its appearance, cleanliness, comfort, quietness, &c., need not be dilated on, but I would direct attention to one point, viz., *scavengering*. Proper attention to this one work is of the utmost importance to a wood-paved road in order to insure cleanliness and safety in travelling, but while this work involves a greater outlay for labour than a macadamised road, the refuse swept off is very much less, and easier to get rid of.

The committee are well aware of the increasing difficulty of getting rid of the road slop, especially in the south district of the parish, while on the other hand there will, I believe, be but little difficulty in disposing of the sweepings off wood-paving. The refuse from Brompton-road now fetches 5*l.* per barge-load, or a net profit of 3*l.* per barge, after deducting expense of loading same.

It will not, however, be fair to assume that in the future such a price would always be obtainable, but there can be no doubt that the refuse from wood-paved roads will always be more readily disposed of than macadam slop. At the present time, while the former commands 5*l.* a freight, the vestry has to pay 5*l.* a freight to get rid of the latter, and this proportionate cost of disposal will, I have no doubt, hold good in the future."

English Engineers in Northern Italy.—The line of tramway from Vicenza to Valdagno-Arzignano and the mines of Pulli was inaugurated on Monday week. This line of tramway is very important on account of the large mineral-water establishment at Recoaro, a village on the hills, about six miles north-west of Valdagno, which is visited by over 9,000 people annually. The laying of the line, which is twenty-eight miles in length, was commenced in April last, under the inspection of Mr. R. F. Mackenzie, civil engineer, of Milan. The rails are of the Vignoles type, and weigh 42 lb. per yard; the engines are principally English.

THE CITY AND GUILDS TECHNICAL INSTITUTE.

The Central Institution, as our readers have been informed, is to be erected on land heretofore belonging to the 1851 Commissioners at South Kensington. On the 6th inst. the Executive Committee of the Institute elected Mr. Waterhouse to be the architect of the new building, having in view the fact that his experience in such buildings has been large. 50,000*l.* is the sum he will have to spend.

THE EDGWARE HOUSE ESTATE.

Fifty thousand pounds was the sum offered and refused for the above estate at the Auction Mart, on Tuesday last, when it was submitted for sale by Messrs. E. & H. Lumley. The property was described as Edgware House and Little Stanmore Farm, containing 334 acres of land, forming a very desirable freehold building estate in the Edgware-road, eight miles from the Marble Arch, and six miles from Kilburn. The conditions were that the property was first to be offered in one lot, and if not sold then to be offered in five lots. In introducing the property the auctioneer stated that there was a present rental of 1,200*l.* from a part of the estate only, with a certain prospective increase. Thirty thousand pounds was first offered, increasing to 50,000*l.*, on which the auctioneer adverted to its close proximity to London, stating it was well worth 80,000*l.* at the least. There was, however, no further advance, and it was withdrawn as a whole, and offered again in five lots. For the first lot, 71 acres 14,800*l.* was offered, and for the next lot, containing 100 acres, 11,900*l.* was bid, but both were declined. For the remaining three lots no offers were made.

THE NEW BUILDING ESTATES AT LEYTONSTONE, WOOD-GREEN, AND WALTHAMSTOW.

During the past week upwards of 150 plots of building land have been sold on the Cedars Estate, at Leytonstone, near "The Avenues," Epping Forest; the Bowes Park Estate, Wood-green; and on a similar estate which has been laid out at Walthamstow; the aggregate proceeds of the several sales amounting to upwards of 13,000*l.*

The sale of the Cedars Estate, at Leytonstone, which took place at the Working Men's Hall, at Stratford, by Messrs. Protheroe & Morris, comprised 109 plots, being the last portion of the estate. Upwards of 100 plots were sold only a few weeks ago, realising the sum of 8,870*l.*, and on several of these plots building has already been commenced. The sale of the last portion of the estate, on Wednesday evening, the 4th instant, was very numerously attended, with an active demand for the different plots, which, with eight exceptions, were all sold at what were considered good prices. The plots facing the several roads which have been laid out on the estate for private houses, having frontages varying from 16 ft. to 22 ft., and from 70 ft. to 120 ft. in depth, fetched prices ranging from 55*l.* to 86*l.* each. Some of the plots sold, however, contained a much larger superficial area, and realised considerably higher prices than those above quoted. The highest sum obtained during the sale was 400*l.* for a plot abutting on the Forest, and specially reserved for a tavern. It occupies a prominent corner position, having a frontage of 51 ft. to the Ferndale-road, and abutting on the Forest to the extent of 80 ft. A corner-shop plot, having a frontage of 30 ft. to the high-road, by a return frontage of 124 ft. to the Ferndale-road, was sold for 293*l.*; and another corner-shop plot, having also a frontage to the high-road, of 26 ft., and a return frontage to Ferndale-road, of 89 ft., realised 240*l.*; and an adjoining plot, having a frontage of 22 ft. to the high-road, and a depth of 95 ft., fetched 210*l.* Eight other shop-plots were sold at prices from 184*l.* up to 192*l.* each. The entire proceeds of the sale amounted to 9,017*l.*, the entire estate having realised,—with the proceeds of the previous sale,—an aggregate sum of 17,837*l.* The number of houses and shops on the estate, when the several buildings are completed, will be about 220, with an estimated new population of about 1,200 persons.

On the following evening (Thursday, August 5th), a similar sale of building land on the Bowes Park Estate, at Wood-green, took place

at the Nightingale Hotel, Wood-green, by Mr. G. Searle, auctioneer and estate agent, of Seven Sisters-road, Finsbury Park. This is a very large and important estate, containing an area of upwards of sixty acres in extent, which has recently been laid out for building upon, no fewer than ten spacious new roads having been formed, which stretch across and intersect the estate at right angles. The estate lies to the east of the Alexandra Palace and Park and the Wood-green Station, and is described as within half an hour's ride of London, by the Great Northern, North London, and Great Eastern Railways. It is estimated that the total number of plots on the estate, when fully laid out, will be about 600. Of these, about 250 plots have already been sold, and building upon them is at present going forward. The number of plots offered at last week's sale was seventy, the several plots having frontages from 18 ft. to 22 ft. each, with a depth of from 90 ft. to 150 ft. Most of the plots were sold, the prices ranging from 64*l.* to 84*l.* each, whilst a number of corner plots realised from 95*l.* to 150*l.* each. Some of the purchasers took as many as five and six plots at each purchase. The proceeds of the evening's sale amounted to about 4,565*l.*

On the same evening, thirty-three plots of building land, on an estate at Walthamstow, were likewise offered for sale by Mr. R. J. Collier, at the Chequers Inn, Walthamstow. The several plots were stated to have frontages of from 18 ft. to 20 ft., and a depth of from 80 ft. to 100 ft. One of the stipulations was that the trade of an innkeeper, victualler, or retailer of wine, spirits, or beer, either under grocer's licence or any kind of licence whatsoever, would not be allowed to be carried on on any plot on the estate. Another stipulation provided that no house on the estate was to be of less than 300*l.* and 350*l.* value as its first cost in materials and labour. Several shop plots fronting Marsh-street realised from 200*l.* to 250*l.* each, and the plots for private houses an average of 65*l.* each.

PROPERTY IN DOCTORS' COMMONS.

On Friday, the 6th inst., Messrs. Reynolds & Eason sold several lots of freehold and leasehold property at the Auction Mart. The property consisted of the freehold business premises, Numbers 39, 40, and 41, St. Andrew's-hill, Carter-lane, at present let upon leases at the aggregate annual rental of 185*l.*, but estimated to be worth 380*l.* per annum at the expiration of the several leases. They were in the first instance put up in one lot, and 5,200*l.* being the highest offer, they were withdrawn, and next offered in three separate lots. No. 40, St. Andrew's-hill, now in the occupation of Messrs. Judd, printers, at the rent of 50*l.* per annum, on a lease expiring in ten years, was sold for 1,570*l.* The adjoining premises, No. 41, St. Andrew's-hill, were also sold for 1,350*l.* They are at present in the occupation of Mr. Sutton, at the rent of 45*l.* per annum, and held on lease for an unexpired term of eight years.

INDUSTRIAL DWELLINGS.

The half-yearly meeting of the Improved Industrial Dwellings Company (Limited) was held at the Mansion House on the 9th inst., Sir Sydney Waterlow, bart., M.P., presiding. A dividend of 5 per cent. was declared, which will absorb 10,625*l.*, and 3,538*l.* was carried to reserve. The total number of dwellings in occupation and in course of erection was reported as 3,921, for the accommodation of about 19,000 persons. In the crowded parish of Bethnal-green alone, where many houses had been absorbed for railway purposes, street improvements, and for the erection of manufacturing premises, 166 old houses had been pulled down to form sites for the company's improved dwellings, and the new buildings in this parish amount to a rateable annual value of 9,500*l.*

In this same parish, the Bethnal-green House Property Association are quietly and unobtrusively doing a work which greatly improves the sanitary state of the parish, whilst it returns the Association a fair interest on their capital invested, and provides for a class of tenants to whom the arrangements and bare distempered walls of the Industrial Dwellings Company are distasteful. This Association is composed of local tradesmen, who utilise their local knowledge in purchasing reasonably ruinous old property, consisting frequently of small one-story cottages, with front gardens situate in *culs-de-sac* of very narrow dimensions. Pulling these down, they widen the court, and if possible open out the ends and erect new three-story buildings, with three-room tenements on each floor, each separately provided with ranges, larders, coal-bins, sinks, water-supply, and other domestic conveniences. The drainage from the houses is delivered over open external traps, so as to be completely cut off from the sewer. The houses are economically built and managed, and are let rapidly. The latest operations of the society are at "Gale's Gardens," heretofore a most unsanitary area. The tenders for the new buildings here have been inserted from time to time in this journal. The new houses built or in course of erection number thirty-five. The builder is Mr. J. H. Johnson, of Limehouse, Messrs. A. & C. Harston being the architects.

THE GREAT NORTHERN RAILWAY COMPANY'S SURPLUS LANDS.

On Thursday, the 5th inst., Messrs. Prickett, Venables, & Co. offered for sale, at the Auction Mart, a quantity of freehold building land, near King's-cross, being a portion of the surplus property of the Great Northern Railway Company. The property was stated to have frontages to Randall's-row, Junction-road, James-street, and East-street, containing altogether an area of about 61,000 superficial feet. It was stated that the railway company had made arrangements with the authorities of the parish of Islington for the latter to make up the roads and footpaths, and also to put in the necessary sewers abutting upon the property, at the cost of the railway company. The property was divided into nine lots. A corner plot, situated at Stroud's-vale, close to York-road, King's-cross, possessing two frontages of 96 ft. and 94 ft. respectively, was sold for 610*l.* An adjoining lot, having a frontage to Randall's-row of 35 ft., and a depth of 60 ft., realised 265*l.* Another plot, of similar dimensions, abutting upon the buildings erected by the Victoria Dwellings Association, was also sold for 265*l.* A plot, having a frontage of 35 ft. upon Junction-road, and a depth of 64 ft., fetched 275*l.*; and a corner-plot, having a frontage of 65 ft. to Junction-road, and 34 ft. to James-street, and including the materials of two cottages standing upon the ground, was sold for 425*l.*

THE UTILISATION OF LONDON SEWAGE.

A Bill with the above object has just now received the Royal assent. It is termed "The Dagenham and District Farmers (optional) Sewage Utilisation Act," and authorises the formation of a company and the construction of works for the delivery of London sewage to the occupiers of some 9,000 acres of land on the Essex side of the Thames between Barking and Wennington. Mr. Peregrine Birch is the engineer to the Act. The essence of the project is pointed to in the word "optional" in the title. The farmer or market gardener will draw sewage only when he requires it, and the company will be under no obligation to take the sewage except when they can dispose of it. The Act confirms a thirty years' agreement with the Metropolitan Board of Works, by which, in consideration of a half-share in the profits of the concern (beyond 5 per cent.) the Board undertakes to supply the company with any quantity of sewage up to 60,000,000 gallons a day.

The promoters of the company have ascertained to their satisfaction that the most successful market-gardeners in the district spend as much as 15*l.* and 20*l.* per annum an acre in London and other manures, and are advised that they can, consistently with a very handsome profit, supply and distribute sewage containing by analysis 20*l.* worth of manure at a charge of about 2*l.* The works proposed will be capable of supplying that amount to every acre of the district during the six dryest months of the year. The addition of the sewage to the rainfall of Essex, it is said, will raise the total moisture of the soil to something like that of parts of Cornwall and Devonshire, which countries are well known to furnish an important part of the vegetable supply of London. The higher ground (about two-thirds of the district), to which the sewage will have to be pumped, consists almost entirely of market-garden farms. The lower ground (about one-third of the district) will be supplied by gravity. It is now devoted to cattle grazing, but it is anticipated that when this cheap means of resuscitation is provided, the tenants will be allowed to mow several crops a year, and dairy farming on a large scale will be introduced. An opportune outlet is thus offered for the 150,000 cows which now occupy sheds within the metropolis, and for which the owners are driven in many cases to seek other accommodation by reason of recent humane and sanitary legislation, which has resulted in the licensing and inspection of all cowhouses in London. The belief that a remarkable increase in the return from the grass land of the district will be brought about is supported by the experience of Edinburgh, which is the only place in the kingdom where sewage can be used in as large or small quantities as desired, and where the meadows are let annually at an average rent of about 25*l.* an acre.

The capital of the company is 150,000*l.*, in 10*l.* shares. The analytical value of the sewage at their disposal is said to be about 1,000,000*l.* a year,* but the promoters say they will be well content to sell it at a tithe of its analytical value, even if they only do business during a small portion of the year. This company may divert the bulk of the sewage from the river, at any rate during the hottest months of the year, and it must be obvious to any one knowing the summer condition of the river that they would then have accomplished a great public good.

IMPERIAL COLLEGE OF ENGINEERING, JAPAN.

Sir,—My attention has been called to a paper by Mr. E. C. Robins, entitled "Buildings for Secondary Educational Purposes," which appeared in the *Builder* of the 10th and 17th of April last. In this paper Mr. Robins dwells at length on the excellence of the arrangements in the Physical Department of the Imperial College of Engineering of Tokio (Yedo), Japan, and on the satisfactory results obtained there. The writer at the same time gives a plan and detail drawings of the same, and I must express my surprise that an architectural paper such as the *Builder* should publish drawings of a new building and its fittings without the signature or sanction of the architect.

It may not be generally known that the Japanese Government, while behaving with great liberality to their foreign employés, are averse to the publication of any of the designs made by those in their employ.

This, you will understand, is a sufficient reason in itself to explain why I should object to any drawings of public buildings I have designed being published. The writer of the paper is perhaps not aware, when giving Mr. Ayrton sole credit for using benches fitted up so that the pupils can repeat the experiments made by the professor,—"which is believed to be unique of its kind,"—that others before him employed the same means for instructing their pupils (Professor Williamson, of King's College, for example).

Before the Physical Department Buildings were thought of, the chemical class-room of the Imperial College of Engineering was fitted up with similar benches.

As much, if not more, credit is due to the principal, Mr. Henry Dyer, and to Dr. Divers, the Professor of Chemistry, than to Mr. W. E. Ayrton, for the happy results which that gentleman's friends would claim for him alone.

C. A. Chastel de Boinville,
Architect to the Board of Public Works of Japan.
11, *Yamato Yashiki Tokio* (*Yedo*), *Japan*,
18*th June*, 1880.

A Local Government Board Inquiry was held a few days ago at Bacup by Mr. R. T. C. Hildyard, on the application of the Bacup Sanitary Authority, to borrow the sum of 1,000*l.* for street improvements in connexion with a new bridge over the river Irwell. The plans were produced and explained by Mr. John Wilson, C.E., surveyor to the Board, who also furnished the inspector with particulars respecting the population, rateable value, and water supply of the district. Mr. John Haworth, of Lane, opposed part of the scheme.

* It has been calculated that the sewage of one person per year is worth analytically between 8*s.* and 1*l.*

THE EMPLOYERS' LIABILITY BILL.

The House of Commons went into Committee on this Bill last week. The greater part of the first sitting was occupied by a discussion of the exact meaning to be attached to "stock," for the defects of which an employer is to be made liable, and which it was pointed out might apply to live stock, and might make a farmer liable for injuries by a mad bull or for accidents caused by a horse with a diseased fetlock, &c. Mr. Dodson, President of the Local Government Board, said he did not care much about the word, and was willing either to leave it out or to limit it to stock-in-trade. The Committee declined, on a division, by 158 to 82 to leave out the word, and, on Mr. Dodson's motion, it was restricted to stock-in-trade; but a motion of Mr. Gregory to exclude live stock-in-trade was negatived. In the course of the debate Mr. Broadhurst objected to the Bill being so narrowed as to exclude agricultural labourers from its benefits. An amendment proposed by Mr. Barnes, with the object of limiting the employer's liability to the person specially charged with his authority, and standing towards the workmen in the position of the employer, was, after a long discussion, withdrawn.

Mr. Craig moved in clause 1, page 1, line 10, after "him" to insert "or in mining or other dangerous employments where it may be impossible or difficult to trace the causes of accidents, by reason of the negligence of any person in the service of the employer, except such workmen as may be engaged in the same working place, and working together as partners with the person injured."—This amendment was negatived, Mr. Dodson refusing, on the part of the Government, to accept it.

On the motion of Mr. Dodson, an amendment was introduced limiting compensation to cases of injury suffered by a workman in consequence of his having obeyed directions of any person to whom for the time being he was bound to submit.

Considerable discussion ensued on a proposal by Mr. Morley to introduce a sub-section extending a workman's claim for compensation to cases where personal injury had been caused by the negligence of any person in the service of his employer engaged in a branch of such service separate and distinct from that in which the workman was employed. This proposal received wide support from both sides of the House. It was at first resisted by Mr. Dodson, but eventually the right hon. gentleman offered as a compromise to "favourably consider" on report a clause by Mr. Morley, adapting the amendment to the particular case of railway servants. On a division, the amendment was rejected by 175 votes against 75.

Sir Edward Watkin then moved an amendment providing that the Bill should not have jurisdiction in cases where a mutual insurance fund existed between employers and *employés*. This was negatived without a division, and Clause 1 was, without further discussion, agreed to.

Mr. Bryce's amendment on clause 2, to leave out sub-section 3, which deprives the workman of compensation who has been guilty of contributory negligence, was accepted by the law officers, on the ground that the case was already sufficiently provided for at common law, and in the end it was agreed to.

At the end of clause 2 Mr. Robertson proposed to raise the question of assurance by an amendment, but after some conversation it was agreed to defer it.

Mr. Craig moved to omit the remainder of Clause 2, beginning from the word "employer" on line 19, which provided that the workman should be responsible unless he gave notice of any defect to a superior, even if not his employer. The amendment was negatived.

On Clause 3 the limitation of the amount of compensation to be granted was discussed at some length. Mr. Barnes proposed a maximum of 100*l*. This was opposed by Mr. Broadhurst, and Mr. Barnes did not press his motion to a division.

Mr. Burt proposed to substitute five years' earnings for the three years fixed in the Bill as the maximum. Mr. Dodson, who was supported by Sir R. Cross, declined to assent to this, and on a division it was negatived by 164 to 71. Another division was taken on the question that the clause stand part of the bill, which was carried by 204 to 74.

On Clause 4, which provides that notice of action shall be given within six weeks of the injury, Mr. Norwood moved to substitute that notice of the injury should be given within six weeks. After some discussion, Mr. Dodson accepted the amendment.

On Clause 5, which allows actions to be brought into court without power for either party to apply for removal to a superior court, Mr. Hinde Palmer moved an amendment that when common employment was pleaded the judge would reserve the point for the jury; but, after some discussion, did not press it, stating that he would wait for the result of a similar amendment by Mr. Morley, but if that failed he would raise the question on report. The clause was agreed to.

On Clause 6, which defines the expression "person who has superintendence entrusted to him" as meaning a person whose sole or principal duty is that of superintendence, and who is not ordinarily employed in manual labour, Mr. Lamb ton moved an amendment to leave out from the words "a person" to the end of the sub-section, for the purpose of inserting, in reference to a mine, "the agent or certificated manager intrusted with the principal management of the mine." The amendment was negatived.

Mr. Cohen moved an amendment that the person who had superintendence entrusted to him should mean one whose sole or principal duty was "in relation to the particular work or matter with respect to which he is alleged to have been negligent." Mr. Dodson objected to this, and upon a division the amendment was rejected by 185 to 45.

Mr. Balfour moved that the expression "workman" should also apply to "domestic and menial servants." Upon a division this amendment was rejected by 158 to 32.

A conference of members of Parliament and representative working men, railway servants, and others, presided over by Mr. Morley, M.P., was held on Friday in last week in the Conference-room of the House of Commons, to consider the offer of the Government to include in the clauses of the Employers' Liability Bill one which would give compensation to railway servants injured by the negligence of servants in separate and distinct departments. The representatives of the railway *employés*, while satisfied with the offer of the Government, expressed their desire that all classes of workmen should be dealt with under Mr. Morley's amendment; but other working men present, while feeling that there might be some jealousy, expressed their satisfaction with the introduction of the principle contained in Mr. Morley's amendment, believing that the principle would ultimately be extended. It was then decided that the clause drawn up by Mr. Morley should relate specifically to a certain class of railway servants who, it was felt, are exceptionally situated. Mr. Morley's clause will be submitted on the report.

A TALE OF A TRACTION-ENGINE.

It is becoming more and more evident that some further supervision ought to be exercised over our public highways, especially with reference to the new descriptions of traffic that come on them. The bicycle nuisance is to some extent palliated by the fact that in any case of collision the user of the vehicle is pretty sure to be injured. A certain amount of caution is thus ensured; but none the less is a new danger sprung upon the pedestrian. The use of traction-engines, with their violent snorting and rattling noise, and their heavy trains of vehicles, is, however, still more deserving of notice. In many cases the road bridges are so manifestly unfit to carry monsters of the kind, that it is only a matter for wonder that more catastrophes have not occurred. Early on the morning of the 5th of August, a heavy traction-engine was passing through the town of Guildford, dragging a truck supporting an enormous iron boiler, upwards of 30 ft. long, constructed by a London firm of engineers, for waterworks, it was said, at Portsmouth. The truck supporting the boiler, the steam-chest of which projected some 4 ft. beyond the off-wheels of the truck, was followed by another truck, weighted to serve as a drag. The driver of the traction-engine turned down Chertsey-street, with a view, no doubt, of avoiding the very steep pitch of the picturesque High-street of Guildford. Chertsey-street has been newly pitched, or has had the pitching re-dressed, and the incline, though less steep than that of the main road, is considerable. So serious was the action of gravity that the truck carrying the boiler pressed upon the traction-engine, the wheels began to slide, the chain and one of the cog-wheels broke, and the leading wheels of the engine, rising over the kerb of the footway pavement, carried away the front of a shop in the street. No damage was done, happily, to life or limb, but the engine and train were stopped in the street for a couple of days, until the former could be repaired.

In the interest of all persons who use our highways and streets for ordinary purposes of walking, riding, or driving, it is to be hoped that the above may prove a warning to manufacturers to send consignments of such bulk by water. The fellow-boiler was safely taken to its destination by a traction-engine a week before. The cost of an accident of this kind is perhaps not altogether to be deplored, as it may serve to discourage a method of sending by land, instead of by water, objects of a bulk for which the roads were not provided as a means of transport.

PARTY WALL QUESTIONS.

WADD *v.* CROLL.

This was a motion heard before the Master of the Rolls, on the 4th inst., to restrain defendant from acting under an award to pull down a certain party wall situated in Basinghall-street, City, on the ground that a proper notice had not been served on the plaintiff, requiring her to appoint a surveyor to act for her. Defendant had given the usual three months' notice on the form authorised by the Board of Works, and had also written plaintiff saying he "should be obliged" if she would appoint a surveyor, but she having failed to do this, he proceeded to appoint a surveyor for her, under section 85, sub-section 9, of the Building Act, and the two surveyors so appointed had appointed a third surveyor. The three surveyors awarded that the wall should be pulled down, but the plaintiff moved to restrain defendant from doing so.

Mr. Karslake, who appeared for the defendant, contended that the three months' notice first served required the plaintiff to appoint the surveyor, and he showed by an affidavit that no other form for doing so had been issued by the Board of Works.

Sir G. Jessel said that the "three months'" notice contained no requirement of the plaintiff to appoint a surveyor, and that the letter was insufficient, as it did not *require* plaintiff to do so, but simply said that the defendant "would be obliged" if it were done. He granted the injunction on that ground, but reserved the question of costs.

DRAWING AT BOARD SCHOOLS.

At a meeting of the School Board for London, held last week,

Mr. Stiff moved the adoption of the following recommendation of the Works Committee:—

"On the 14th instant, the Board referred to the Committee for consideration a letter from the Education Department, stating that My Lords would not object to the use of the drawing-room at the Cook's Ground School (Chelsea) as a class-room, and requested that the dimensions of the room might be stated. The Committee recommend that a reply be forwarded to the Department informing them that the dimensions of the room in question are 23 ft. 10 in. by 22 ft. 10 in."

Mr. Lucraft moved as an amendment, that a letter should be forwarded to the Department asking them to withdraw their permission for the room in question to be used as an ordinary class-room. Drawing instruction was of the utmost importance, and it was a great pity to use the room in the way proposed. The Board ought to do everything they could in the way of furthering drawing instruction. The artisans of other countries were beating those of England in their knowledge of art. It was one of the most, he might say, the most important subject the Board had to deal with.

Miss Taylor seconded the amendment.

Mr. Stanley said that those schools which had drawing-class rooms had not attained the best drawing results. The school in question would not suffer in its drawing if the Committee's proposition were carried. It would be unwise for the Board to cause an inconvenient and expensive arrangement to be made, merely to afford Mr. Lucraft the satisfaction of having his principles asserted.

Professor Gladstone remarked that if the Board used as much extra room in the schools for drawing as Mr. Lucraft desired, they would be carrying out what ought to be done in technical schools, and not in the Board's ordinary schools. The teaching of drawing was exceedingly valuable, but he did not think the Board ought to always have special rooms for the purpose, to be used for nothing else.

There were six for the amendment and eighteen against it. The Committee's proposition was adopted.

Christ Church, North Kensington.—Earl Stanhope laid the dedication-stone of this new church on the 6th inst.

COST OF NEW BOARD SCHOOLS.

At last week's meeting of the School Board for London the committee reported the cost of the following schools which have been erected by the Board. In none of these cases have the committee found it necessary to exceed the authority granted to them to sanction extras up to 10 per cent. on the contract amount. [The figure before the name of the school is the accommodation provided; the first figure after is the authorised cost; the next the extras; the last figure is the cost per child]:—

Chelsea (X).—624; Fox School, Silver-street; 7,750*l.*; 32*l.*; 12*l.* 9s. 5d.

Chelsea (AD).—802; Edinburgh-road, Ladbroke Grove-road; 8,150*l.* (actual expenditure, 8,119*l.* 17s. 1d.); (no extras) 10*l.* 2s. 6d.

Chelsea (AD).—1,160; Latimer-road, Nottinghill; 11,131*l.*; 114*l.*; 9*l.* 13s. 10d.

Finsbury (AZ.)—1,200; Gillespie-road, Highbury-vale; 12,430*l.*; 202*l.*; 10*l.* 10s. 6d.

Finsbury (BB). — 802; Bowman's-place, Seven Sisters-road (including cookery classroom); 7,151*l.*; 94*l.*; 9*l.* 0s. 8d.

Greenwich (R). — 800; Plumstead-road; 8,846*l.*; 113*l.*; 11*l.* 3s. 11d.

Marylebone (G).—532; Whitfield-street, Tottenham-court-road (including rooms for correspondent); 7,957*l.*; 189*l.*; 15*l.* 6s. 2d.

Marylebone (AR). — 500; Barrow-hill-road, Portland New-town; 6,643*l.*; (no extras) 13*l.* 5s. 8d.

Tower Hamlets (S).—602; Dalgleish-street, Limehouse; 6,236*l.*; 122*l.*; 10*l.* 11s. 2d.

PITCH-PINE.

I see in your impression last week a letter signed "A Civil Engineer," in reply to an inquiry made with regard to the use of pitch-pine for cills to window-frames.

I certainly have been always impressed with the belief, in consequence of the large amount of resin and turpentine that is contained in this particular material, that it would throw off, instead of absorb, moisture. Surely there is more of these two ingredients in the above-named wood than in yellow deal? I trust some of your numerous practical readers will give us results of their experience in the matter.

Pinus.

TREATMENT OF DAMP WALLS.

Sir,—In reference to your article on the above subject (p. 171, *ante*), we beg to say that by a process that we use for curing damp walls we think it far more simple and effectual than the German system. What we do is this. Cut off the whole of the old plaster, as far as the damp extends up the walls, in the interior of the house, extract all the moisture by heat from the bricks with the apparatus, then saturate the bricks with a hydrofuge, forcing the hydrofuge in with heat until the bricks will not absorb any more. After this is done we replaster the walls at once, and dry them off, immediately rendering them fit for painting, papering and decorating. This process has been in use in France for some years, and we have used it in England repeatedly, and it has not failed in any instance.

A. Dreyfus & Co.,
Sole Licensees for Ligny's Patent Process for Curing Damp Walls.

A COMPETITION.

Sir,—Will you allow me, through the medium of your columns, to inform the gentlemen who kindly competed for St. Matthias's Church, Upper Tulse-hill, that the motto of the design placed first by the committee is a red cross in a circle, and the architects are Messrs. Harnor & Waters, John-street, Adelphi. John T. Gadsdun.

HISTORY OF STAINED GLASS.

Sir,—Allow me to correct a clerical error in my letter published in your number of July 31st.

The date, A.D. 1400, mentioned in connexion with the advent of the Decorative style, should be A.D. 1300.

N. H. J. Westlake.

A Coincidence.—On the resignation of the late Mr. Robert Sibley, who held the appointment of "County Surveyor" for Middlesex for many years, and during that period built the Hanwell Lunatic Asylum, Brentford Bridge, and other works, the late Mr. W. Moseley, whose death was mentioned in our last, was appointed as county surveyor, which appointment he held until elected district surveyor for West Islington. When Mr. Sibley retired from the county surveyorship he was elected district surveyor of Clerkenwell, in which office he was succeeded by his son, Mr. R. L. Sibley, who is now appointed *ad interim* surveyor for West Islington to fill Mr. Moseley's place.

Books.

A Manual of the Alkali Trade, with 232 Illustrations and Working Drawings. By John Lomas. London: Crosby Lockwood & Co. 1880.

The special ground on which it is desirable to make known to our professional readers the publication of this book is, that it gives, in its first chapter, consideration to the general planning and ordering of an alkali works, and the points which should be attended to in selecting a site for it. The maxim is 2,000 years old, that the next best thing to having the information desired is to know where to look for it.

Mr. Lomas has produced an admirable work on the subject of which it treats, the alkali trade, including the manufacture of sulphuric acid, sulphate of soda, and bleaching powder, and it ought to go into the hands of all managers, foremen, and others engaged in such works.

Miscellanea.

Birkbeck Literary and Scientific Institution.—A meeting of the members of this institution has been held for the purpose of considering the proposal to purchase a site on which to erect a new and more convenient building for the purposes of the society. Mr. G. M. Norris, F.R.H.S., manager and hon. secretary of the Educational Council, presided, and stated that negotiations had been considered for the purchase of a plot of land covering 7,544 square feet, near the Record Office in Chancery-lane, upon which it was intended to build an institute with a lecture-theatre and fifteen class-rooms, with offices, committee-rooms, &c. The cost of the building was estimated at 16,000*l.*, towards which 6,000*l.* was at present in the hands of the committee. The Commissioners of Woods and Forests had agreed to let the plot of land to the committee on a lease for eighty years, at a ground-rent of 400*l.* per annum. Part of the site belongs to the Ecclesiastical Commissioners, the freehold of which will, if possible, be purchased. It was resolved to empower the committee to enter into negotiations for the purchase of the proposed site, on the understanding that, if possible, the freehold be secured.

Liverpool and Birkenhead Subway.—The preamble of the Liverpool and Birkenhead Subway Bill has passed the Select Committee of the House of Commons, but the Committee declined to allow the insertion of a clause providing that the subway should not be converted into a railway or steam tramway during the existence of the powers of the Mersey Railway Company. They also decided against proposals to maintain a distance of 42 ft. from the limit of deviation of the railway company's line, that land in possession of the railway company should not be taken without their consent, or that special compensation should be made for damage, inasmuch as it was held that should such damage occur by reason of the too near approach of the two borings, the fault would rest with the railway company, who need not approach the line of the subway. The buildings and land required for the purpose of the proposed subway have been surveyed by Mr. Edmund Kirby, of Liverpool, who estimates their value and the necessary compensation at 115,280*l.*,—99,000*l.* on the Liverpool side, and 16,280*l.* on the Birkenhead side. Mr. Sherlock, valuer, estimated the value of the land on the Birkenhead side required for the subway at 24,625*l.*, exclusive of the 10 per cent. for compulsory purchase. The land on the Liverpool side he valued at 105,840*l.*, making, with the 10 per cent., an aggregate of 143,000*l.*

A Testimonial.—On Saturday evening last a meeting of about 140 *employés* of Mr. F. Sage, builder, of Gray's-inn-road, took place at the Tuffnell Park Hotel, to present their foreman, Mr. J. Putterill, with a testimonial, in the shape of an address and purse of sovereigns, on his leaving the firm. The chairman for the evening was Mr. S. Peffers, and the vice-chairman Mr. J. Butler.

Water for Liverpool.—The Liverpool City Council have resolved to proceed with the first section of the new water supply from Vyrnwy. The scheme is expected to be completed in five years, and will secure an additional supply of thirteen million gallons of water per day to Liverpool. The total cost of the scheme will be 3,000,000*l.*

A Memorial of Temple Bar.—On Tuesday last the first stone of the memorial structure which is about to be erected by the Corporation of London on the site of Old Temple Bar was laid by Mr. John Thomas Bedford chairman of the City Lands Committee. The structure will leave room for two lines of carriages in the space of 16 ft. reserved on either side. To pedestrians it will serve as a refuge in crossing between the new Law Courts and Messrs. Child's bank. It will be 37 ft. high, 5 ft. wide, and 8 ft. long. The base will be of polished Guernsey granite, the next tier of Balmoral granite, and above that there will be pink granite from the same quarry as that used in the Albert Memorial in Hyde Park. In the niches on the north and south side will be life-size figures in marble of the Queen and the Prince of Wales, by Mr. Boehm, A.R.A., and in panels on the sides will be representations in bronze, by Mr. Mabey and Mr. Kelsey, of the Queen's first entrance into the City through Temple Bar in 1837, and of the procession to St. Paul's on the day of the thanksgiving for the Prince's recovery. The superstructure will be of hard white stone, and will be surmounted by a griffin, which is being executed by Mr. Birch, A.R.A. The inscription round the structure will be the words:—"Here formerly stood Temple Bar." The memorial is designed by Mr. Horace Jones, the City Architect. The memorial will be finished in September or October next.

Durham and Northumberland Archæological Society.—On the 30th ult. the members of this Society paid a visit to Escomb Saxon Church, which has been repaired with a view to re-consecration. On arrival at the church, Canon Greenwell delivered a few introductory remarks relative to the ancient character of the edifice, and expressed surprise that so interesting a structure should have remained in obscurity so long. Mr. W. H. D. Longstaffe then read a paper which appeared in the Transactions of the Society for the previous year, on the history of Escomb, more particularly as regarded its nomenclature. Mr. Johnson, who had superintended the repairs, next read a paper giving a detailed account of the church, which is a very complete example of a small church built before the development of Norman architecture. It was, in fact, the Saxon church of old Escomb; but it was not possible to assign a date for its construction with any degree of certainty. It was by far the most perfect of these early buildings in this part of the country. At Jarrow, part of the walls of a Saxon building remains and forms the present chancel. At Monkwearmouth, there was the western gable of the church, with its curious shafted windows, together with the very remarkable porch and archway that were disinterred by the Society. There are also such fragments as the towers of Bywell, Ovingham and Corbridge, but at Escomb we have a complete church with its chancel and its walls almost intact that has fortunately survived all these centuries with scarcely any injury. The party afterwards proceeded to Witton-le-Wear and Hamsterley.

Roads in Sussex.—For many years the roads in the Cowfold district have suffered from the extra vehicular traffic conveying building materials to the Carthusian Monastery in course of erection at Parkminster, Sussex. For the restoration of the roads, the Highways Surveyor of Cowfold desired to obtain materials from the private grounds of several well-known and influential landed proprietors in the parish. The Rev. John Goring, rector of Wiston, and Mr. R. Ramsden, of Woolringfold House, appeared before the magistrates at Horsham to resent the proposed intrusion. The local surveyor asked for a compulsory order, under the Highway Acts, to allow stone to be dug on the private grounds of the above-named gentlemen. The magistrates granted the compulsory powers asked for by the highways authorities, and Mr. Ramsden at once gave notice that he should take the case before the Queen's Bench Division.

Foreign Exhibitions.—The Great Eastern Railway directors are offering advantageous terms to passengers intending to visit the Düsseldorf Exhibition, such as special cheap tickets, every Monday and Thursday, first class, 2*l.* 6s. 4d.; second class, 1*l.* 10s. 4d.; available for thirty days. They are also issuing special reduced tickets to Brussels and back, available for eight days, including admission to the Exhibition, first class, 1*l.* 10s. 10d.; second class, 1*l.* 0s. 10d.

Utilisation of Wood Shavings.—From wood-shavings and paper Herr Heilemann makes plates, dishes, &c., as follows:—Selected plane-shavings are bound into bundles, and steeped in a bath of weak gelatine solution about twenty-four hours, then dried and cut into suitable lengths. Plates are cut of strong paper or thin pasteboard, of the size of the objects to be produced. These are moistened with a liquid consisting of weak gelatine solution with sodium waterglass, and pressed in heated metallic moulds. After drying, the pressed paper objects are coated on both sides with an adhesive material made of five parts Russian gelatine and one part thick turpentine, the shavings are applied to them, and the whole is subjected to pressure. (Wood shavings alone would, because of their unequal thickness, present uneven surfaces.) The objects are now cut, if necessary, dried and varnished.—*Exchange.*

St. Andrew's Presbyterian Church, Sheffield.—On the 8th inst. this church was re-opened for public worship, after a lapse of three weeks devoted to repairs and cleaning. The pulpit was occupied by the Rev. John Kinnear, D.D., minister of Letterkenny Presbyterian Church, and Member of Parliament for County Donegal, Ireland. The interior of the church has undergone several alterations. Foremost amongst these is the lowering and bringing further into the church the organ gallery. The result of this alteration is a great improvement in the rendering of the psalmody. The seats within the communion rail have been removed. The lighting of the church has undergone a thorough renovation. Instead of sixteen standards, there are now four tripod standards. For the first time the walls have been decorated with borders of Grecian and floral patterns, and the gallery pillars embellished with an ivy-leaf design. The spandrels in the roof are coloured flat blue, picked out with gold.

Improvement and Distribution of Sound.—Mr. Engert is carrying further his experiments in this direction by the introduction of steel wires. To properly apply the invention (he says), one or more layers of steel wires are stretched along a building lengthwise, connected by cross wires and spiral springs, and properly tuned, so that the vibration may be absorbed and conveyed from one to another, and instantaneously spread over the whole building. "This entirely prevents any after-sound, as the naturally slow speed of sound in the air has been so accelerated that the words of a speaker, or the notes of a singer, reach the audience about fifteen times more quickly than under ordinary arrangements." Up to this time he has exhibited his system only in places where people can hear very well without it. We want to see it applied in an apartment where speakers cannot usually be heard. The success or otherwise of his arrangements would then be obvious.

The New Pier at Bournemouth.—The new promenade pier at Bournemouth was opened on the 11th inst. by the Lord Mayor of London, who was accompanied by the Lady Mayoress and civic dignitaries. The cost of the pier is about 23,000*l.*, and it has an area available for promenading of 42,000 square feet. Ornamental seating accommodation is provided for 1,500 persons, and there are fourteen semi-circular wind-screens, which afford shelter in rough weather.

Mortality in New York.—It appears from the semi-annual report of the Registrar of Vital Statistics that during the half-year ending July 1st, the deaths in New York represent an annual death-rate of 25·26 in every 1,000 of a population estimated, on the basis of the recent census, at 1,206,561. This death-rate is much higher than that which prevails in London.

Stidder's Trade Book.—Messrs. G. Stidder & Co. have sent us their newly-issued trade catalogues, divided into two sections, giving lists, illustrations, and prices of their sanitary appliances and systems. Their productions are carefully classified, and the catalogues will be found of great practical utility by architects, surveyors, and builders.

Farington.—New week-day and Sunday schools were opened at Farington on the 24th ult. The site, which is within easy distance of the church and vicarage, was given by Mr. Pilkington, of Ashton. Messrs. Garlick, Park, & Sykes are the architects of the buildings, and the contract was let to Mr. Walmsley, builder, Theatre street. Adjoining the building are two large playgrounds. The whole is estimated to have cost 3,500*l.*, which amount will be defrayed by the Penwortham Grammar School Trust.

Balsall Heath Local Board.—With reference to a brief report in our last of the proceedings of this Board, including a resolution passed complaining of the engineer, Mr. G. B. Nichols, that gentleman has sent us a copy of a reply which he has published in the local papers. This puts a different face upon the matter, as will be seen from two sentences which we quote from Mr. Nichols's statement, but we are not in a position to discuss the rights or wrongs of the case:—

"That the extras reach the sum of 14,000*l.* is not correct; of that sum 13,944*l.* is for additional works (not extras), towards which a sum of 2,000*l.* is estimated in the contract in respect of the repair of old sewers, and a sum of 700*l.* for general extra works."

"In conclusion, I may remind the Board that in the additional sum of 22,000*l.* now proposed to be borrowed is included a sum of about 5,000*l.* on account of a previous contract, with which I was entirely unconnected."

The Tay Bridge.—At a meeting of the directors of the North British Railway Company, the evidence given before the Select Committee appointed by the House of Commons to inquire into the Bill for the reconstruction of the Tay Bridge was considered. The directors then resolved to remit to an engineer of the highest eminence the preparation of plans and estimates for the reconstruction of the bridge on such a footing as to insure its absolute stability and its avoiding any objection on the part of the Board of Trade.

Right Restoration.—*Notes and Queries* says,—We are glad to hear that, through the efforts of Mr. J. T. Micklethwaite, a long-missing brass is about to be replaced in the church from which it had been wrongfully removed. The Church of Colwall, Herefordshire, having been restored about fifteen years ago, nearly everything of interest was carefully removed from it, amongst other things the brass in question, that of Elizabeth, wife of Anthony Harford, who died in 1590. It represents the lady, with her husband and ten children.

TENDERS

For residence, stabling, and lodge, Hampstead-heath, for Mr. M. Baylis. Mr. Walter Graves, architect. Quantities by Mr. W. Barnett:—

Burdett & Sons	£7,500 0 0
Wellings Bros.	7,236 0 0
Barford	6,942 0 0
Dowsing & Sons	6,888 0 0
Wall Bros.	6,885 0 0
Scrivener & Co.	6,891 0 0
Hunt	6,877 0 0
Longmire & Co.	6,849 0 0
Manley	6,782 0 0
Holding	6,693 0 0
Croaker	6,528 0 0
Haynes	6,340 0 0
Toms	6,335 0 0
Cooper	5,998 0 0
Stimpson & Co. (accepted)	5,963 0 0

For proposed United Methodist Free Church, Moffat-road, Thornton-heath. Mr. Stanley C. M'Murdie, architect:—

Hoare & Son	£1,630 0 0
Punchard	1,695 0 0
Elliot	1,650 0 0
Kemp	1,635 0 0
Higgs	1,430 0 0

For proposed alterations and additions to No. 133, Lambeth-walk, for Messrs. Taylor & Son. Mr. Stanley C. M'Murdie, architect:—

Gibbon	£1,398 0 0
Canning & Mullins	1,379 0 0
Rice	1,345 0 0
Nightingale	1,343 0 0

For alterations, &c., to the "Robin Hood and Little-john," St. John's-road, Hoxton, for Mr. Buckingham. Mr. H. J. Newton, architect:—

Alterations.

Lamble	£367 0 0
Anley	355 0 0
Godden	340 0 0
Cole	317 0 0
Wood (accepted)	315 0 0

Counter.

Edwards	177 0 0
Helling	165 0 0
Heath	155 0 0
Warne (accepted)	152 0 0

Gas Fittings.

Winn (accepted)	150 0 0

For alterations and additions to No. 295, Edgware-road, for Messrs. Farmer & Sons. Mr. Walter Graves, architect:—

Mark (accepted)	£812 0 0

For building greenhouse at Hampstead for Mr. M. Baylis. Mr. Walter Graves, architect:—

Welling Bros. (accepted)	£194 0 0

For alterations and additions to Malabar House, Finchley, for Mr. A. Saunders. Mr. Walter Graves, architect:—

Cooper (accepted)	£295 0 0

For the erection of a house at Sutton, for Mr. J. Everitt. Mr. Sydney Everitt, architect:—

Holliday (accepted)	£705 0 0

For the erection of new schools at Aylestone Park, near Leicester, to accommodate 633 children, for the Aylestone School Board. Mr. Chas. E. Willoughby, architect:—

T. & H. Herbert	£6,080 0 0
Bromage	5,900 0 0
Vickers	5,850 15 0
Tyers	5,800 0 0
Southam	5,753 10 0
Elvey	5,694 5 0
W. H. Kellett	5,675 0 0
Wright & Co.	5,582 0 0
Stevens	5,570 0 0
Riddett	5,519 10 0
Hodgkin	5,500 0 0
Eagle	5,500 0 0
Hutchinson & Son	5,490 0 0
Barnett	5,460 0 0
Gilbert & Pipes	5,440 0 0
Finde	5,400 0 0
Cooper	5,392 0 0
J. C. Kellett	5,374 0 0
Bass	5,250 0 0
H. M. Hewitt	5,245 0 0
Clarke & Garrett	5,216 0 0
Langton & Son	5,200 0 0
G. Hewitt	5,157 0 0
W. & A. Rudkin	5,150 0 0
Duxbury & Son	5,150 0 0
Bland & Son (accepted)	4,989 0 0

For alterations and repairs to the Woolsack Tavern, Poplar, for Mr. A. Hudson. Mr. T. P. Ashby architect:—

List	£1,036 6 4
Jackson & Todd	1,015 0 0
Andrews	900 0 0
Bar Fittings.	
Everitt	259 10 0
Hall	180 0 0
Trent, Bros.	153 13 6
Pewtering.	
Phillips	135 3 6
Heath	129 10 0
Warne	125 0 0
Including allowance for old engine, &c.	
Gasfittings.	
Gardner	103 0 0
Dodson	78 10 0
Embossed Plate Glass and Written Tablets.	
Holiyer	65 0 0

For the erection of a new swimming-bath at Grays, Essex, for the School Board for London. Mr. E. R. Robson, architect to the Board:—

Ford & Co.	£1,594 0 0
Higgs & Hill	1,422 0 0
Atherton & Latta	1,310 0 0
Kirk & Randall	1,084 0 0
Tongue	1,050 0 0
F. & F. J. Wood (accepted)	1,047 0 0

For roads and sewers at Hampstead. Messrs. Farebrother, Ellis, Clark & Co., surveyors:—

	Netherhall Terrace.	Maresfield Terrace.
Watts	£2,137 0 0	£4,890 0 0
Anderson	2,250 0 0	4,850 0 0
Wilson	2,350 0 0	4,600 0 0
A. & F. Culverhouse	2,200 0 0	4,680 0 0
Killingback	2,013 0 0	4,650 0 0
Nowell & Robson	1,991 0 0*	4,606 0 0*

* Accepted.

For the erection of a conservatory at Knowles Lodge, Cuckfield, Sussex, for Mr. George Knott. Mr. Hampde, W. Pratt, architect:—

Messenger & Co., Loughborough (accepted)	£424 15 0

For a pair of cottages, Great Eton, Whitley, Surrey, for Mr. F. E. Eastwood. Mr. Henry Peak, architect:—

Martin, Wells, & Co. (accepted)	£520 0 0

For a pair of cottages at Woking Station, Surrey. Mr. Henry Peak, architect:—

North, Knaphill	£321 0 0
Shears, Maybury	320 0 0
Butt, Woking	297 0 0
Millard, Woking	285 10 0
Hack, Woking	275 15 0
Whitburn, Woking	270 0 0
Moore, Woking	269 10 0
Musty, Knaphill	266 0 0
Wilson, Woking (accepted)	248 10 0

For two pairs of labourers' cottages at Kemishford, near Woking, Surrey. Mr. Henry Peak, architect:—

Christmas, Guildford	£549 0 0
Shears, Maybury	530 0 0
Swayne, Guildford	520 0 0
Harms, Woking	460 0 0
Butt, Woking	455 0 0
Whiburn, Woking (accepted)	439 10 0

For four new houses, Georges-place East, Russell-street, Bermondsey, for Mr. W. J. Perrin. Mr. E. Crosse, architect:—

Bailey, Old Kent-road	£780 0 0
Wells, Riley-street	700 0 0
Kipps, Long-lane	679 18 4
Bullers, George-row	672 0 0
Eldridge & Gee, Fendall-street	663 0 0
Almond, Jamaica-road	590 0 0
Brookwell, Maltby-street (accepted)	580 0 0

For alterations and additions to the Queen's Head, Pentonville, for Mr. George Eason. Mr. T. H. Watson, architect:—

Royle	£549 0 0
Batchelor	513 0 0
Spencer & Co.	490 0 0
Beale (accepted)	470 0 0

For alterations to Nos. 29 to 31, North-row, Earl's Court, for Mr. A. Savigear. Mr. George Edwards, architect:—

Martin, Wells, & Co. (accepted)	£900 0 0

For repairs and decorations to No. 12, Cornwall-terrace, Regent's Park, N.W., for Mr. Charles Burge. Messrs. Ebbetts & Cobb, architects:—

Sanders	£423 0 0

For wrought-iron girder road-bridge over the South-Eastern Railway, for the Tunbridge Wells Local Board. Mr. W. Brentnall, engineer:—

Contract No. 2.—Ironwork.

Potter, London	£5,479 10 0
Westwood, Baillie, & Co., London	5,371 12 6
Dixon, London	5,315 10 0
Butterley Company, Butterley	5,269 11 3
Patent Shaft and Axletree Company, Wednesbury	4,881 15 0
Stockton Forge Company, Stockton-on-Tees	4,681 0 0
Cochrane & Co., London	4,874 0 0
Tildesley, Willenhall	4,849 10 0
Pitts, Stanningley	4,835 0 0
Jukes, Cowlson, Stokes, &Co., London	4,376 12 6
The Cleveland Bridge and Engineering Company, Darlington	4,640 18 9
Brettall, Worcester	4,522 16 6
Handyside & Co., London	4,519 10 0
Paton & Co., Crumlin, Monmouthshire	4,505 5 0
Finch & Co., Chepstow	4,466 0 0
Head, Wrightson, & Co., London	4,460 0 0
Oliver & Arrol, London	4,352 0 0
Firth & Sons, Dewsbury	4,294 5 0
Wilson, London	4,254 4 3
The Bridge and Roofing Company, Darlaston	4,164 0 0
Le Coy & Co., Hal. Belgium	4,153 8 0
Skewell & Co., London	4,141 5 0
Butler, Stanningley	4,125 19 0
Tidy & Sons, Tunbridge Wells	4,115 10 0
Shaw & Co., London	4,096 17 6
The Tank and Boiler Company, Wolverhampton (accepted)	3,794 4 9

Contract No. 1.—Brickwork, &c.

Dixon	£7,654 0 2
Jackson	6,882 11 0
Shaw & Co.	6,700 12 0
Ward & Torkington	6,335 1 1
Firth & Sons	6,162 15 5
Pamnett & Sons	5,561 12 4
Kellett & Bentley	5,560 5 8
Ball & Gammon	5,469 11 4
Potter, Stepney, London (accepted)	5,463 16 8
Hunter	4,722 19 2

For drainage and roads, at Brislington, Bristol. Mr. Cloutman, surveyor:—

Brock & Bruce, Bristol	£325 0 0
Church, Bristol	290 0 0
Cowlin & Son, Bristol	275 0 0
Crowther & Roberts, Bristol	240 0 0

For alterations and additions to house, Chipping Sodbury, Gloucestershire. Mr. Cloutman, architect:—

Watken & Masterman, Bristol	£435 0 0
Whitfield, Wotton-under-Edge	350 0 0
Walters, Bristol	276 0 0
Roach, Charfield	260 0 0
Young, Bristol	256 0 0
Crowther, Bristol	250 10 0
Hill, Bristol	205 0 0

For the erection of new banking premises at Maidenhead, Berks, for the London and County Banking Company. Mr. E. Salter, architect. Quantities supplied by Mr. W. Stoner:—

King & Son, London	£3,490 0 0
Rider & Son, London	3,333 0 0
Hobbs, Croydon	3,069 0 0
Woodbridge, Maidenhead	2,989 0 0
Cocks, Maidenhead	2,890 0 0
Kingerlee, Banbury	2,845 0 0
Silver & Sons, Maidenhead	2,825 0 0

For two villa residences, Nether Hall-road, Doncaster. Messrs. Wilson & Masters, architects:—

Turner & Holmes, Snaith	£884 3 6
Meggitt, Thorne	875 0 0
Butt, South Emsall	863 0 0
Riggall & Hewins, Grimsby	856 0 0
Stanley, Doncaster	834 2 7
Wortley, Kilnhurst	820 15 9
Spraker, Doncaster	820 0 0
Furnival, Doncaster	793 8 6
Barker, Doncaster	779 17 0
Howitt, Doncaster	750 0 0
Staniland, Doncaster (accepted)	749 0 0

For rebuilding the Royal Lancer Inn, Doncaster. Messrs. Wilson & Masters, architect:—

Riggall & Howins, Grimsby (accepted)	£400 0 0

For two shops, Baxter Gate, Doncaster, and repairs to the Blue Bell Inn. Messrs. Wilson & Masters, architects:—

	Shops.	Repairs.
Sprakes, Doncaster	£1,200 0 0	£180 0 0
C. Aneley, Doncaster	923 0 0	160 0 0
Beastall, Doncaster	859 4 0	195 10 0
Barker, Doncaster	859 0 0	148 0 0
W. Adeley, Doncaster	784 7 0	166 9 0
Arnold, Doncaster	726 13 0	165 0 0
Furnival, Doncaster	698 15 8	180 6 0
Wortley, Bros., Doncaster (accepted)	688 19 9	129 10 10

For timber-framed farm buildings at Soulbury, Bucks. Mr. Frederick Gotto, architect:—

Underwood & Son	£275 0 0
Fleet & Rickard	170 0 0
Whiting	169 0 0
Adams	165 0 0
Harris (accepted)	145 0 0

For building boundary-walls for the Sevenoaks Gas Company. Mr. A. Penny, engineer:—

Dartnall	£643 0 0
Wiltshire	622 0 0

For building new house and premises adjoining the Derby-road, Ripley, near Derby, for Mr. J. Allen, M.D. Mr. R. Argile, jun., architect. Quantities supplied:—

Fletcher	£1,274 10 0
Wetton	1,226 9 10
Clark (accepted)	1,205 0 0

TO CORRESPONDENTS.

W. W.—J. L.—A. R. P.—R. A.—K. & Son—M. P.—A. & F. C.—H. P.—C. P. H.—J. P. A.—P. & P. J. W.—R. C.—G. R. N.—S, E—G. & Son.—W. W. & Co.—C. C. H.—C. R. W.—T. & Sons.—E. C.—F. T.—F. C.—J. F. & Co.—S. & Co.—Z. S. (no).—H. M. C. (thanks, not desired)—J. D. (the particulars came to us officially, from the premises).—B. & Co. (should send lists).—W. C. T. (next week.)—J. M. (next week).—S. C. L (next week).—W. P. (next week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles and papers read at public meetings, rests, of course with the authors.

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The Builder.

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ILLUSTRATIONS.

CONTENTS.

Aboriginal Architecture in Central America.

It is with considerable interest that we are enabled to announce the first annual report of the Archæological Institute of America, with accompanying Papers, 1879—80. It is prefaced by a preliminary statement, which sets forth the organisation of the Institute upon the usual lines, and indicates aims, moreover, which are more than usually ambitious and comprehensive, directed as they are to the active exploration of the sites of ancient civilisation in the Old World as well as in the New. The first papers which are printed by the executive committee are fully answerable, in scope, at least, to these pretensions.

Mr. Lewis H. Morgan contributes an ambitious Memoir on the Houses of the American Aborigines in New Mexico and elsewhere, to which we shall return. Mr. W. J. Stillman communicates the results of a personal examination of the ancient walls of Monte Leone, in the province of Grosseto, Italy. These are the remains to which attention was first drawn by Mr. R. P. Pullen, situated in the Tuscan Maremma, on the estate of the Marchese Salviati Corsi. Mr. Stillman has concluded, from a survey of the ground, that these walls extended from water to water across the neck of what had originally been a peninsula. They ran in parallel lines with an interval varying up to about half a mile, for a distance of eight miles, opening out into a loop westward, where they were continued by a single wall. They were built of rough stones, the largest weighing, perhaps, two tons, and originally appear to have been 10 ft. thick and about 15 ft. high. Little more could be determined. The space within the walls would have accommodated a considerable population, but no remains of dwellings could be identified, which, however, decides nothing. Such a defence of a peninsula would manifestly be futile unless it was held by a power which had command of the sea. More than one height within the peninsula was crowned by a circuit of walls of better construction and presumably of later date. The negative result of the inspection may, perhaps, be amended some day by the discovery of a cemetery.

Mr. Joseph T. Clarke contributes the first part of Archæological Notes on Greek Shores. Mr. Clarke reached his destination by way of the Danube; his notes on the currents and other contingencies of navigating the Black Sea, Bosphorus, and Hellespont, as well as the Ægean, in a small craft, are not without value to the student of the conflicts of the ancient navies in these waters, and the seamanship which they called so importantly into play. Mr. Clarke's interest, however, was mainly engaged by the remains of the Doric temple of Assos,—the only Doric temple, indeed, which has been discovered in Asia Minor. He reports that the *grandes constructions militaires modernes* which stood upon its plan at the time of Texier's measurements, and seem to have been a serious hindrance, have since been entirely demolished, and some blocks of the temple structure which will assist in its restoration were readily found. The account of the state of the ruins imports that all explorations of them hitherto must necessarily have been incomplete, and all restorations to a large extent conjectural. European architects and antiquaries will greet most heartily a thorough examination and exact publication of these remains, if, indeed, the American Institute decides to make such welcome contribution to our knowledge.

The subject of "The Study" of Mr. Lewis H. Morgan is justly recognised by him as pre-eminently appealing for elucidation to the American Archæological Institute. "One great object," he says, "of the Archæological Institute, so far as it relates to America, should be to explore, delineate, and describe the house architecture of the Indian tribes, as represented by the houses now to be found in ruins, or in actual occupation, in the region of the San Juan river, in New Mexico and Arizona, in Mexico and Central America, and to study such fictile wares, implements, and utensils as may be found therein, and may tend to illustrate the condition of the people."

The districts enumerated extend over a wide area, and are marked by the climatic as well as geological differences which always have great influence upon architectural construction, as well as on plan and ornament. New Mexico and Arizona are intermediate between Texas and California, between thirty and thirty-eight degrees of north latitude. Mexico proper extends to the isthmus, and so much of Central America as comes into question is chiefly the district which closes in the Gulf of Mexico to the south and east; Chiapa, and especially the great peninsula of Yucatan, to the north of the bay of Honduras. It is now some years since the descriptions and drawings of Stephens and Catherwood drew attention to the marvellous remains in these latter countries; the conscientiousness of Catherwood's drawings, which were executed by aid of the camera lucida, has since been attested by photography, and the general conclusions of the travellers as to the nature of these structures and the social conditions which they implied are adopted and endorsed by the independent judgment of Mr. Fergusson in his "History of Architecture." These conclusions, however, are traversed by Mr. Morgan with an adventurousness as positive as it is explicit. He believes that a wrong interpretation has been put upon this architecture from a failure to understand its object and uses, and the condition and mode of life of the people who occupied these structures. All these mistakes, Mr. Morgan believes, may be corrected by comparison of the analogous, and more than analogous, constructions of the Indian village tribes of New Mexico and districts conterminal; and very remarkable indeed these are. What is sought and what is believed to be established by the author, is nothing less than that the structures which have been styled palaces, and as palaces referred to a highly-developed social organisation, are merely the houses of tribes which lived in clusters of dwellings upon a system more or less approaching to absolute communism. He leaves his readers in no doubt as to the portentousness of the blunder that high authorities have in his opinion imposed on the world. It is, indeed, not quite pleasant to observe that an imputation of something more serious than blundering is sometimes — it may be unguardedly — allowed to deface the phraseology. We read, some previous discoveries "at Palenque were becoming known, and were exciting vague and high expectations in the public mind, which Mr. Stephens undertook to gratify by more extended explorations." Intercalated compliments go too little way to qualify such phrases as "Mr. Stephens (*in his valuable works*) showed a disposition to feed the flames of fancy with respect to these ruins." "This is a clear case of *suggestio falsi* by Mr. Stephens, who is usually so careful and reliable and even here so guarded in his language." "That Mr. Stephens himself considered either to be true may have been the case, but he is responsible for the false colouring thus put upon these ruins and for the deceptive inferences drawn from them." If any of these side-thrusts fail to penetrate, a note in conclusion (p. 76) might be trusted to drive them home. "That honest men are in danger of falling into the trap so unguardedly set by Mr. Stephens is proved by the latest utterances respecting these Yucatan and Central American ruins." It appears, however, that Professor Rau, "the trusted archæologist of the Smithsonian Institution," fully accepts what Mr. Morgan calls "the visions," but we prefer to regard as the modest but pertinent "suggestions" of Mr. Stephens,—that the buildings in question were either temples or dwellings for princes or other persons of rank, and that the common people lived near them in habitations of perishable character, all trace of which have long disappeared. These views, however, it is averred, belong to "the class of puerile conceptions, and their tendency is to stultify and disfigure American archæology; from the expressions of Stephens a false terminology has sprung up to stimulate the unwary reader which has remained to the present time,—a most per-

nicious incumbrance upon American ethnology and archæology."

It is clear that discussion which has arrived at this point demands independent and dispassionate consideration. It must be said that, when we rise from the mere study of the drawings of Mr. Catherwood, of which no one impeaches the accuracy, and quite without regard to the concurrent descriptions of Stephens, Andrewes, and Squiers, it gives a shock of surprise to find them interpreted as something of the nature of model lodging-houses or Peabody buildings. Nothing, however, but instruction and interest is to be expected from taking accurate note of whatever characteristics they have in common with other Indian constructions to which such a description certainly more aptly applies.

The closest analogy which is produced to the structures of Yucatan is in the joint tenement houses of the sedentary village Indians of New Mexico and Arizona,—the so-called Pueblos. These Indians erected houses of *adobe* brick, of cobble-stone and of *adobe* mortar, and later of sandstone and the same mortar. They were raised from two to even six stories high,—the first or ground story being solid, and the others in terraced form, each receding in front from that below, with walls from 2 ft. to 3 ft. thick. Access to the first terrace and thence to others in succession was by ladders, the rooms being entered through trap-doors in the terrace-roofs and by ladders again. Every such house was, therefore, a fortress, and an occupied or garrisoned fortress. The occupants cultivated the ground by irrigation, and wore garments of cotton as well as of skin. One of these buildings might consist of fifty or 500 apartments, and lodge accordingly from 200 to 1,000 persons. An engraving reproduced from the report of Lieutenant Simpson, 1849, exhibits the restoration of such a Pueblo,—one of the smallest of a series,—300 ft. long, and with wings each 144 ft. in length; it contained an aggregate of 146 apartments, some of them 13 ft. by 18 ft.

The walls, about 3 ft. thick in the first story, were built of tabular pieces of unhewn sandstone and *adobe* mortar; the stones, undressed, were laid with some regard to evenness. White cedar beams, about 1 ft. in diameter, were laid from wall to wall of a room, then small poles upon these transversely and close together; afterwards slips of bark, and then a coating of mortar 3 in. or 4 in. thick, furnished a floor for the room above. Ceilings and floors are still formed in this manner in New Mexico.

Still more interesting are the description and photograph of the Pueblo of Taos, in New Mexico, which is still occupied by some hundreds of descendants of the original tribes. This is 250 ft. long by 130 ft. deep, and has six stories; the first solid, those above receding in terraces, and for the most part entered through trap-doors by ladders, which children and even dogs run up and down with great freedom. The occupants are described as thrifty, industrious, and intelligent.

It must be said that the descriptions supplied by Mr. Morgan do not on the face of them bear out his statement (p. 44) that "the Pueblo-house presupposes a state of the family without the exclusiveness of monogamy, in which communism in living might be expected to exist as a necessary principle of economy, and to express itself in the form of the house." For anything that appears, the architecture affords no more presumption against monogamy as a tribal custom than that of the flats of the Queen Anne mansions, or the co-operative stores, or semi-detached villas. There may, however, be more evidence on the subject than is here adduced, and "communism" is a word that always requires accurate definition.

It is not necessary at present to follow Mr. Morgan into his discussion as to the relation of this architecture to that of the mound-builders to the east of the Mississippi; nor, indeed, is the architectural aspect of the subject much illustrated by comparison of the comparatively rude long houses of the Iroquois Indians. Here, again, we have little proof of adaptation for any other communism than may be more fitly styled economical combination. A long house might have a length of 100 ft.; it was walled with a double frame of poles with elm bark between them, and bound with withes; it was divided within into compartments at intervals of 6 ft. or 8 ft., with a passage-way down the centre from the single entrance at one end, between the opposite chambers, which were open like stalls of a stable. All provisions were thrown into a common stock, and the daily meal was distributed by a single matron. It is clear that a numerous association could be housed in this sort of barrack with great economy of material and labour; and although it is possible that the system of joint tenement here may be related anteriorly or posteriorly to that of New Mexico, the systems may as certainly be independent of each other,—natural outgrowth in either case of natural needs,—as both are underived from the cells of a Capuchin convent or a New York hotel.

But Mr. Morgan now sets forth that "there is no reason to suppose that the Pueblo of Mexico contained any structures superior in character" to the Pueblos built of small stones, —from 3 in. to 6 in. in thickness, and from 6 in. to 18 in. in length,—in New Mexico northwards as described. "We may recognise," he argues in the quoted example, "a substantial reproduction of the miscalled 'palace' of Montezuma in the Pueblo of Mexico, which, like this, was constructed on three sides of a court, in a terraced form and two stories high. In the light which these New Mexican houses throw upon those of the Mexicans, the house occupied by Montezuma is seen to have been a joint tenement house of the American model. It is therefore unnecessary to call any of these structures palaces in order to account for their size, or to assume a condition of society in which the palace of a ruler was built by the forced labour of his subjects."

In Mr. Fergusson's "History of Architecture" is rendered happily accessible a condensed but conclusive and sufficiently illustrated summary of the proofs that Mexicans built for other purposes than mere economical lodging. If "sculptures, hieroglyphs, palaces, temples, public buildings, and pyramidal elevations are mentioned freely in connexion with these remains," it is the reader who allows himself to be persuaded that this "terminology is false,"—who is the truly "unwary reader." No theory of a scheme to combine abundant occupation and defence, will explain the so-called Mexican Teocallis or houses of God, pyramids in terraces, with flat tops, surmounted by a chamber or cell. A small but more perfect example exhibits such a pyramid faced with stone, and with a broad flight of steps on each side from base to summit. Still more significant is the paradoxical structure at Mitla, a building about 65 ft. square, with a roofed and pillared portico in front, of 160 ft. in length; the carefully-executed walls,—like no other walls,—slope outward from below, and their faces are divided into panels sculptured with frets, lozenges and meanders most ingeniously invented and varied, and executed at an extraordinary expense of labour. Mr. Fergusson reproduces the engraving from the Smithsonian Transactions.

Is it then possible, we are enforced to ask, that an American can have put pen to paper upon such a theme without consulting the authorities and the descriptions in the standard history of the conquest of Mexico by his countryman Prescott? Or what more than Lethean oblivion enwrapped his senses after he had done so? It is, however, scarcely necessary to appeal to the historical accounts of the social condition and architecture of Montezuma's Mexicans, before disallowing the cogency of the inferential identification of an aggregate of dwellings destitute of any superfluous enrichment or decoration whatever, with what is admitted to have been a royal residence, and that solely on the strength of agreement in being built in stories and with terraces.

That the complimentary title of "Honourable" is conceded alike to an American diplomatist and the son of an English peer, may justify the archæologist of the future in assuming some community of race, but he will go far wrong indeed if he thence concludes for like agreement in political constitution, and assigns the Lords' House in the Palace at Westminster to the elected senators of a confederation of republics. There are many fair reasons for connecting the comparatively civilised population which the Spaniards found in Mexico with the native Indians to the south of the Gulf, at least as far as Guatemala, and the semi-civilised sedentary village Indians of New Mexico may possibly again be proved to be related to both; the analogies of language, superstitions, and social habits may be strengthened by certain analogies in plan and arrangement of their architecture; but when we compare the architectural evidence, it is really too little to say candidly,—we would rather say with our eyes open,—the fact becomes salient that, leaving the question of Mexico aside, the marvellously laboured and enriched and varied structures of Yucatan and Chiapa attest such a contrasted condition of technical and social development and organisation as reduces what agreement there is to insignificance. Here, again, it may be sufficient to refer to the chapter of Mr. Fergusson, a single chapter as it is, and that of necessity, from the scope of his work, a short one.

The type of the Mexican Teocalli recurs in Yucatan, but modified, or the original of the Mexican modification. At Palenque a pyramid, 280 ft. square and 60 ft. high, is cased with unbroken flights of steps on all sides at an angle of about 45°, and its top platform is occupied by a chambered structure carefully ornamented with *bassi rilievi*.

The Casa de las Monjas at Uxmal (Fergusson, p. 771), which Mr. Morgan adduces as a parallel to the New Mexican houses, has so far the characteristics of a joint tenement, that it consists of a number of small paired or single chambers; but the construction is of stone upon a principle which tended to restrict their size. There are no such signs of economy of cost and labour as pervade the New Mexican barracks. The roofs are formed by bringing regular courses of large and well-shaped stones nearer together till they meet above, and are finally covered by a common horizontal course. This is the arch of the archaic builders in Italy and Greece, and, indeed, the view of an interior of one of the chambers is almost identical with that given by the Russian Archæological Commission of the interior of an Hellenic tomb at Kertch. Mr. Catherwood gives a view of the ruined façade of the Casa del Gubernador at Uxmal, which exposes the interior of such a chamber filled to the summit with earth and stones. Mr. Morgan supplies the explanation, which is confirmed by contemporary practice in India. This filling in is, in fact, a core which was employed to support the work while it was in progress. Ruin overtook the builders before the construction was considered to be sufficiently settled for it to be removed; but in the meantime the sculpture of the front and entrance had been completed with an expenditure of labour and study also, which need not have been due to forced labour, but which we demur to ascribing to the work of people with willing hands upon a communal house "to be occupied by them on terms of entire equality."

The employment of a core to facilitate the construction of a vault will remind architects of the proposal of a competitor of Brunelleschi for the dome at Florence. The suggestion may not seem utterly wild when we are informed how a hall at Lucknow, 162 ft. by 53 ft. 6 in., has been covered in our own time. A centering of bricks and mud was modelled in the forms required to be given to the ceiling. Upon a first and finer coating was laid a coarse concrete several feet in thickness. Not until a year or two had allowed the whole to set and dry was the centering removed, and the vault then remains independent of abutment, and exerting simple downpress. And yet we do not infer that the builders of Lucknow either lent a suggestion to those of Uxmal or borrowed one from them.

The utmost that can be fairly deduced from the analogies and resemblances between the structures of Mexico, Yucatan, Chiapa, and Guatemala, and those of New Mexico, even supposing them to be much more salient and significant than a precise comparison will show them to be,—is that there may have been some original connexion between the races,—in whichever direction,—whether the New Mexicans exhibit the crude notions which were developed by a superior tribe in the south as it made progress in skill and civilisation,—or whether the northern buildings were the best that indigent and ill-situated tribes could do in imitation of more elaborate models that were remembered in their traditions. But it seems strange indeed that monumental documents, like the antiquities so fully in evidence of Yucatan and neighbouring districts, can be read in any other sense than as proving that either royal power or that of a ruling caste, or sacerdotal control, must be assumed as a chief factor in the combination of influences that made them possible.

Solvitur ambulando was the sole response of the sophist's auditor, as he walked away from the disputation as to the possibility of motion; assuredly the question as to the identity of the social institutions of the New Mexicans and the Indians of Yucatan may be dismissed as un-

ceremoniously, after a glance at the comparative productions of their architects.

It is a satisfaction, at least, that in this criticising the first publication of an American Archæological Institute, which has our best and warmest wishes for honour and success, we arrive at conclusions which are in harmony with those that have been promulgated by what Mr. Morgan himself very justly styles "the high authority of the Smithsonian Institution."

RAILWAY CATASTROPHES AND WORKMEN'S EDUCATION.

We called attention, so recently as the 24th ultimo, to the great need that exists of a set of workmen's primers, or rudimentary text-books, which should, amongst other things, point out plainly and forcibly the chief dangers to which the pursuers of any special craft are exposed, and the primary rules that are imperative, in order to guard against such danger. Hardly three weeks have elapsed before we have a fatal commentary on the suggestion, repeated on the following day, as to the need for such books of warning. We do not, and did not, intimate that absolute reliance is to be placed on this or any other book teaching. But we think that any great employers of labour, whether gas companies,' railway companies, collieries, or whatever he the industry next called upon to offer fatal evidence in favour of our suggestion, would stand in a better position in any of those cases in which they come in contact with the coroner's jury if they could show that such a means of informing their workmen of the risks they daily run had been adopted by them.

On the 10th, and again on the 11th current, an express train, apparently in perfect order, left the rails for some reason which has not yet been ascertained. In the second case, indeed, which occurred at Wennington, about twelve miles north of Lancaster, on the Midland Railway, the line becomes single, and it was on striking the facing-points, while going at the rate of about thirty-five miles an hour, that the engine left the rails. Such, at least, was the first account telegraphed from Lancaster on the evening of the 11th current. On the Thursday the correspondent of the *Standard* says:—"The original idea that the train left the metals while running over the facing-points from a single to a double line of rails now turns out to be quite incorrect." But the evidence given to the coroner's jury on the 12th current supports the first statement. The chief inspector of the line, Loveday, stated that he believed that the flanges of the engine-wheels at the right-hand side on taking the points, did not bite in the ordinary way, but that it mounted the metals. The first point at which it was evident that the train was off the rails was 167 yards from a bridge, the abutment of which was struck by the carriages as they were ploughing their way along the side of the track, with the effect of the entire destruction of the first, an empty third-class, the raising up and destruction of the second, and serious damage to the third, a composite carriage.

Without anticipating in any way the result of the inquiry as to the quarters to which blame is to be attributed, it seems pretty clear that in this catastrophe we have a recurrence of a danger that has been before denounced. As the line is here single, the points must face either the up or the down trains. But it is hardly to be admitted that this fact should not be so far recognised by those who frame the running directions of the engine-drivers, as to prescribe a low rate of speed on approaching the points in fact. As to this, we shall probably hear more on the inquiry.

With regard to the first and the least fatal of these departures of the train from the track, it is said to have occurred when "the train reached the curve at Mareball Meadows cutting, 400 yards west of the Marshall Meadows Bridge, about three miles from the North British Station at Berwick. At this point the engine left the line." "The spot," said the second account from the special correspondent of the *Standard*, "where the catastrophe happened, is just at the commencement of a deep cutting, almost at the termination of an inverse curve of about a mile in length, and upon a sharply falling gradient." The inquiry before Colonel Yolland will no doubt bring out with proper preciseness the points here indicated, as well as the speed of the train, which is given at between fifty and sixty miles an hour. The points as to which it strikes us as especially useful that attention should be called, are, the radius of the curve, the exact place of the reversal of the curve (if the expression "an inverse curve" is correct), and the relative heights of the inner and outer rails. It is obvious that if the accounts above cited are correct, it may be difficult to give the usual counterpoise to the centrifugal force of the train at a point where the curvature changes. We hope that this important physical question will receive due attention.

Pending the result of the full inquiry which is demanded by the alarming character of each of the above catastrophes, we call attention to the illustration, afforded by the occurrence, of the force of the remarks we lately offered on the education of the workman. In each of these cases, so far as we can at present see, the disturbing element appears to have been the well-known influence of centrifugal force. It may be objected that in the case of the departure from the line at the points there was not an adequate curvature to call this force into disturbing action. But this very reply enforces our argument. Centrifugal force is identical in its principle with that tendency to continue linear motion in a straight line which acts against the tongues of the pointe that are intended to deflect the course of the engine. Whether it be the driver of an engine, the pointsman, or the platelayer, it is obviously important that all those men who have to do with the guidance of great weights, moving at great speed, or with the preparation or maintenance of the line on which such movement is to take place, should be familiar with primary mechanical principles. Unless the driver has some idea of the relation of centrifugal force to speed, to weight, or to curvature, he can exercise no intelligent choice as to the speed to which he should reduce his train under certain conditions. Unless the platelayer has some better guide than rule of thumb, he will not know to what height he ought to pack the outer rail of a curve, of given radius, in proportion to the maximum speed at which a train will run over the curve in question. Nay, what more will he know of a curve than, as we once heard a witness assert and reassert, to the baffling of an acute cross-examining counsel,—that "it warn't straight?" That a great deal of what we must call instinctive mechanical knowledge is to be found among the platelayers, as a class, we well know to be the case. Is it just to these careful men,—is it just to the travelling public,—to allow them to form their own theories as to the cant of the rail on a given curve, and never to dream of putting into their hands an elementary guide-book?

Again, if it turn out to be true,—which we will to the last moment in which it can be honestly done steadfastly disbelieve,—that the chairs at the Marshall Meadow curve were not properly bolted to the sleepers, does not such an idea suggest the primary importance of instilling into the platelayer, from the very moment that the anger and the rammer are put into his hands, a knowledge of the rudimentary laws of motion? It sometimes happens that, in relaying or repairing a line, the traffic has to be conducted over a way that is not in a perfect condition. On such occasions warning is, or ought to be, given, and a low running speed kept over every such unfinished portion. But if the platelayer is unaware that a sidelong thrust is thrown on the chairs on the outer part of the curve, in proportion to the weight and speed of the train, it may make a material difference either in the way in which he executes work under the pressure of time, or in the warning which he will give to the engine-driver of the unfinished state of his work. These remarks may, or may not, prove to be directly applicable to either of the disasters now under investigation. That we shall perhaps see. In the meantime, let us remind every one who takes a railway ticket of the extent to which his personal safety and life are dependent on the possession of primary mechanical knowledge by the thousands of workmen on whose care the issue of his journey depends. If he once realises that, he will echo our demand for workmen's primers.

Stafford.—The New Connexion Chapel, Gaol-square, has been re-opened, after repair and enlargement. The work has been carried out by Mr. Pemberton, under the direction of Mr. Wood, architect, Longton; while the building has been decorated by Messrs. Riley & Sons, of Eastgate-street. The whole work has cost nearly 1,000*l.*

A CAXTON MEMORIAL.

PARISH PAYMENTS IN EARLY DAYS.

Having given a few illustrations of the times in which Caxton commenced his celebrated work in Westminster, in the reign of Edward IV. (see p. 165, *ante*), we will now proceed to review the events which are chronicled in the St. Margaret's books during the remainder of our printer's life in the parish.

1484-1486.

"Here folowyth thaccompte of Thomas Gregory and Henry Swifte, Wardeyns of tha parisshe churche of Sainte Margarete, of Westm', in ths shire of Midd." From May 24, 1484, to May 11, 1486. This account comprises twenty-two written pages, on parchment, and while the two years' receipts amounted to 57*l.* odd, the payments were some 26*l.*, leaving a balance of 31*l.* 6s. 0½d.

As we have already stated, the majority of items in the receipts are for funerals which cost, for ordinary parishioners from 2d., which was the usual price for the two tapers used at the ceremony, to as much as 6s. 8d. for "the pitt" in the church, 6d. for "the knell" with the bell in the church tower, and certain payments according to the position of the deceased, for torches, or tapers, or lights, as we shall presently give evidence of. Thus, in the first year's receipts, at the burying of William King's wife we find the pit cost 6s. 8d., the bell, 6d., and the four torches 5s., while at "the hurying of a prisonar," the light cost only 1d.! Then, again, there is an entry of the burial "of the good man of the Katryn Whele" (Catherine Wheel), which for four tapers cost 16d., although we have not been favoured with the gentleman's name. A servant of the King's Chappel paid 6d., as did also "William's Childe, of the Popis hed" (Pope's Head). Among the second year's receipts, "the burying of William Spade," for four tapers cost 4d.; "John Barnard Gentilman," eight torches, 13s. 4d., and knell, 6d.; and "my lady Stoner," six torches, 10s. Two very important personages were also buried this year: the first was "Ranffs of the Pantry" in the Palace, four tapers, 8d.; the other was "Mr. John, the Quenes ffoole," but his burial only cost 4d. for two tapers.

We have already instanced the fact of the church goods having been lent out as occasion might require; but here is an interesting entry, perhaps in some way relating to the demise of the king:—"Item in a rewarde for Candlesticks lent into tha Abbey for King Edward the 4th, 6d."

The festival of St. Margaret's is again quoted among the payments:—"Paid to tha Kep[r] of the Kyng's place for clothis of Arras to hang aboute the Church on Sainte Margaret's day, 2s. To the Vesterer of the Ahhay for clothie of sylke and of golde, 12d. For hangyng up and takyng downe of the saide clothie, 6d. For wasshyng of the ymage of Sainte Margarate, 1d. Unto 2 watchmen on Sainte Margaret's night," no doubt to protect the drapery, &c., lent by the king, "8d. For ffaggote for the bonefire, 4d." And, as usual, "for brede, ale, and wyne, for Singere of the Kynge Chapell, 12½d."

In the early volumes of the *Builder* much interesting information will be found relating to churchyard crosses. That at St. Margaret's, Westminster, is now shown to have been in existence earlier than 400 years ago, for here are the items of its restoration:—"Paida for a grate brode frise stone to mend the foto of the crosse in the churche yerd, 3s. 4d. Paid for Assheler Stonee for the same croese, and for laying and werkmanship, 7s. 4d. Paid for makyng of a croese of tre to set upon the said crosse of stone, and for the spere, eponge, and nailes of the same, 2s. 4d. Paide to John Reda for peynting of the same crossa of tre, eponge, spere, and nailes, 3s."

In the second year's accounts we find some notes about the steeple cross, which also appears to have been a restoration. Thus the carpenter "for half a lode of tymber to make the crosse upon the steeple of the chirche" received 4s. 2d. Two carpenters for labour on it received 8s. 4d. The plumber for 32 lb. solder 16s., and for casting 711 lb. of new lead, 9s. 9d., and as "the new lede is more than the olde lede" (which he took in exchange) by 219 lb., he charged the churchwardens with the difference at the rate of 5s. 4d. the hundredweight. The same plumber received for his labour and for nails used 39s. 6d.; the smith received 2s. "for 2 doggis of yron for

ths stepill and the hrodds to them," and 16d. was paid "for sawydyrg."

Among ths miscellaneous payments ws find "for 4 harrys for the clerkys wyndowe, weynge 21 lh. price the lh. 1½d." "For a hushell of coolys [coals] for hallowyng of the ffonte, 2d." "For makyng of a new claper to Judas hsll," 10d. "For mendynge of the hellowse of the organs in the rode lofte," 6d. "For hrede and als spent npon Crowe and other Clarks and the Children of the Kynge Chapell at Crisstemasse," 6d.; while William Tnll, "the tiler and his fellow," received 8d. a day each for three days' work.

1486-1489.

The accounts for these years are not those of the churchwardens proper, hut of Thomas Burgsys, William Saynbrygge, and William Hungate, "late Maistsrs or Wardeyns of the fraternyts or gilde of oure hlessid lady Saynt Marie withyn the parissbe church of Saynt Margarete," and ars written in forty pages of parchment. Thsy are a much more elahorate affair than the ordinary accounts, and give us a very intsresting insight into "the origin and mystery" of a rsligious guild four hundred years ago. Ths we find the receipts with arrearagss cams to 365l. odd, and the payments to 269l. Of the halance "the said Maisters nowe accomptants havo lsnt to the chnrchwardsns of Seynt Margarets upon certsn plegges of sylver," 60l.

Ths greater sum of ths receipts came from rents from houses left to the guild hy henevolsnt membsrs, which, for the three years, amountsd to 134l. 9s. 4d. Here are the rentals:—Three houses in Tothill-street, for ths three years, lst for 19l., of which ons was let to Sir William Stoner at 66s. 8d. a ysar, "with reparations"; nine tsnements in our Lady-alley (thrse years), 14l. 10s.; a tenement called the Swan in St. Mary's parish, in the Strand, with five others adjoining (three years), 13l.; ths tenement and garden late in the tenure of Sir Thomas Norfolk, at Long Ditch (thrse years), 48s.; two tensments at Kensington, 40s.; whils 40 acres of land, also at Ksnsington, wsre let as a field at 13s. 8d. a year! The house called the Sun in King-strest, 4l. per annum; ths Bell Tavsrn (which was a flonrishing house 250 ysars aftsrwards), 40s. a year; while quit-rents were rscsived of "ths monastery of Westminster" of 13s. 4d. yearly for the tsnemsnt called the Saracen's Head hy the Palace gate in King-strest, and of a John Randolf, mercer, of London, 6s. a ysar "for a licsnse of frss sntre of comyng yn and going ont for his tensnts thurgh ths gats and alsy called our lady aley in ths Kynge strete."

Bequests to the guild inclnded 30s. in monsy, three torches, two candlsticks, "a ryng of golde w' a saphnre"; a tenemsnt "next the Wulstapel gate," let at 20s. a year, and all the velvet for the nsw garland, except a quarter of a yard!

Under the heading of "foren receyts" there is an extraordinary item of 6s.: "ths said late Maisters charge theym self wyth the farme of a cowe longyng to the said fraternyte, letyn to ferms to Ch. Jakson at 2s. hy yere"!

Next ws havs ths entry of admittsnes of 114 persons into the fratsrnity, at the cost of 6s. 8d. sach. Among these, Sir Richard Surlonde, snh-dean of the King's Chapel; Mr. Thomas Crapp's mother; Sir Johu Tyler Priest; the porter of the King's House; Andrew, the heer-brewer; the master kesper of my lord of York's place; and last, hut not least, "*Wynkyn Worde*," who, without donht, was the fellow-worksr with Caxton in his printing-offics, and his worthy snccessor in the art and mystery of printing. There wers also eleven persons rsceivsd into the fratornity after their dsath,—that is to say, their nsmes were entered upon ths roll if they were kindly dispossd in the shape of a lsgacy, as was the case with the Qussn's chaplain, who left 20s. to the guild.

Ths payments naturally form a vsry interesting series of items. Quit-rents were paid to the amount of 115s. 6d. for the three ysars. Six priests rsceived 33s. 4d. a quarter each, except one who, having "departed without licence," had two weeks' wages stoppsd. Four slmspeople received 6s. 8d. a quarter each; the headsl, 13s. 4d. a year; while "expenses of quarterdaies" come at from 12d. to 20d., heing payments "for hrede, ale, and chese." The "Ohytes," or religious services for the souls, &c., of the departed henefactors, amounted to 6l. 10s. 5d. for the three years. The "necessary expenses" included, for washing clothes, repairs, torch-hearers, scoaring of hasins, &c., 14s. 2d. Wax cost nearly 5l. Rspairs to ths honses amonnted to 7l. 3s. 2d. Allowances for the thirty-ons separats pennies offersd at the ohits, 2s. 7d.

The most interesting portion of ths account is naturally the "costs of the generall feste," and it will very forcihly explain that the art and mystery of eating and drinking was a failing indulged in hy even a religious guild in ths good old times. This grand banqnet was "kept and holden at the Archhishop of York's place in the third yere of this accompt," and cost no less than 37l. 7s. 3d., of which the hrethrsn and sisters present paid 11l. 17s. 9d. We hope our rsadsrs, in casting an inquiring look at the little hill, will remember that "all things are changed" since those times, and calculations of the relative difference in prices must he made according to circumstances.

A pipe of red wine and a hogshsad of claret, 105s. For making of ths garlands, 5s. For six dozens of white cnps, 2s. 8d. "For portage and hote-hirs of the turhut, 4d." "To ths pleyers for a pley, 7s." Red wine hought for jelly, 7¼ gallons, at 8d. Carriage of the wine "from London to Wsstminster," 2s. 8d. For twenty-two dozen bread, two dozen manchets, and four dozsn trenchors, 26s. "To John Bright for a kildorkyn of ale, 2s. Four barrols of als at Chelsea, 10s.; and a barrel hought at Holhorn, 4s. Thirty-two pike fish cost 14d. each; nine turhots cost 15s. 2d. the lot. Poultry, too, was cheap, for five dozen and eight capons cost 6s. a dozen; seven dozen chickens 15d. the dozsn; three dozsn geese at 6s. 8d. the dozen (!); six hsrons 16d. sach; eleven dozen conies 2s. ths dozsn; eight swans at 3s. 4d. each (!); and 300 eggs 2s.—that is to say 8d. a hundred! We next come to the hutcher's hill. Shoulders of veal cost 3d. each; ten lsgs of mutton 20d.—that is 2d. a lsg; two shssp 3s. 4d., (!) or, to nse the words of the acconnt, "an hole shepe 20d."; nine pair of calves' feet, 9d.; two pieces of heef, 12d. Fifty-two gallons of milk "for farments," 3s. 4d. Bucks cost 6s. 8d.; hut ssveral rswards of from 12d. to 5s. were givsn to ths ssrvants of donors of some of thsss dainties. The miscellaneous items included a pint of mustard, ½d.; three gallons of honey, 3s. 8d.; 10 lh. of candle, 10d.; hrsakage and loss of thirty-five pots and pans, 1s. 6½d.; half a hushel of grapes, 6d.; herhs, 8d.; half a ponnd of cynamon, 12d.; 2 lh. of psppsr, 2s. 11d.; ¾ gallon of vinegar, 6d.; 18 lb. of raisins at 2½d.; 6 lb. of almonds at 3d.; and 1 lh. of cloves, 3s. Carriage of the tahles cost 6d.; lahourers "watching" two nights, 2s. 7d.; the cook for dressing the dinner received 26s. 8d. The hutler and his men, 13s. 4d.; the plate-kesper, 6s. 8d.; hire of the vessels cost 11s. 6d.; and last, hut not least, there was paid as a gift "to the keeper of my lord of Yorks place" 6s. 8d., to the under kesper 20d, and to the headls 12d., no doubt in acknowledgmsnt for the kind psrmission to hold the hanqnst there.

Such are a few of the itsms from this fsast acconnt, and they will convey, we think, a very good idsa of the cost of provisions at that psriod. Retarning to the chnrchwardens' hooks proper, we find the next two accounts are of more than usual intersst, for they are the last of thoss in the years in which Caxton lived and worked amongst us, in the famous city of Westminster.

1488-1490.

"Here folowyth thaccompte of John Gerard and of Hsugh Okham Wardeins," &c. from May 28, 1488, to May 27, 1490, writtsn on twenty pages of parohmsnt, 8 in. hy 12 in. in sizs. The two years' rsceipts amounted to 48l. odd, hut the payments only came to 15l. 11s. 6d., leaving a halance of soms 32l., 20l. of which, we ars told hy the audit, was deliversd over "to the Maisters of ths chirch werks."

This account gives, as usual, an intimation that a portion of the church goods was lent out to another parish, for we find 20d. was received "for lsndyng of the hest cowpes to Saynt Clemsnts w'out temple harr at Wytsontyd," and 8d. "of my lord grey for lendynge of a Masboke vsstment and chales." In the second year a "Thomas Chyppyngdale" was huried at the cost of 2d.; while the funeral of the parson of Arundsl (Sussex?) cost 6s. 8d. for torches, and 6s. 8d. for his pit in the chnrch.

The hequests the second year comprised two only,—Lord Gray, for the loan to him, upon three occasions, of a vestment, chalice, and mass-hook, gave 2s. 8d.; and 100s. was received from Lady Ancras.

The payments included a rope for the middle hell, 7d.; "to John Benet and John Tadgoce, for theyr gret age at Mydsomer," 3s. 4d.; making the hase of the cross of stone in the churchyard, 4s.; "for leynthyng of evry raftre of ths olde tile, 5s.; for tils-pins, 2½d.; a lahourer 4 days, 16d.; and last, hut not least, "payde for hrede, ale, & wyne, and kychen for a sowpar to the awdytors and to the new wardeyns," 20s.

1490-1492.

The accounts of these years,—Richard Frost and Robard Lowthyam heing wardens,—have a melancholy interest, for thsy contain the relation of the hurial of William Caxton. Thsre are twsnty-seven written parchment pagss, and thsy smbrace the psriods May 27, 1490, to June 3, 1492, in which psriods the rsceipts ware 60l. 1s. 9½d., and the payments 56l. 1s. 9d., leaving a halance of only 4l. 0s. 0½d. on the right side.

As this account is of more than ordinary intsrest, Mr. Nohle has gone somswhat minutely into details, and the result of his scrutiny we cannot do hetter than give. Of the general receipts, the first year there are 344 entries, and the majority of thsse are hurials. As we have already instanced, the smallest payment is 2d., and the numhers huried at this rate were 135. The highest payment was for the pit and torches of a "Mayster Bostok," 14s. 8d. There were two hurials at 5s.; thres at 20d.; 26 at 8d.; 89 at 4d.; and 19 at 12d. Two cost 4s., one 7s. 4d., and five 6s. 4d.; so it will hs sesn that the parish at that date contained many persone ahove the average class. It is in this first year we find "Mawdo Carston" huried, costing for torches and tapers, 3s. 2d.; hnt what relation she was to the printer Mr. Blades has not hsen able to discover. The second year's items for hurials, &c., amount to 25l, and of these exactly 100 are for 2d.; 23 for 6d. (tolling the hell); 59 for 4d.; 9 for 8d.; and 16 for 1s. The highest payment this year was for "Annes Clark," whose funeral, for pit, torches, and tapsrs, cost 13s. 4d. But the most interesting entry is that which stands ths 190th ont of the 25l, and which reads in these words:—"*Itm atte bureyng of William Caxton, for* iiij *torches,* vj^s viij^d. *Itm for the bell atte same bureyng,* vj^s." The relative position of the entry would lead us to suppose (says Mr. Blades) that our first English printer was hnried towards the close of the ysar 1491, and we do not think he is far ont, if we taks into consideration all the other facts attsnding the close of his carser. It must he borne in mind the sarliest parish regieter in this country is of dats 1538 (which is the date that at St. Margaret's commences), so in having thsse churchwardens' hooks prssrved to us we havo priceless treasures extending hack half a cantury hefore official registration, and in this instance far ahove valuation, for they contain the entry of the hurial of William Caxton.

Among the other items of receipts of the first year stand the hequests, 20d. from "Syr John Batyll Prest"; 10d., which was "gadsred atte wsddyng of Howell's mayde"; and 2s. 8d., which two psrsons philanthropically gave "for dyvers peces of olde tymher." In the second year, "Bartylmew the lay monke" gave 8d. "for two old hordes"; "Syr Richard Sugar Prsst" left the church 10s.; while there was "receyved of the churchwardens of Seynt Pulchres for the dragon," 2s. 4d. This latter entry, which at first reads nnintelligihle, is further explained hy a payment in the same year, "for dressyng of the dragon, and for packthrsad," 4d.,—this dragon hsing, without donht, a painted reprssentation of that winged serpent who, it may he remembered, according to tradition, took upon himself to swallow St. Margaret, hut who in turn was too strong for the stomach of even so great and powerful an enemy, for she managed to effect her escape, and hy so miraculous a delivery became the patron saint of all unhorn infants! Consequently, as we havs already stated, St. Margaret's Day (July 20th) was ancisntly a grand festival in Westminster, hencs in this second year,—the same year that Caxton disd in,—we find payments of 4d. "for fagotts for the hondfire on Saynt Margarett's Even," and 12d. "for payntyng of the wall hyhinde Saynt Kateryn, and for ffreshyng of Saynt Margarett," hesides those other refreshing entries, when hread, ale, and wine, no doubt, kept alive the festivities of the hour.

There is an entry among the receipts of a diaper towel 4¼ yards long, by half a yard wide, which Margaret Eden was good enongh to present to the church, with the substantial addition of 2s. 8d. in money. Such a notable bequest had to be recognised by the parish, and so we find among the payments, "Payde for brede and ale spent upon Margaret Eden and her felesbipp atte Rceyuyng of a towell afore wrytton, 2d."! The parish had only just spent three-halfpence "for brede and ale atte makyng of the inventory of the chirche goodes."

Some extensive repairs were carried out about the church at this time; for William Egerden, the plumber, actually received 25*l.* 11s. 6d. "for ledyng of the south ile"; 40s. was paid for boards bought at Kingston; 60s. 8d. was paid for the outer work of the two windows of the vestry, the glazing of which cost 9s. 7d. more; a new door for it cost 11s., and a pair of hinges 23d. Also, "for thirteen borthens of Roshes for the new Ile," 18d., and "for careying of fourteen lodes of erthe from the Wolstaple to the Chyrche," 12d.

"For mendyng and dressyng of a grete boke," 4s. was paid; 8 lb. of tallow candles cost 8d.; twenty-four hurthens of rushes at Easter cost 3s.; William Royall was paid 8d. "for two days in mendyng of pewes"; also 10d. "to Hewgh, Keper of the Paloyes [Palace] for a new ladder"; mending eighteen vestments cost 2s. 2d., while there was spent upon Master Harry Ahyngton, who was a worthy benefactor to the parish, 6d. "for a brekfast" upon one occasion, as also 4½d. for wine for him "at dyvers times." Added to which there was always a payment at the end of the account of 20s. "for brede, ale, wyne, and kychen, for a soper to the awditors and to the new wardens," at which, without doubt, our Westminster friends talked over parochial affairs with the same spirit as they do to-day.

By the foregoing entries we have illustrated the times of William Caxton throughout the fourteen years in which he worked his printing-press at Westminster. Our extracts from the books have not been exhaustive, but Mr. Noble has made them as illustrative of the period as possible. At the same time, we must not forget that the years we have quoted are not the only early accounts possessed by the parish of St. Margaret. The earliest is dated 1460-1462, and comprises nine parchment leaves 10 in. by 6½ in. in size. The earliest "Guild" account is 1475-1478, in twenty leaves 11 in. by 8 in., and in it is the receipt of 20s. for three years' rent of the tenement inhabited by the Vicar of Kensington, and 7s. 6d. for three years' rent for 2½ acres of land in St. James's-fields, which is now covered by those princely blocks of buildings lying between Pall-mall and Piccadilly!

Although we do not intend to go deeply into the other accounts, there are one or two items interesting enough to quote. Thus in 1494:—"Reseved of the wyffe of the Katrine Whele [Catherine Wheel] and of the wyffe of the Dragon for a Pew," 3s.; and these appeared to be the ladies of the taverns of those names. "For mendyng of y^e^ gret Pulpitt," 3d. "For naylis and makyng of a bedde in the vestrie for the clerkys," 6d. This was probably a bedstead, and is explained by an entry among the church goods in 1498:—"Item, a fether bede w^t^ a bolster of the gefte of the Syster of the hysshop of Seynt Asse [Asaph] to thentent that he shall remayne into the vestrie as long as they last for the clerkis of the cherche to lay upon"!

In 1496:—"For 20 tonne and 5 fote of Cane Stone, price the tonne, 6s."; and "to 6 laborers havyng up of the same stone at the myll and to 4 labarers for ye helpyng home therof fro the myll to the cherchyard, 3s. 4d."

In 1498:—"For a chayne of yron to bynd the boke at Mast Habyndon's pewe," 8d. "Of a man of London for a stone that was founde w^tin^ the grounde that a man was buried in," 6s. 1d. "Paid at a taverne for a Potell of Wyn for Sir William Tyler when we spake to him for to have license to have our Reigate stoon," 4d. In 1500:—"Rec^d^ a ryng of sylver and gylte of an olde woman." "Payd for fetchyng of 2 tonne of stone over the water from Fakkes halle into the Kynges brydge," 6d. The stone itself cost 4s. a ton. In 1502:—"For 2 foder lede bought at Bertylmewe feyre," 8*l.* "For makyng of 8 dragons," 6s.8d. "For changing of £5 of nonghty pence," 3s. 4d.,—and this, we presume, was money received at the collections, &c., which was either bad or under weight. In 1504:—"To fader Yanne for the kepyng of the whype for betyng the dogges oute of the chyrche," 16d. The same year, on St. Margaret's-day:—"To the waitts of London for to go afore the pcession," 4s. In 1510:—Received "atte hurying of the costerdmonger for 4 tapers," 4d. This is an early mention of the word "costermonger," which is brought very close to our present definition in the accounts for the feast in 1519:—"To the costerdmonger for Peirs, 12d."! And as we travel over the interesting entries year by year, we find the cherished names of our early printers,—of Wynkyn de Worde, of Pynson, Copland, Berthelet, Julian Notary, and others, who all helped to produce, after Caxton's death, those wonderfully-printed sheets and books which, at this day, are looked at by all of us with such loving eyes.

We have mentioned the guild already, and endeavoured to show its design. Of its powers as a society we see an evidence in its accounts for 1519-1522, and an extract we cannot do better than submit to the attention of the rulers of benefit clubs of to-day: "Receyved of Robert Craunte for misbehavyng hym in words spekyng at a quer-day kept in the checker chamber on Seint Thomas Day in Cristmas in the presence of all the masters and brethren then beying, Master Walter Gardener, John Wryght, and John Ford, wardeyns, the whiche wordys wer spokyn to William Millys and Edward Stokwod, then churche-wardeyns of Seint Margret, and ther he was juggyd by all the hous to pay a pound of wax, and so he payd ther 10d." And the same time Thomas Wylde was fined to the same amount for having entered into a law-suit with another brother, Philip Lentall, without having first submitted his case to the fraternity! It is such entries as these that help to enlighten us about the customs of our forefathers. Such decisions among themselves in these old guilds frequently saved the members from the gentlemen of the long robe, an endless law-suit, and loss of money and ruin of home.

The Church of St. Margaret, Westminster, situated as it is beneath the shade of the Abbey and the Parliament Houses, boasting, as it does, of a history which goes far back into the age of tradition, is a building well worth a pilgrimage to see. Recently restored at an expense of 12,000*l.*, which amount, thanks to the energy of its rector, the Rev. Canon Farrar, has just been paid off, it is now one of the finest, as it is one of the lightest, of our London church interiors, and what is of even more consequence, it is one of the few London churches which often has a congregation larger than it will comfortably hold. But somehow or other it has always been a popular edifice, while the parish has been the home of some of the most celebrated of England's worthies from the days of Caxton to our own. Its registers, as we have stated, commence in 1538, twenty years earlier than the majority of parish registers, and yet in those twenty years something like 12,000 names are written in its books, while in the first 100 years we are rather under the estimate than over when we state the number of entries in its books to be 60,000, of which 34,000 are burials. This will give good evidence of the size of the parish even in those early times.

The three names recorded in the parish books which stand most prominently forward in history are Caxton, Raleigh, and Milton. Other famous names occur in the registers, but these are the illustrious ones. At the top of the page of the Burial Register for October, 1618, is written, "Sir Walter Rawleigh, knight," and this is all the evidence we have of his burial in this church after he was beheaded in Old Palace-yard. Curiously enough, the register, during this month, is without the actual dates; but as the entry is only the fourth from the end of that month, the day of his burial must have been, as historians state,—the 29th. Among the Birch MSS. in the British Museum is a copy of the letter which Queen Anne is supposed to have written to the king's favourite, the Duke of Buckingham, in these words:—"Anna R. My kind dogge,—If I have any power or credit with you, I pray you to let me have a trial of it at this time in dealing sincerely and earnestly with the King that S^r^ Walter Raleigh's life may not be called in question. If you do it so that success answer my expectations, assure yonrself that I will take it extraordinery kindly att your hand, and rest one that wisheth you well and desire you to continue still as you have been, a true servant to your master." But although every effort was made to save Raleigh, it was useless. At the time of the recent restoration an effort was made to trace his remains, but that, too, failed; and although there is a tablet to his memory in the church, it has been suggested there should be, and Canon Farrar still hopes to succeed in getting for the great west window, a suitable stained glass memorial. As the text on the tablet tells us,—"Reader, should you reflect on his errors, remember his many virtues, and that he was a mortal,"—a mortal, too, hear in mind, to whom the world at large owes something.

John Milton, "the prince of poets," and Oliver Cromwell's secretary, who was then a resident in Petty France, in St. Margaret's parish, was married to his second wife, Katherine, the daughter of Capt. Woodcock, of Hackney, by Alderman Dethick, probably in the Guildhall, London, the 12th of November, 1656. We are indebted to the researches of Col. Chester for this valuable information (see Prof. Masson's "Life of Milton") and to the registers of St. Margaret's for the fact that there the banns were published October 22nd and 27th, and November 3rd. On October 19th, 1657, the Baptism Register records the name of "Katherine Milton," the issue of that marriage. But poor Milton's second venture was of short duration. His wife was buried here on February 10th, 1657-8, and the infant child on March 20th following, thus bringing, as Professor Masson remarks, darkness once again over the life and labours of this celebrated man. Of what those labours were, at Westminster at least, Professor Masson himself is the best story-teller.

To give even an outline of all the noticeable entries to be found in the registers would take up too much room, and tire the patience of our readers; but there are a few curious ones which may interest us all, and give us an insight to the style our forefathers had in registration. Turning, therefore, to the list of burials, we find these items:—1554, May 9, "Jone Wylson the heretyck was huryed without ye churchyearde." July 7, "A poore man dyed at ye Mynster doore." August 10, "Jone a pore Woman died at Westminster Hall doore." 1567, Oct. 10, "Jane a pore Woman w^ch^ died in ye theving house." 1578, June 26, "My ladie Chickin a poore woman so called." The first entry in the second volume of the register somewhat puzzled us. The burial of "Roberte Nohle" is recorded on the 24th and 25th of May, 1572, and to prevent any mistake, the clerk has bracketed the dates. Why should Robert Nohle's burial take two days? After puzzling ourselves for some time we arrived at the conclusion that as it is the first entry in the book, and as many of the subsequent entries of a later date had evidently been written in at the same time, the new book had not arrived when these burials took place, and the clerk who had kept notes in his pocket found the date of the earliest one to be somewhat indistinct, and the happy thought struck him to put down the two days, one of which he knew was correct, but it did not much matter which. The careless system of posting parish registers three hundred years ago easily accounts for the remarkable entry,—1618, January, "John Agodsname." But when we came to the year 1649 we began to think it was time to stop, for on October 11th stands the entry of the burial of "Cardinall Wolsey"! Subsequent inquiry showed him to have been a child baptised the 15th of June previously as the son of Robert, by Abigail his wife! After all, what's in a name?

Among the baptisms we find on October 25, 1598, "Nelleodillior Billy, daughter to Hugh," and on December 3, "John, base son to a pudding man." Even a couple of hundred years later the clerk had a curious way of entering, for on October 3, 1782, is this entry, "A boy with 2 Xtian names, sneaked off." It seems the child was baptised, but the parents went off without paying the fees, and so the clerk had his revenge. On August 11, 1657, were baptised "Abraham, Isaac, Jacob, and Sarah Joanes SS. and D. to Edward by Alice borne att one birth in the long Woolstaple. The mother dyed in child-bed." Upon referring to the burials, the mother's name is entered that day, and on the 16th of September the child Sarah, but no record of the burial of the three boys. If we only knew they survived to man's estate the fact would be doubly interesting.

One marriage, so far as curious names are concerned, is worth a note, and it occurs June 7, 1626, "Richard Lambe to Barbara Puddinge." The connexion is certainly suggestive. And yet these names are eclipsed by more modern ones to be found in the registers of the Church of St. Dunstan-in-the-West, such as

"Lock Key," in 1685; "Marey Whit-Sunday," in 1697; "Thomas Shipyard," in 1698; "Elizabeth Chancery Lane," in 1705; "Remarkable Bunworth," in 1712, and "Politicall Smith," the same year. In 1673, however, there is a still more curious entry of burial, "September 28, What-you-please Hill buried under the Quest House out of Chancery Lane." After this, what more need he said? We do not give our children such odd names nowadays, but for the privilege of telling our readers some of the peculiarities attending the registrations of centuries ago we owe our gratitude to William Caxton, in whose honour, and to perpetuate whose fame, this memorial is offered to our readers.

SANITARY CONDITION OF DUBLIN.

The Report and Minutes of Evidence which have been published by the Royal Commissioners appointed to inquire into the state of Dublin, "with a view to sanitary improvement," form an important and valuable volume, the value of which is not confined to those interested in Dublin.* The Commissioners are Mr. Robert Rawlinson, C.B., and Dr. MacCabe, the late Mr. William Jerrold Dixon first acting as secretary, and after his lamented death Mr. R. O'Brien Furlong. A competent person would find in its pages materials and data for an interesting and useful volume on the general subject of sanitary improvement. Before commencing to take evidence relative to the matters referred to them, they deemed it their duty to make personal inspections of the river Liffey and of the city generally, and found that the existing system of sewerage, although a cause of nuisance by polluting the river, could not be made wholly answerable for the high rate of mortality which prevailed in the city of Dublin. They therefore extended their inspections to the back streets, the courts and yards, the slaughter-houses, the cow-sheds, the scavenging depôts within the inhabited area, and to the state of the tenement-houses. The sanitary condition of Dublin revealed by these inspections was found to be so defective that they deemed it their duty to ascertain to what extent the abnormally high death-rate might be attributed to defective sewerage and drainage and the condition of the river Liffey, and to what extent it might be considered traceable to other causes.

In a recent report the City Engineer states, "Few cities have a more efficient system of main sewers than Dublin. Improvements were commenced under the authority of the Municipal Council in 1851, since which date an enormous amount of work has been done without incurring any debt, and conferring great benefit on the citizens, with the least possible inconvenience. The works remaining to be done are small, and when completed Dublin will be thoroughly well sewered." He further states that on examination of the main sewers in certain districts they were found to be free from deposit and "perfectly sweet," but that the basements of houses in the principal streets were found, on examination, to be in a deplorable condition, quite sufficient to account for the prevalence of fever in them. And, he adds, "Personal observation, during twenty-seven years' experience, confirms my opinion, often expressed, that it is to defective house drainage, the miserable state of repair in which the tenement houses throughout the city are kept; and to poverty (too often arising from drink), that the high death-rate in Dublin is to be attributed, and not to any defects in the main sewers."

The evidence tendered at the inquiry, and embodied in the Report, confirms these remarks of the City Engineer, namely, that it will be a mistake to charge the exceptionally high death-rate which has for so long a period afflicted Dublin, exclusively on defective main sewering. The Commissioners, while willing to give the fullest credit to the Municipal Corporation and to their engineer for the improvements carried out in the Dublin sewers since the year 1851, know by experience that, considering the circumstances under which they have worked, the main sewers of Dublin cannot be in that perfect condition claimed for them, as they are necessarily a patch-work system,—irregular in line, in gradient, and in cross-sectional dimensions,—they are not complete in side entrance and manhole arrangements, nor in ventilation and gully apparatus, as the evidence shows that these works are reported to be in progress at this time. Having examined the sections of the improvements carried out in the old sewers, they admit that credit is due both to the Corporation and to their engineer for what has been done, but in the nature of things the main sewers of Dublin cannot be accepted as a perfect system, such as would be designed and carried out now if the work had to be commenced without the fettering consideration of how best to arrange, improve, and bring into fairly working order a rude, irregular, and roughly-constructed number of street and road drains. The sewers of Dublin at present form a network of continuous flue communication, so that any gases generated in the lower portions and along the margins of the river can flow along the sewers and drains uninterruptedly to the higher levels, rendering the higher portions and the suburbs, which ought to be the healthiest districts, exceptionally unhealthy. The remedy for some of these defects may be provided in the main intercepting scheme of sewerage when this system is carried out.

The main sewers having been constructed from time to time, and not on the best plan that modern engineering would now devise, the City Engineer calculates that a further sum of 30,000*l.* may be required to complete the main sewers.

The evidence laid before them leads to the conclusion that house-drainage in Dublin is extremely defective in all classes of houses. The house-drains, from the description given, would appear in the vast majority of cases to consist of loosely-constructed rubble-walled channels, resting on the soil beneath the basement, and from their imperfect construction presenting numerous points of leakage through which sewer gas and fluid sewage escape and saturate the subsoil. Under conditions such as are described, it is not surprising that the health of Dublin should have suffered, and that the mortality from diseases classed as constitutional should have remained high.

Five plans and estimates for the main drainage of Dublin were brought before them, and these are fully described and illustrated in the Report.

As to the river, the following conclusions are taken as established, namely:—

a. That the River Liffey is now in a state of pollution from the influx of sewage, so as to be offensive, especially during periods of local drought and warm weather.

b. That with the extension of the city and the completion of main-sewering and house draining, the pollution will be greatly increased.

c. That a fuller and more complete washing of footwalk surfaces and flushing drains and sewers will also add to the impurity.

But though the evidence on the question of the pollution of the river is full and clear, with few exceptions, the opinion is also prevalent that the foul river is not a material cause of local disease. And though it is generally accepted that the polluted Liffey is not the prime cause of the excessively high death-rate of Dublin, it is locally considered to be a known, palpable, offensive, and admitted nuisance, which ought, if practicable at any reasonable cost, to be abated.

At present the tides, as they rise in the river, block the main-sewer and drain-outlets, shutting back the sewage, which then accumulates in the sewers. The remedy for this defect will be by manholes and ventilating-chambers constructed on the intercepting sewers behind the quay-walls, to stop the blocking action of the tide, and providing means of escape for sewage gases so as to secure extreme dilution.

The Report then touches on some general matters relating to the health of the city of Dublin. The city of Dublin in 1879 contained 23,830 houses; of these 9,760 were occupied as dwellings let in tenements, and it appears from the evidence of the executive sanitary officer, that of houses of this description occupied by more than one family, 2,300, containing an estimated population of 30,000 persons, are in a condition which renders them unfit for human habitation, and some are not worth the expenditure which would be necessary in order to place them in a proper state, and to provide the requisite sanitary appliances. Of the houses let in tenements, it may be stated, in general terms, that they were originally intended for the accommodation of one family, and that they had only one privy and ashpit, the sanitary appliances at the period they were built being considered sufficient for the use of a single household. Under existing conditions it, however, frequently happens that each room is occupied by a family, and as far as can be ascertained it would appear that about 117,000 of the population of Dublin are thus lodged. The average number of persons in each tenement house is stated to be from ten to twelve, but this number is frequently exceeded, so that excessive overcrowding is the rule. The occupants have to resort to one ashpit, placed in a yard, and if there is a privy it is utterly unfit for use. When it is borne in mind that the corporation, acting as the sanitary authority, have not so far been able to organise any regular system of domestic scavenging, it is not surprising that the condition of the privies, yards, and ashpits attached to the tenement houses should be described by all witnesses as "extremely filthy and detrimental to the public health." These statements are borne out by the inspections the Commissioners made in different parts of the city. In all cases they found the privy accommodation inadequate, the ashpits unduly full, the yards badly paved, filthy, and generally having no connexion with the sewers, except by surface drains, which frequently had no proper fall.

Amongst the several sanitary defects of the city of Dublin, the condition of the tenement-houses is perhaps the most pressing, and is certainly, as the Report points out, the most difficult to be dealt with. The houses at present let in tenements have been erected at various periods, some previously to the beginning of the present century. In one of these Dublin tenement-houses, there were counted 78 inhabitants, the rents paid by each occupier or family ranging from 10*d.* to 5*s.* per tenement or set of rooms. There are said to be about 1,100 tenement houses owned by five persons, who are not absentees, but who reside in the district for the purpose of receiving the rents. If these 1,100 tenement-houses only yield 5*l.* per annum each, there will be 5,500*l.* per annum for these five owners, or at a rate of about 1,100*l.* each. The great blot in Dublin all admit is caused by these tenement-houses, and the peculiarity is that they are not confined to narrow streets and poor localities, but are to be found in all parts of the city. The history of a modern tenement-house fully told might be as interesting as a passage in a novel, and its gradual degradation shown to be as terrible as a tragedy. These 9,700 tenement-houses when first erected were, as previously stated, arranged each for one family; now they are divided and subdivided, and let in flats and single rooms from basement to attic, and, as stated in evidence, one house being made to serve for seventy-eight tenants. This degradation of houses is, it is clearly shown, at the root of most of the excess of disease to be found in Dublin. It is not in defective sewering, defective paving, defective street-scavengering, or in the polluted state of the river Liffey, so much as in these horrible room-tenements, which exist to the direct injury of more than 100,000 of the poor inhabitants, and at the indirect charge and direct money loss of the entire community. The poor people who overcrowd these tenements, and pay the pittance of 6*d.* or 1*s.* 6*d.* per week for their room, buy misery very dearly, in loss of wages through sickness and suffering. The evidence in this Report tendered by leading physicians, medical officers, and others, all points to similar causes, —overcrowding, filth, foul air, drink, sickness, beggary, and pauperism. Public sanitary works and main sewers will be of little avail if these tenement-houses are left in their present neglected condition, without a proper supply of water, and utterly without any privy accommodation. It may be said that there is a public supply of soft, good, and wholesome water, sent into the city even in extravagant abundance. This, no doubt, is true; and yet the evidence given by the local medical officers shows that practically the poor have no good water, as it is stored within the room improperly, the vessels used in some cases being of the most objectionable character.

The room-tenements of Dublin being the great sanitary sore of the city, until these places of residence are improved in some practicable and effective manner, there will be no hope or prospect of bringing the death-rate of Dublin to a moderate standard. The evidence against these tenements may be described as overwhelming. But the Commissioners see no reason to doubt that a considerable proportion of the tenement-houses may be converted into healthy dwellings.

In finally deciding upon the system of filth

* Report of the Royal Commissioners appointed to inquire into the Sewerage and Drainage of the City of Dublin, and other matters connected therewith, together with Minutes of Evidence, Appendix, Index, &c.: presented to both Houses of Parliament by command of Her Majesty. Dublin: Alex. Thom & Co. 87, 88, & 89, Abbey-street. 1880.

removal which the Corporation may deem it best to adopt in respect of the tenement-houses of Dublin, the Report impresses upon them the importance, from an economical point of view, of availing themselves as far as possible of the water-carriage system, for which the existing sewers should be adapted.

Treating of road formation, the Report has the following passage:—

"Wood is now being extensively introduced and used for street surfaces in London, where the traffic and wear are very trying. Most of the varieties of pine-wood have been tried or are in course of trial, as red pine, pitch pine, yellow pine, and pine from the Baltic. The samples of pine woods enumerated vary considerably in hardness, as, for instance, pitch pine and red pine are harder and heavier than yellow pine or than Baltic pine, but they do not appear to stand wear so well as the softer and cheaper wood. This, however, is to be accounted for by the yellow pine being more yielding to the horses' feet and carriage-wheels,—that is, these do not jar and jump as they do on the harder surfaces. The softer wood, being more elastic, endures slight compression without disintegration or causing so much of a jar to the carriage-wheels as is experienced on harder wood pavements. Some of the wood-blocks have been laid on a base of sand and two sheets of 1-in. thick pine boards, the wood-blocks being placed about 1 in. apart, the open joints being filled in with gravel and pitch. This form of paving has not answered, as the base is not sufficiently solid and firm to prevent a vibratory motion when driven over, which is plainly to be felt and disagreeable to be experienced. The material filled in to the wide joints does not wear evenly, but permits the edges of the blocks to splinter and fray, and this goes on until the surface of the street becomes ridgy and uneven, wearing rapidly out of condition. The best foundation for any form of material constituting street pavement, such as asphalte, granite sets, or wood, is unquestionably concrete, and the better and stronger the concrete is when laid, the longer will any covering placed upon it wear. From this time forth, all road-makers who wish to produce the best wearing and enduring street pavements, must first form a good foundation. This, in fact, must be the true road, the covering being only a veneering, to be repaired and renewed from time to time, as may be necessary. It is the absence of a sound concrete foundation to the streets of Dublin which tends to the production of so much mud on their surfaces."

Effective street-cleansing is one of the most important municipal duties, and to be effective the cleansing must be at short intervals, with the immediate removal of the refuse cleansed.

In consequence of the evidence given by the medical officers of health, the Commissioners rightly draw the attention of the sanitary authority to the circumstance that at present, with the exception of those attached to the Mendicity Institution, there are no baths and wash-houses for the poor of Dublin, though there are Turkish baths for those who will pay for the use of them. Baths and wash-houses for the working-classes have become common in English towns, and where they have been judiciously placed, constructed with economy, and are well arranged and properly managed, they are found to be not only a luxury but a necessity.

The Commissioners entertain little doubt as to the conditions which exercise the most injurious influence upon the health of Dublin. They consider these conditions to be:—First, the state of the tenement-houses, their overcrowding, their defective drainage, and the absence of any organised system for the removal of filth from their surroundings. Next, the defective house-drainage, including in that term the connexions between the house-drains and the public sewers, and are satisfied that defective house-drainage exercises an influence prejudicial to the health of the occupiers of the best as well as of the worst class of houses. Owing to generally defective house-drainage, the inhabited area of Dublin possesses a saturated subsoil, and there is reason to believe that within, as well as outside, the house foundations, the subsoil water is contaminated with sewage matter.

The following are the most important conclusions arrived at:—

"That the main sewers of Dublin have been improved, but have not been completed; that new sewers are required; and that the entire system of sewers and drains should be more fully ventilated and have additional side-entrances, manholes, gullies, and flushing arrangements formed and completed.

That house-drains are proved to be very defective; and that yards, courts, and back streets are, for the most part, defectively drained and very dirty in consequence. That privy accommodation is generally defective throughout the poorer quarters of the city, and that it is, for the tenement-houses, practically absent; and that, as a consequence, the inhabitants suffer both in health and in morals.

That the tenement-houses of Dublin, according to the medical evidence so voluminously tendered at our inquiry and embodied in this our report, appear to be the prime source and cause of the excessively high death-rate; that they are not properly classified, registered, and regulated; that they are dilapidated, dirty, ill-ventilated, and much overcrowded; and that disease, a craving for stimulants and its consequences,—drunkenness and extreme poverty,—are thereby fostered, and that until the condition of these houses shall have been improved the general health of the city will continue to be injuriously affected.

That the Corporation have taken action under the Artisans and Labourers' Dwellings Improvement Act with the view of effecting tenement-house improvements, and that it is desirable they should further extend their operations in that direction.

That most of the courts and yards in connexion with tenement-houses are unformed and unpaved, and that, as a consequence, there is an accumulation of offensive dirt, general discomfort, loss of health, and loss of power to earn wages.

That many of the streets are formed with defective material; that public scavenging is inadequately performed; that there is no municipal system of private scavenging; and that, as a consequence, the streets are dirty, and that courts and yards are at all times filthy.

That in our opinion the cleanest and cheapest mode of removing excreta will be by water, through closets, drains, and sewers, to a common outlet. Houses must be drained, streets must be sewered, so as to remove waste water; and if these drains and sewers are well and truly constructed, no additional expenses need be incurred to transmit the entire volume of excreta from the houses and city (if it is suspended in the waste water removed from the city), through the main and intercepting sewers to some outlet."

They end by recommending the plan for main drainage prepared by the City Engineer, who is most intimately acquainted with the city, with its sewers, with its drains, and with its water supply,—a plan estimated to cost 300,000*l.*, and they urge that the sewerage of the city be completed as soon as practicable, so that every street within the municipal area may be provided with a sufficient main sewer.

The Corporation should take action at once,—not to-morrow, but to-day.

THE ARCHITECTURAL ASSOCIATION IN EAST ANGLIA.

The Architectural Association is this year following, to some extent, in the steps trodden by the British Archæological Association last year,—with respect to the Norwich part of that pleasant meeting. The members assembled on Monday, the 16th, at the cathedral, and were carefully guided by Mr. John H. Brown, the cathedral surveyor, round the outside and inside of the church, and the group of buildings near to it. Persistent attention to the buildings during his father's tenure of office, and his own, necessarily implies intimate knowledge of every detail, and all his stores were most kindly displayed when called for by the members. As, however, the main lines of the history are an oft-told tale, and especially as we retold it in the words of Dean Goulburn so recently (see *Builder*, 30th of August, 1879, page 965), repetition would now seem uncalled for. There are, indeed, plenty of topics for controversy, and for reconsideration of authorities and of the evidence of the stones themselves, which will engage attention in the future as in the past, so that diligent antiquaries may reflect with satisfaction on the prospect of no lack of the toils which are their pleasures. The works at the west front are not yet quite completed. The aim has been to put back features of the Norman structure which were taken away not so very long ago, when parts of the front were recased and recast. Towards the eastern end of the church decorative paintings have been laid bare from time to time, and there is now a goodly store of ornament and figure painting of various dates,—much of it, of course, a good deal reduced in force, and nowhere very completely showing the original scheme. There are, however, hits showing rare talent in design and execution. Doing a good deal of the work done upon the cathedral, since remodelling came into fashion half a century or so ago, was hardly a matter of choice or preference,—and in all candour it must be confessed that the whole result is not all that could have been longed for, or in sanguine moods hoped for. Close-jointed ashlar in the south transept, for instance, goes ill with the too-forcibly jointed masonry elsewhere; and false-jointed stones, if they do not parade quite all the wrong-doings of the masons and designers who were not ashamed to prepare them, do not conduce to the peace of mind of the conscientious observer of other people's errors. It should be mentioned, by the way, that this sort of sin has not to be compounded for nowadays, and that most of the more recent work is carefully conservative of ancient forms in the shapes and surface textures of the stone-work. Privileged visitors have every ground for feeling that complaint on their part would be ungracious and foolish, even when they are inclined to heave a sigh of regret because this great church has not come down to our time with the greensward running to the base of its walls,—as a sight all the year round for townspeople and casual visitors. The grounds of private residences sweep round so large a portion of the building that the charm of Salisbury or Wells, which makes everybody anxious to recall frequently the memory of them, seems largely absent. It is not every sight that we share with all the world which loses value in our eyes on that account. Something may some day be done which will give to the many what is now accorded with the best grace to all who can make good use of the privilege. The recent wanton defacement of the lavatories in the south-west corner of the cloisters is, however, a dreadful example of the barbarisms that people of decent appearance and presumably fairly well-to-do can indulge in at times. At best it is an unwholesome habit which prompts anybody to mark a wall, in order that he may convince himself in the course of a generation or so that he visited in the flesh some scene which he might otherwise believe had been only come across in imagination. Much training seems to be required for the "cicuration of first and destructive malignities"; perhaps nothing short of the best exertions of members of Sir Thomas Browne's profession would be necessary in order to bring about the thorough taming of such inveterate forms of rude inanity.

In order to effect a diversion from such severe moralising, let it be noted that the Dean exercised a kindly hospitality; that St. Peter Mancroft, now in full restoration, was visited thereafter; and that St. Stephen's, St. Peter's Permountergate, and St. Giles's, occupied the rest of the first day. When the whole of the programme has been duly worked through, it may be possible, as the examples have been carefully chosen with that view by the skilful Excursion Secretary, Mr. C. R. Pink, to use them as texts for a short discourse anent some of the distinctive characteristics of the architecture hereabouts.

THE BRITISH ARCHÆOLOGICAL ASSOCIATION.

On Monday last the members of the British Archæological Association opened their thirty-seventh annual congress, in Devizes, and were cordially received by the Mayor and Corporation, and the representatives of the Wilts Archæological and Natural History Society, at half-past three, in the Town-hall, where a numerous audience assembled. The ancient charters granted to the town by different sovereigns, together with the maces and loving-cup belonging to the Corporation, and other objects of interest were exhibited and inspected by the visitors with much interest.

The Rev. A. C. Smith, on the part of the Wilts Society, cordially welcomed the British Archæological Association, and observed that Wilts men were proud of the antiquities of their county, and they hoped to show the great London society objects of interest second to none in this country. They had certain Mediæval specimens of architecture well worthy of inspection, also some good specimens of monastic work,—Malmesbury and Lacock Abbeys,—while there were interesting illustrations of domestic architecture at Potterne and other parts of the district. Wiltshire, however, was not famous so much for works of the periods referred to as for those of the earliest of all periods,—the British periods; and where could they look for better specimens of these than on the downs to be visited during the week? They would also have the opportunity of inspecting Stonehenge and Avebury, which were the largest stone circles in existence, that at Avebury being the most extensive, although less known to the general public.

Mr. Morgan, F.S.A., treasurer to the British Archæological Association, having replied, the

visitors were conducted to the churches of St. Mary and St. John, described by the rector of Devizes, Dr. J. Hart Burges; the remains of the ancient Castle of Devizes, and the grounds of the modern structure, now the residence of Mr. Leach, were subsequently visited.

Earl Nelson, the president, delivered his inaugural address at the Town-hall in the evening. His lordship, who was cordially received, said he felt pleased to accept the office of president over these meetings, though he had no pretensions whatever to great archæological lore, and really represented the more humble, but perhaps as useful, and certainly more numerous, class of people who might do a great deal for archæology—the busy bees, who might gather honey for the greater ones to work and feed upon. Speaking of what archæology had already done, he said there was no end to the immense advantages they saw in these days from their work in elucidating history; for during the last half-century the history of this country had been really re-written by the means of archæological research. These recurring meetings, though they might be held amidst scenes often visited and reported on before, had a greater work to perform than was at first apparent. It was much more than the pleasant picnic which many of their outings in this fine weather enabled them to enjoy. It was much more than the additional pieces of information that might be gathered upon each fresh visit and from the valuable papers which would be read: its greater work was a missionary one, and the zest that such meetings gave to all to become antiquaries, to gather together little bits of family history, and of the history of their respective parishes, to support the local association, promote the circulation of their archæological and natural history magazine, and contribute to its pages. In that way a mass of information was gathered together from time to time which helped to elucidate different obscure parts of history, and had already, through the "Wiltshire Magazine," added much to the materials for a county history, which, with much less labour than Sir Richard Colt Hoare and his noble compeers bestowed, would greatly enlarge and illustrate the work associated with his name. A well-known archæological friend,—Canon Jones, of Bradford,—was on the point of bringing out a most interesting book on the original uses of the different parts of Salisbury Cathedral, with a second volume on the whole religious history of the diocese from the earlier times,—a publication which, in such hands, would be most useful to the history of the county. In reference to the ecclesiastical branch of their subject, he illustrated, by two instances, how a true knowledge of archæology would have had an eminent useful purpose. When restoring Salisbury Cathedral there was a natural desire expressed by the laity that they should not have a closed choir, and that they might have seats, if not in the choir, at least in the north and north-eastern transepts. Both these demands were looked upon as contrary to old arrangements; but he believed that Canon Jones's book would show that at Salisbury the return stalls were a mistake, as it was a foundation of secular canons, and that in the original design the laity sat in the presbytery and the two eastern transepts, thereby surrounding the altar. There was a direct order in part of the old Sarum Use that the priest walking round the altar should incense the people in the transepts and in the presbytery. The other case he adduced was the use of colours at the different church festivals and seasons. The colours adopted by many in ignorance of the subject were taken from the modern Roman Use, whereas the old colours of the Church of England, as taken from her old service-books, pointed to the part Gallican and part Eastern origin of their Church, and gave an additional proof of her independence of Rome. In these two instances it was clear that a true knowledge would have avoided a cause of offence, and, if the deductions of Canon Jones were correct, would have shown that a desire to act according to the old order of things would have been in favour rather than against the natural desire of the people. His lordship then proceeded to point out that they might assist in promoting archæological lore by preserving the old names of the different fields and farms. Every field had a name, and many still retained them by mere tradition among the old labourers and in the old parish maps and terriers. Some of more modern date only referred to the size of the field on its comparatively recent allotment, such as "Hundred acre," which generally meant "under acre," and "Ten furling," or the like, but there were much older names than those, and if they ever attempted to walk the bounds of an old Saxon charter many of the old names, if kept, would help out the boundaries, and the specified points on the boundary would give a point and an explanation to the names. Whelpley, Wellow, Landford—often spelt with two l's—were a proof of the British being originally to the east of their Christ-Church Avon. Cerdic's battle at Charford drove them to the other side and caused the succession of forts from Old Sarum down the valley protecting the western lands to which they retired. A few years ago, in digging in a rabbit burrow, Lord Radnor's keeper came upon an old Saxon chief with his sword by his side, who had evidently fallen in the moment of victory in the middle of the fortified path he had taken from the British—following up the successes of Cerdic, and driving the Britons on the other side across the river at Britford, which it was still called. That showed the use of preserving names and the old earthworks. A discovery was made which would have been comparatively useless without those well-known surroundings which, having been preserved, gave a consistency to the history. His lordship then proceeded to refer to some of the places of interest which it was the intention of the archæologists to visit. Referring to the tumuli, he said those on the Wiltshire downs had been sufficiently excavated; and he thought nothing could justify the profanation of old burial-places when there was a certainty of no new discovery being made. He did not see, however, why a careful tunnelling should not be conducted under the so-called altar-stone at Stonehenge, to see if any remains which might illustrate the age of Stonehenge could be found there, or within the sacred circle; and secondly, he advocated the replacing of those stones which had fallen within man's memory, or a record of which had been carefully preserved. The mechanical appliances of the present day could easily replace them. The necessity of something being done to preserve the ruin as handed down to us was becoming more and more pressing. One of the great stones was gradually leaning more heavily on a stone of the inner circle, and it might come down any day. Some means should be taken by artificial supports to prevent that catastrophe, and he could not for the life of him see why, when that was done, they might not have those stones replaced whose position was clearly known, and whose fall had been carefully recorded. Having briefly glanced at the programme, the noble earl said he earnestly wished them a happy and successful meeting, and he should be fully satisfied if under his presidency many of the small fry learnt their own usefulness, and resolved to put their shoulders to the wheel and endeavour to collect and preserve all such monuments of the past as came in their way, so as to bring them under the notice of the greater *savans*.

The Mayor proposed a vote of thanks to the noble earl for presiding, and for his delivery of the introductory address, which was carried with applause.

At half-past eight on Monday evening a dinner was held at the Bear Hotel, Devizes. About 100 ladies and gentlemen sat down, under the presidency of Lord Nelson. The usual loyal toasts were followed by others of a social character and specially applicable to the gathering.

Punctually at nine o'clock on Tuesday morning carriages were in waiting at the Bear Hotel, the party being evidently bent on business as well as pleasure. About 100 ladies and gentlemen started for the village of Potterne, about two miles west of Devizes, where the fine church was examined, under the direction of the Ven. Archdeacon Buchanan. The church is cruciform, the massive square tower being one of the finest of the kind. Mr. Loftus Brock pointed out the most interesting points in the architecture of the edifice. He said it was a good specimen of the general style of the older churches in Wiltshire, nearly all of which were of a cruciform shape. The old houses were next examined, and proved to be of very great interest to the archæologists. The houses have lately been restored, and to a certain extent spoiled, though their general features remain the same as of yore. The prevalent opinion was that they were formerly the residence of some episcopal magnate. A very old and interesting building known as Church House was next visited and commented upon by the Rev. H. A. Olivier. About eleven o'clock the drive was continued through Erlestoke to Edington, where the beautiful church was examined, and attracted great interest both inside and outside. The church and monuments were described by Mr. J. R. Bramble. At one o'clock the party went on to Tinhead. After examining some points of interest in the village, luncheon was partaken of at the George Inn. At three o'clock the village of Bratton was reached, and after the old church had been examined, the Castle was visited and the encampment, the company walking up the steep ascent. Here they stayed for nearly an hour. The spot is of the utmost interest to archæologists. It is said that on this spot King Alfred visited the Danish camp in the guise of a minstrel, and there learnt their tactics and their strength. Recent discoveries show that near this place it must have been where Alfred achieved his great victory over Guthrum and the Danish army. The spot was explored and commented upon by many of the party. Soon after four o'clock the party re-assembled at Bratton, and proceeded to Steeple Ashton, where the church was visited. This building is more like a small cathedral than a village church, both interior and exterior being richly decorated. The lofty tower and nave and the number of pinnacles are not unlike St. Mary's Church at Devizes. Inside, the beautiful pillars and columns were greatly admired and much commented upon. The old church at Keevil was next visited, and then the old houses in the same village; these latter are very much like the old houses at Potterne, and are some of the finest specimens of old Domestic architecture that exist in the neighbourhood. About six p.m. the party proceeded to Poulshot, where the church was visited, and described by the vicar, the Rev. H. A. Olivier. The beautiful old belfry was greatly admired. This concluded the programme for the day, and the party returned to Devizes at seven p.m. At half-past eight a meeting was held at the Town-hall, when papers were read by Mr. J. A. Picton, F.S.A., and by Dr. Stevens.

On Wednesday about one hundred members and friends proceeded in carriages from the Bear Hotel, Devizes, at nine a.m., to Bishop's Cannings, where the church was visited and examined. Mr. Loftus Brock said the building was a splendid exemplification of the cruciform type of church. It was in the Early English style of the thirteenth century, the pointed arches being very fine. He called attention to the beautiful work on the roof of the chancel. The spire, he thought, was of a later date than the tower, and was no doubt intended to be higher. Proceeding to Wansdyke, the excursionists, after walking along the entrenchment for about half-a-mile, were called together, and the Rev. A. C. Smith addressed them. He said that the ditch was thrown up as a defence for the inhabitants of the east from the raids of those on the west. He thought it was the last entrenchment erected by the Belgæ to protect them from the Britons. It could be traced for thirty miles, and for ten miles most distinctly. The party then crossed the Roman road near Wansdyke, and went on to Avebury, where a prolonged stay was made. The Rev. A. C. Smith said that Avebury was much older than Stonehenge, which was proved by the stones being rough and uncut. There had formerly been two avennes, but they had been almost demolished. The largest of the stones weighed 63 tons; one weighing 90 tons had been destroyed nearly 100 years ago. Mr. J. A. Picton, F.S.A., Dr. Stevens, Mr. Morgan, and others, also commented on the temple,—Dr. Stevens speaking of the peculiarity of the use of the number three in such erections. After luncheon the party visited and examined Avebury Church, and then proceeded to Sitting-hill. The party returned to Devizes about seven p.m. the day having been beautifully fine.

Melbourne Social Science Congress.—The first meeting of this Congress will probably take place during the month of October, 1880, in connexion with the Melbourne International Exhibition. Mr. Chester Earls, hon. sec. of the Music, Science, Fine Arts, and Literature Section of the Congress, is desirous of receiving papers on any of these subjects, which should be addressed to him at the Victorian Academy of Arts, Melbourne. Communications will be received as late as the 20th of October.

PORCELAIN HOUSE, VIENNA.

Bearing on the subject of the papers on terra cotta we are giving at this moment, we illustrate a house recently erected in Vienna, and in which porcelain has been largely employed externally. For some time past we have kept our readers fully informed of the movements in art and architectural progress on the Continent, and have shown the vast changes which the last two decades of building operations have brought about in Vienna. The venerable Kaiserstadt has been rejuvenated. Old Vindobona has burst the bonds which for centuries restrained her expansion and development. Her emperor spoke the word, and the old walls, before which the barbarian despotism now tottering to its fall in Eastern Europe received the check which marked the zenith and the first sign of the decline of its power, are crumbling under the gentle influence of modern civilisation. Become once more youthful, and at the same time more beautiful and imposing than she ever was, Vienna is rising fully conscious of the liberty which has been granted her. An unbounded architectural activity, which soon set in after the wand of the enchanter had touched her shackles, announces in monuments of stone the new glory of the younger city. The new squares of the city form real pattern-cards of all possible styles; every variety of taste finds expression. The population of Vienna took, and still takes, a lively interest in the splendid edifices which are arising on all sides. Every newly-finished building forms the subject of conversation until another edifice completed invites public attention. The most recent subject for discussion is the so-called Porzellan-Haus in the Kärntnerstrasse. The building derives its name not only from containing the shop and warehouse of the firm of Ernst Wahliss, dealers in porcelain, but also from the fact that china has been used in decorating the façade of the building, an experiment for introducing a new and more durable material, and one more suitable than terra cotta for polychromatic effect in architecture.

As with everything new, great difficulties had to be encountered in the neighbourhood in the employment of porcelain for architectural decoration, difficulties happily overcome by the perseverance and numberless experiments of Herr Carl Knoll, porcelain manufacturer at Fischern, near Carlsbad.

The house, of which Herr Baurath Gustav Korompay is the architect, contains in the basement, the ground floor, and the mezzanine stories, the warehouse of the above-mentioned firm; while the three upper stories have been fitted up for private dwellings.

The fact that for the lower stories large spaces not intercepted by walls were required, while the upper floors had to be subdivided by walls into dwelling-rooms, necessitated the employment on a large scale of iron in the construction of the house. The very complicated ironwork, as well as all the locksmith's work, was executed by Albert Milde, the "Court" locksmith.

In the centre of the warehouse is a large square courtyard, covered in with glass as high as the first floor. This space is the shop proper, and from it stairs lead to the basement and the mezzanine floor. This court, with its double galleries in the ground and mezzanine stories, filled with a rich selection of the various *genres* of china, faïence, majolica, and all the other products of the potter's art, deserves to be called one of the sights of Vienna. All possible forms and brands are represented, from the cheapest and simplest vessels to the most elaborate products of the celebrated Meissen china factory. We have here, indeed, a very international exhibition of the china industry, offering to the connoisseur inexhaustible material of ever-changing interest. But even the uninitiated, the layman, to use a common term, in the potter's art, will be charmed. English visitors should by no means neglect it.

The illustration which we give of the building is from a photograph.

Army and Navy Hotel.—The announcement of this Company has been received with much favour. We understand that an eligible site has been secured in Victoria-street, and under efficient management the proposed scheme is certain to secure a very large measure of public support. There is no reason why a full measure of comfort should not be secured with a less expenditure than has lately been thought necessary in such undertakings.

THE ARCHITECTURAL EMPLOYMENT OF TERRA COTTA.

In a former article* we summed up the principal practical facts connected with the use of terra cotta as a building material; its advantages and disadvantages, and some of the difficulties which have had to be surmounted in bringing the manufacture up to its present point of excellence. We have now to consider what are the special characteristics of architectural treatment which terra cotta demands in order to produce a satisfactory architectural and artistic result in harmony with the capabilities and peculiar character of the material.

The two points to be chiefly borne in mind in designing for terra-cotta are, that the size of the pieces to be used is limited, and that the material, while incapable of the high finish and precision which can be obtained in stone detail, and still more in marble, possesses, before it goes into the kiln, absolute plasticity: it can be modelled by the hand with great ease and rapidity, and with as much variety as in drawing. There are other minor considerations to be noticed just now, but these two are the most important as affecting what may be called a terra-cotta style in architectural design, as distinguished from a masonry style. The first consideration manifestly points to the fact that buildings with large projections are unsuitable; they can never be carried out in a pure terra-cotta style, or without assistance, open or concealed, from other materials. The projecting cornice, which has its type in Classic architecture, has therefore no proper place in terra-cotta architecture. It has been carried out, and in one very notable instance in this country in the front of the Science Schools, towards Exhibition-road, at Kensington, which is treated in a very bold manner, but where unfortunately the design is not true, and the features which appear to be brackets doing some of the heavy work of the upper part of the design require concealed supports to carry them. Those who know nothing of the nature and capabilities of terra-cotta may no doubt admire such a design, which, as a mere composition, is very effective; but, to say the least, it is surely undesirable so to design a building that the less respect will be felt for the design the more that people know about the material and the way it is put together. Let it be taken as a first rule, therefore, that nothing is to be attempted in terra-cotta architecture which is not capable of being honestly executed in the material, without the aid of concealed supports and ties.

The other condition is a much pleasanter one to contemplate, since it is not a restriction, but rather involves a declaration of entire liberty to the designer. He has before him a material capable of endless variety of treatment, and the whole value of which consists in its artistic treatment. If he wishes for a considerable amount of repeated ornament economically produced (and there are occasions when repeated ornament is the most effective and when economy must be a consideration), he can have it more easily than in most materials, and without the consideration that he is setting workmen to carve repetitions of a detail mechanically one after another. But the real advantage of terra cotta in architectural detail does not lie in its facility for producing repeated ornament with a mould, but rather in the facility which it offers for working continuous ornament by hand with constantly varying detail, and in a material where the designer's thought can be at once realised, improved on, and varied as he proceeds, with as little restriction as if he were making a sketch of it; or if the object is to produce at some special point a repetition ornament, this can be done by hand with far less labour than if carving were required, and with all the slight and hardly definable deviations from precise repetition which the human hand puts even into repetition work, as compared with what the mould can do. Indeed, in terra-cotta work, mould-repeated ornament should not be used except in the case of the very simplest kind of ornament, the mere commonplaces which serve to break a line or mark off a division in the design, and which it might seem hardly worth while to employ the human hand upon. And along with this facility of modelling ornament there is also the capability of employing, if stoneware be used, a considerable variety of colour which is indestructible, and more susceptible of cleansing, amid the contaminations of a town atmosphere, than any other building material.

Terra-cotta architecture, therefore, seems to point itself out, from the very qualities and capabilities of the material, as being essentially an architecture of ornament. Where it is not so, it has been mostly a material employed on grounds of economy where stone was scarce; and this, in fact, was the first origin of its extensive employment in architectural design; its capabilities of producing rich and varied ornament came afterwards. Terra cotta has been called an art of the Romans, but Roman terra cotta was hardly used as an architectural material. It was rather a material out of which a few ornamental objects were made, such as vases, &c.: we might, perhaps, call the very hard and impervious Roman building-tile terra cotta, for such, in fact, it was, but then this was not architecture; this was merely the core of the building, to be covered afterwards with marble or stone, or in distant provinces, where these more costly materials were not available, probably with plaster. The first really architectural use of terra cotta arose in the clay plains of North Italy, and it is from the productions of the architects of this district in the thirteenth, fourteenth, and fifteenth centuries that much of the inspiration of the modern terra-cotta designer in architecture has been or should be drawn.

In earlier specimens of these North Italian buildings in terra cotta we find the greatest simplicity. In one or two of the old churches at Pavia, for example, there is hardly any ornament but the simple moulded brick cornice, in two or three projecting rolls one over another; the baked clay is used in the most unostentatious and straightforward manner as an economical building material. Later we find a gradual elaboration of ornament, especially in cornices, and also in ornamental work in panels and on the face of pilasters, the latter especially being a favourite way of applying a somewhat conventionalised floral ornament in terra-cotta relief. When we come to such a building as the Certosa at Pavia, we find richness carried in some parts of the building almost to its greatest possible extent in the materials used; and in some respects the Certosa is rather a warning against overdoing it. What may be called the constructive ornamental details, such as the designs of the cornices, are admirable; but the applied ornament in the panelling is often not at all satisfactory when examined in detail, and has faults of style which are lost, it is true, in considering the design as a whole, but which are very apparent on close examination. As a whole, too, it may be said that the Certosa of Pavia is too loaded with ornament, and that its principal façade narrowly escapes having what is sometimes termed a gingerbread effect. Richness of ornament, however beautiful in itself, requires to be massed and composed so as to show a certain predominant idea in its distribution, and to have some unornamented spaces to give the effect of contrast, otherwise the very richness of the ornament to some extent obscures its effect and defeats its object.

In some of the other North Italian buildings this is very admirably done. In the Church of the Carmine in Pavia, for example, the ornament is for the most part confined to the cornices and horizontal strings, and is there admirably designed so as to bring out some of the best capabilities of the material. Figure 2 in our illustration is the main cornice, and this is interesting and significant in more ways than one. It shows the curious struggle between Classic and Gothic detail which went on in the North of Italy in the period just preceding the development of the Classic Renaissance. We have Classic mouldings and the Classic dentil ornament at the top and bottom of the cornice, and Gothic details in the middle portion; and this kind of combination meets us over and over again in the architecture of this district and period. This, however, is not a fact having any special reference to terra-cotta design; it would perhaps have shown itself equally in masonry design. But we see in this cornice one peculiarity which arises directly out of the nature of terra cotta; the flat outline of the cornice, namely, and its slight projection as compared with its vertical measurement. The true Classic cantilever cornice could not be executed in terra cotta except on a very small scale, as it would require larger blocks than could be made. Accordingly, while the main divisions, vertically, of the Classic cornice are clearly kept

* See p. 193, *ante*.

in mind here, while there is a kind of reminiscence of corona, bed mould, and frieze, the effect which cannot be got by projection is sought for by increased depth, and by richness of surface ornament. Other characteristics may be observed in which the material has influenced the design. Thus the twisted rope-like string below what may be called the frieze of the cornice is a kind of design which is naturally and easily carved out in a plastic material that is worked while still soft; it is easy to mould; it would be much more difficult to carve in stone, and would hardly in that case repay the trouble. The same may be said of the somewhat similar but richer spiralised ornament which occurs above the "frieze." These ornaments are also peculiarly suitable for terra cotta, for another reason which we may mention separately. The rather earlier cornice from the Certosa at Chiaravalle (a more masculine building than that of Pavia), fig. 1, is another example of the mixture of Classic and Gothic feeling, and of the means employed to give force to the cornice where it is impossible to get projection. Here the upper mouldings are distinctly and almost purely Classical; here again the space below them, with the line of toothed bricks breaking it in the centre, fills the place that would be filled by the frieze in a Classic cornice; and again we have below this the Gothic feature of the miniature wall arcade or corbels,—not here with the pointed arch, but still essentially Gothic. Fig. 3 is a cornice designed to carry out the same principle of composition, that of a deep and richly ornamented cornice without projection, but also at the same time to suggest an ornamental treatment more directly in accordance with the nature of terra cotta than some of the ornaments in the Pavia cornice and others of the same class. For it will be observed that in fig. 2 the friezo and the sub-arcading are both in reality stone forms, which would, in fact, be better executed in stone than in clay; they would be more precisely spaced and truer in their curves than it would be possible to make them when modelled in clay and burned afterwards, with the inevitable additional departure from symmetry which even the most careful burning entails. They are bits of symmetrical architectural design, in fact; but terra cotta is not the material of symmetry, but of freedom. Accordingly, in the frieze of figure 3 a treatment of foliage ornament is introduced which involves no symmetry and no repetition; which may be carried along the whole line of the cornice in the same character, but with continually-varying design; may, in fact, be actually worked by the architect of the building, if he be a modeller, with his own hands, and then fired and set up in its place, so that in such a case there would really be the architect's own handiwork, as an artist, on the building, and not merely his idea or suggestion carried out second-hand by an art-workman. The same is the case with the smaller ornament in the lower part of the cornice. This is not a repetition of one form, but an ornament which could be sketched freely by hand in the clay, and carried out with whatever variation the hand and eye seemed naturally to suggest as it proceeded, only taking care to preserve the same character and something of the same distribution of lines and parts throughout,—the effect of repetition at a distance, in fact, with freedom and variety on closer view; and this we take to be the true and special capability of terra cotta as applied to ornamental detail in architecture. The same principle can, of course, be carried out and illustrated in much more elaborate and artistic work than this simple and roughly-sketched example.

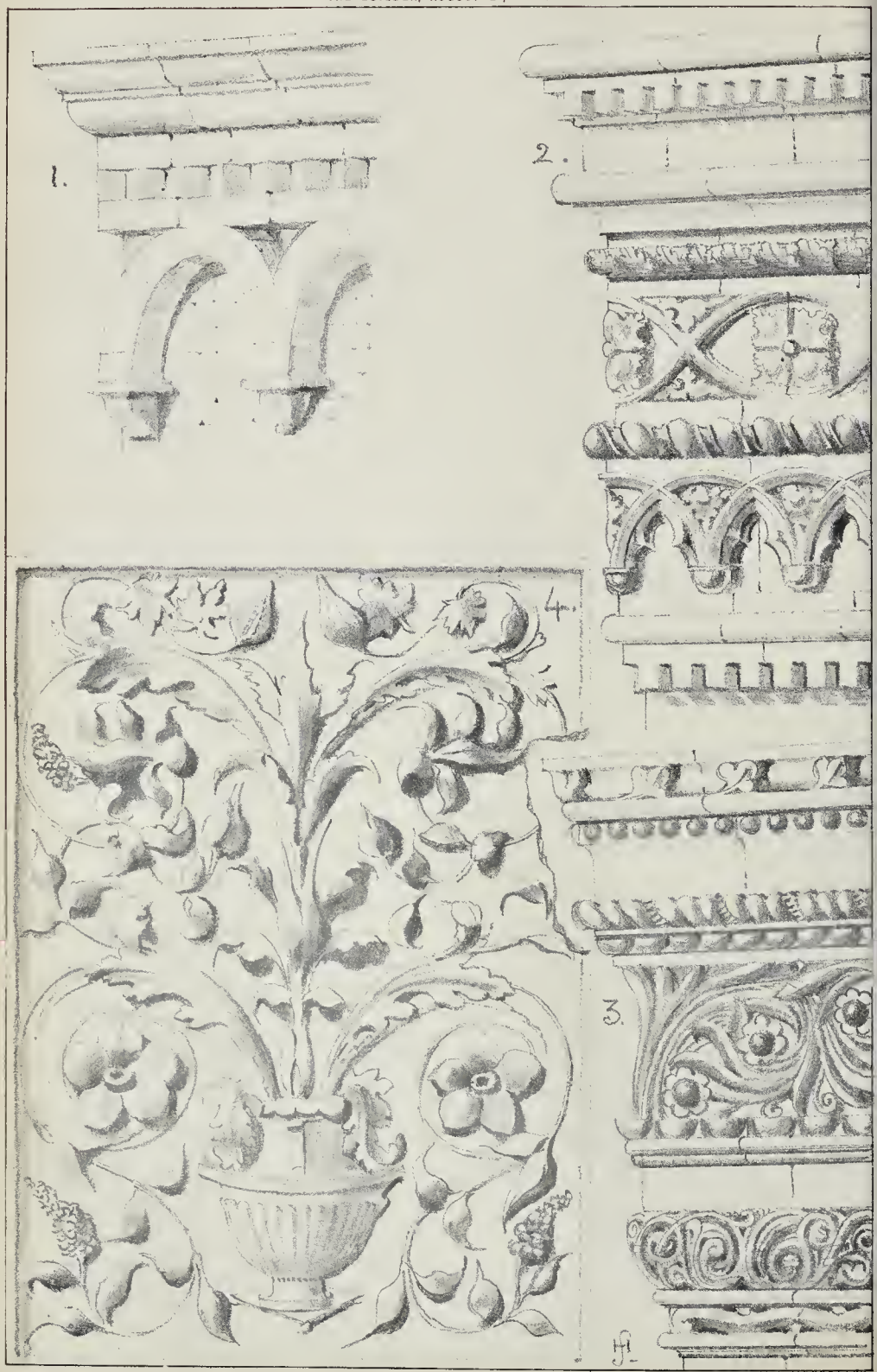
The manner in which style in ornament has been influenced by treatment in terra cotta is well illustrated in the panel from Brescia Cathedral, figure 4 (reduced from a photograph). This is a building of advanced Renaissance style, or what would have been so if it had been executed in stone or marble; but the mere influence of the material has sufficed to almost compel the art into a degree of picturesqueness, vivacity, and naturalism, of detail more allied with Gothic than with Classic feeling. The panel we give is really the repetition of a very familiar motive in Cinquecento architectural ornament,—a scroll ornament growing from a vase, and treated symmetrically on either side of the centre. But observe what a difference there is between this example, freely modelled in clay, and the regulation Renaissance scroll: how, in spite of the profession of symmetrical treatment, the leaves and buds fall into little diversities on either side as compared with that opposite; how the foliage seems to grow up from the background, as if we could see the very action of the hand in modelling it; and how much nearer nature it is than the usual carved or painted Renaissance ornament of this type. It is not, of course, necessarily a matter for praise that ornament should show naturalism; there are many circumstances in which conventionalised ornament is best, and the degree of conventionalism required varies with the material and the circumstances; but we wish to point out how increased naturalism is the result of the carrying out of an ornament, originally purely conventional, in a material which allows the artist to work with all the freedom of nature, so that even when intending to execute a conventional design he is almost unconsciously betrayed into designing with something of the freedom of a natural growth, and with the direct imitation of natural details.

The consideration of the difference which would have to be made in ornamental detail, especially of the Classic type, in transferring it from marble or stone to terra cotta or painted and glazed stoneware, suggests another influence in the nature of the material which must also affect the ornament executed in it. This is, the impossibility of trusting to terra cotta for absolute symmetry in the result, where ornament of very fine and precise outline is concerned. However well mixed and burned, the necessary shrinking and the almost inevitable slight degree of twisting in the kiln (though care and experience may reduce the latter to a minimum), render it impossible to trust to terra cotta to give the precise, clear, and sharp symmetry of Greek detail, for example. And here is the meaning of that tendency to "twisty" detail which, as above remarked, shows itself in the North Italian terra-cotta work, in the twisted rope-like ornaments of the cornices, in the columns with twisted or spiral flutings, as if they had undergone a test for torsion. The prevalence of this "twistiness" was the result of an intuitive perception on the part of the terra-cotta architects of Italy, that as the material would warp and twist more or less (and their terra cotta probably twisted much more than our more scientifically mixed and burned stuff), it was better to import a certain degree of twisted character into the details, to avoid hard straight lines and attempts at symmetrical detail, and to impart to the design such a degree of irregularity of line that accidental irregularities arising in the manufacture would be the less observable. Following out this idea, we have attempted one or two sketches of the manner in which well-known Greek details might be modified so as to bring them within the proper scope of terra cotta. Take the Dorio capital to begin with; the characteristics of that, as executed by the Greeks in marble, are the heavy and massive abacus, the peculiarly delicate curve of the profile of the echinus, and the succession of thin hard parallel lines produced by the grooving below the echinus, and which give so much of the character of united refinement and strength to the complete Doric capital of the best period. Now the first quality, the heavy abacus, we deliberately set aside; we substitute a thinner abacus (see fig. 5), because that is more in keeping with the idea of a *tile*,—a thin but very hard and coherent plate of burned clay. The delicate curve of the echinus we cannot depend upon getting in terra cotta; if we could model it precisely in the clay, the kiln would almost certainly disturb it, and therefore we will not depend upon the mere completeness of the outline; we follow the usual outline in the main, but we break up the face of the echinus by fluting, which attracts the eye from the mere consideration of the curve, so that any failure in its exactitude is not so much noticed. We cannot work the thin clean lines of the annulets satisfactorily in terra cotta, so we take a hint from one of the older forms of Doric at Pæstum, in which the annulet is less conspicuous and there is a deep gorge or throating, ornamented with a leaf repeated all round, and which suits our purpose very well. The fluting of the column we will work spirally instead of vertically, to avoid being caught in any distortion of lines which ought to be rigidly straight (or to be worked with an entasis curve much too fine and delicate to be executed in terra cotta), and also to assist in giving to the design that partially picturesque character which is suitable to terra cotta, and which it is our object to attain. We may call this a translation of marble Dorio into terra-cotta Doric; it being borne in mind, however, that the Dorio column could not with any advantage,—perhaps could hardly at all,—be carried out in terra cotta on a really large scale, such as the Parthenon order: this must be a small and domestic Doric, perhaps for internal use, but recalling its great original, while showing that it has been deliberately modified to suit the condition of a new material. If it be worked in stoneware, then the fluted echinus and the gorgette would present opportunities for the effective picking-out of the capital in colour.

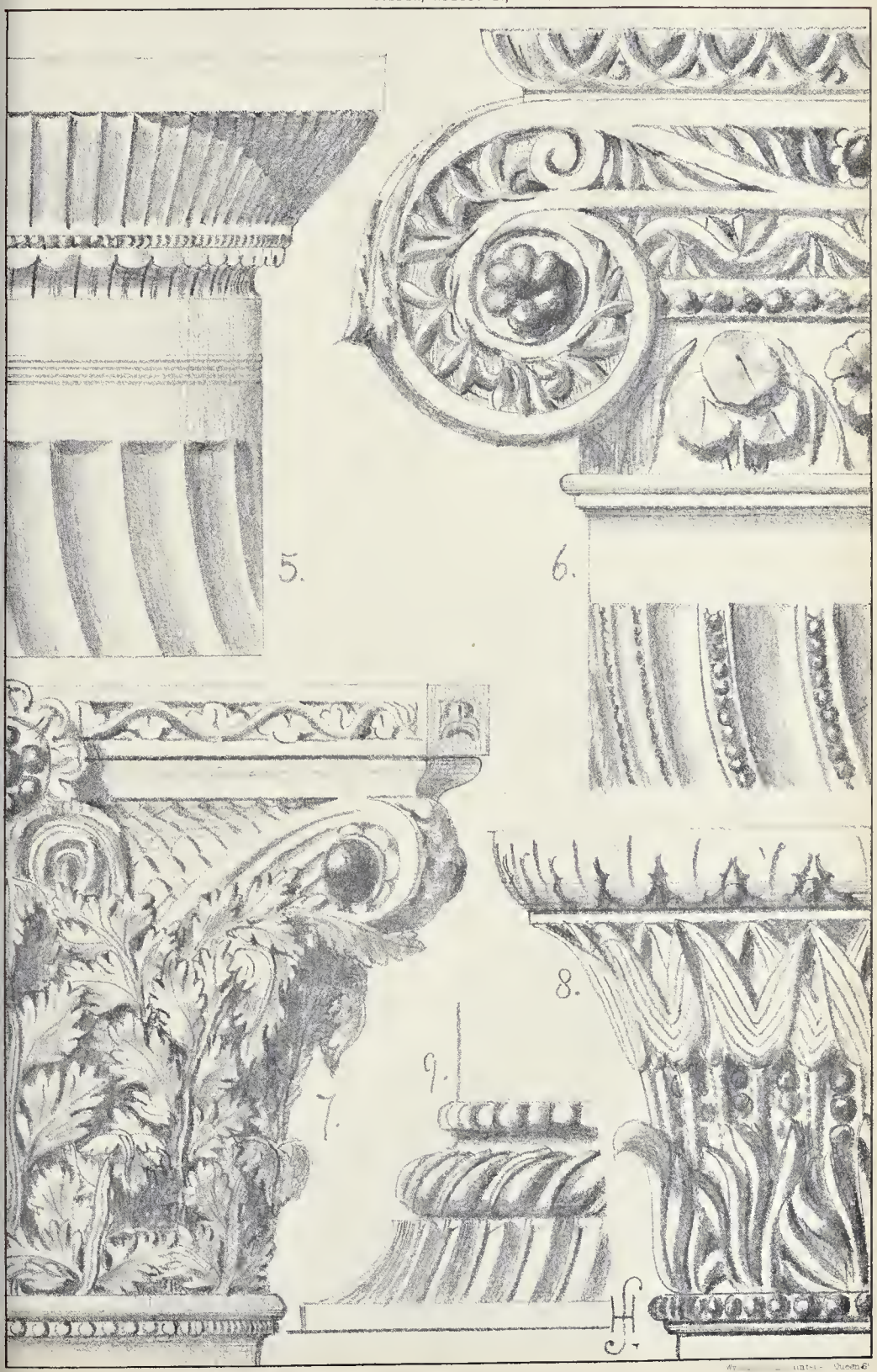
Taking the Ionic capital in hand, we discard the usual form of the volute with its numerous and precisely-defined spiral lines, one within another; to obtain these in terra cotta with the requisite purity and precision of line would be nearly impossible. So we reduce the spiral to a simpler form (figure 6), and substitute a free bit of foliage ornament for some of the inner spirals; we give the crowning ovolo a freer and more Gothicised surface ornament than the orthodox Greek egg-and-tongue decoration; we treat the ornament below, on the neck of the capital, with more free and naturalistic foliage than the Greek carver in marble would have introduced: in this example this ornament is founded on the nasturtium flower and leaf. We will suppose this to be a coloured stoneware capital, and the centre of the flute is occupied by a coloured boss, a treatment which is, after all, in harmony with Greek practice, for there is no doubt that bosses of coloured material were introduced in this kind of manner in Classic Ionic capitals. The volutes are spiralised as before, but an additional richness is imparted to the shaft by rows of little beadings on the fillets between the flutes. Figure 7 is an adaptation of the Corinthian capital. Here again some of the repeated spiral lines usual in the volute are omitted, and the whole volute is made simpler and more massive than in the Classic marble volute, and its centre filled with a bold projecting coloured boss. The lines of the abacus are made bolder and more massive, and the upper member decorated with a waving or zigzag ornament to distract the eye from dwelling too much on straight lines and pure curves, which we cannot be certain will come out quite straight and pure. The symmetrical and highly conventionalised acanthus leaves of the Greek capital give place to a much freer and more sketchy treatment, which may be varied in every capital in the colonnade, and which in this case is founded on the leaf of a French variety of fern, the serrations of which bear a curiously close resemblance to the conventional serrations of the Classic acanthus-leaf, but the general form of which is different,—longer and more pointed than the acanthus. In figure 8 is shown a varied treatment of the Temple of the Winds capital; a form of capital which, as sometimes executed in stone in some of our buildings, is singularly ineffective in a northern town atmosphere, but which, executed in coloured stoneware, would be susceptible of admirable effect. The upper large leaves in this example, with their curious divided or duplicate form, are taken from a foreign shrub, of which a good many varying examples are to be found in the hot-houses at Kew. The name has escaped us. Figure 9, as will be seen, is a treatment of one form of the Classic base, on the same principle of introducing curvature and twist in the modelling, as we saw exemplified in the spiral mouldings of the Pavia cornice.

Another point in regard to the general treatment of the walling of terra-cotta buildings may be noticed: in many of the Cinquecento terra-cotta buildings there is an entire absence of any attempt to obtain a completely homogeneous wall surface, in regard to tone and colour; the surface is as varied and broken up in this respect as that of a brick building. This, again, carries out our idea as to terra cotta as the material for varied and picturesque effect rather than for symmetrical finish and neatness. In this respect it seems to us peculiarly valuable as affording an opportunity for giving to buildings of Classic type of design the variety of detail and of surface which is desirable in a northern climate and in the smoke of large cities. For our decided conviction is that terra cotta architecture is essentially suitable rather for Classic than for Gothic types of building. It has an appearance of surface treatment about it which is much more in harmony with the feeling of Classic, or at least of Renaissance architecture, than of Gothic, in which latter we look rather for the appearance of great mass and solidity than

PORCELAIN HOUSE, VIENNA.—Herr Baurath Gustav Korompay, Architect.



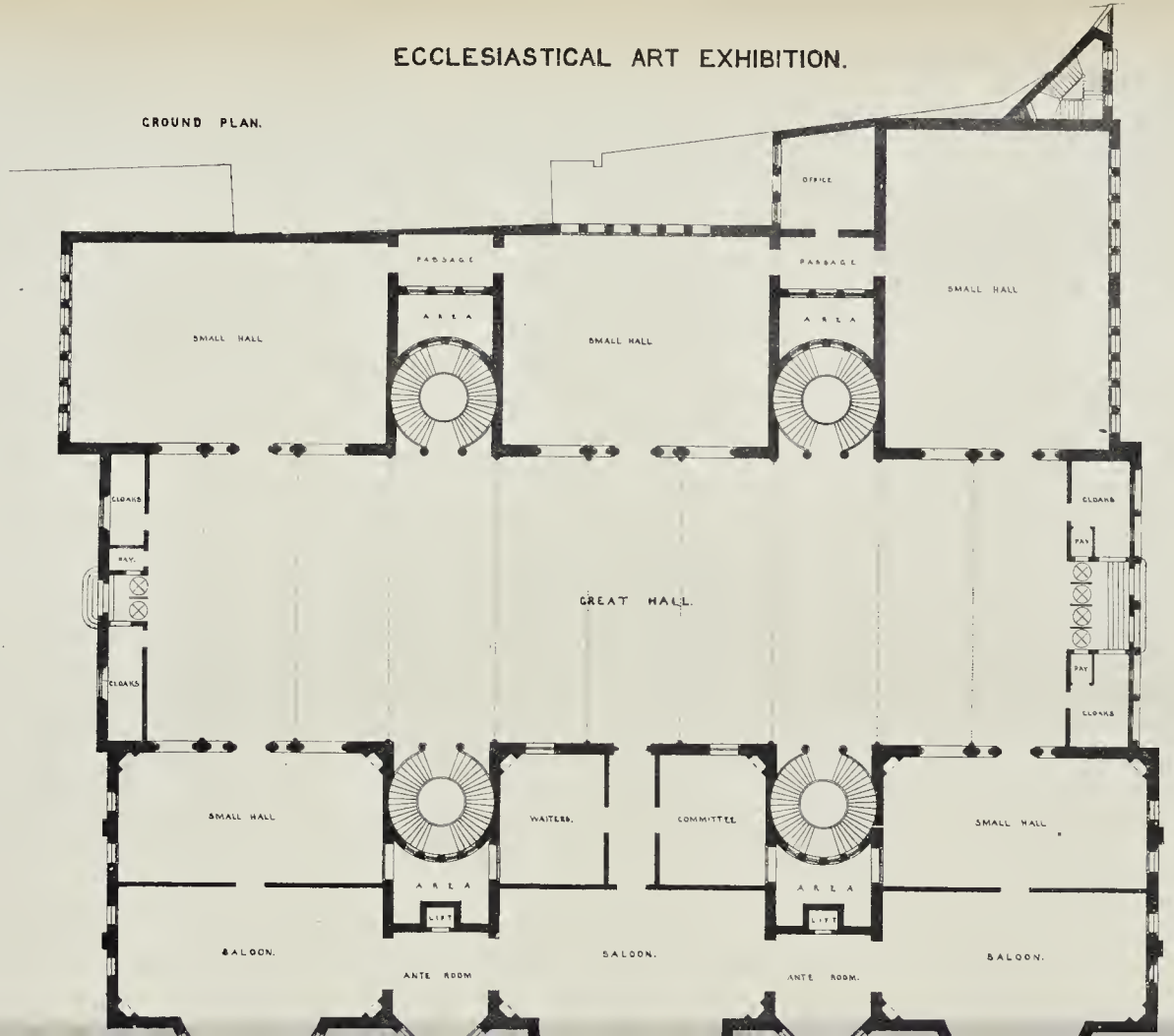
TERRA-COTTA DETAILS, OLD AND NEW.



TERRA-COTTA DETAILS, OLD AND NEW.

ECCLESIASTICAL ART EXHIBITION.

GROUND PLAN.



ECCLESIASTICAL ART EXHIBITION.

SOUTH ELEVATION.

Whiteman & Bass *Photo-Litho* 236 High Holborn

Wyman & Sons, Printers, 29 Queen St

of elegant surface ornament; and if the revived taste for Classic design which seems to be impending is really developed, it may perhaps be found that terra cotta will offer to architects a material in which they may carry out the Classic types of design with a great deal of really new modification, and in a material admirably suited to the conditions of modern city architecture.

"ECCLESIASTICAL ART EXHIBITION."

The Ecclesiastical Art Exhibition building, intended to be erected upon the well-known Savoy site upon the Victoria Embankment, has been unavoidably postponed, owing to the nature of the requirements of the Metropolitan Board of Works, which entailed too large an expenditure for a mere temporary exhibition, as at first proposed.

The design, shown by the elevation we publish this week, was prepared by the architect to the undertaking, Mr. John P. Seddon, in order to fulfil the above-named requirements.

As often happens in such enterprises, more than one change has to be adopted before the final one that is carried into effect. So it is in this case. A proposal having recently been made to those connected with the undertaking to incorporate with their building for the Ecclesiastical Art Exhibition one for a panorama, upon the scale of the largest of those which have been erected on the Continent, upon terms considered favourable, it will become essential to modify the design afresh. Mr. Seddon is now engaged upon this work, which will doubtless come before the public presently in its entirety. Under existing circumstances it is unnecessary to explain further than is represented by the accompanying elevation, which, as it had been prepared, we offer simply to show that the building is intended to be of a more permanent and architectural character than at first proposed, and more worthy of the fine site and its surroundings which it is intended to occupy. The cost, it is stated by those concerned, is not likely in any case to be less than 50,000*l.*

CHRIST'S HOSPITAL.

PROPOSED NEW BUILDINGS.

The Charity Commissioners have issued the draft of their new scheme for dealing with this important institution. Among the principal clauses are the following:—

"The schools of the foundation shall be hospital and boarding-schools for boys and girls respectively, and such schools respectively shall be maintained in the present school buildings of the foundation in London and at Hertford, until other suitable buildings shall be provided, as hereinafter directed. . . . Within three years from the date of this scheme, or such further time as may be allowed for the purpose by the Charity Commissioners, the council of almoners, by acquiring, by purchase, lease in perpetuity, or otherwise, a suitable site, within a convenient distance from the city of London, and acquiring or erecting buildings thereon, shall provide proper hospital and boarding-school buildings, with hall, chapel, infirmary, and residences for masters and for the treasurer, and for the other officers, if any, who may be required to reside in such buildings, suitable for 1,000 boys as boarders,—that is to say, 200 boys in the upper or Grecian school, 400 boys in the middle school, and 400 boys in the lower school,—all such buildings to be planned with a view to convenient extension, and the buildings of the lower school to be so planned as to facilitate the separation of the younger from the elder boys. For these purposes the council of almoners may apply for the purpose a sufficient sum, to be provided or raised out of the building and repairs fund, and, so far as may be necessary, out of the general fund of the foundation, by sale or otherwise, but for all the purposes of this clause they shall act subject to the consent and approval of the Charity Commissioners. The said site and buildings shall be vested in the official trustee of charity lands in trust for the foundation, but shall be managed by the council of almoners. When the said buildings are complete and ready for occupation the council of almoners shall remove the whole of the boys' schools of the foundation from London and Hertford to such new buildings. Within three years from the date of this scheme, or such further time as may be allowed for the purpose by the Charity Commissioners, the council of almoners, either by altering or adding to the present school buildings at Hertford, or otherwise by acquiring or erecting buildings upon some convenient site, shall provide proper hospital and boarding-school buildings, with infirmary and residences for mistresses, and for other officers, if any, who may be required to reside in such buildings, suitable for not less than 400 girls as boarders,—that is to say, 200 girls in the upper school and 200 girls in the lower school,—all such buildings to be planned with a view to convenient extension, and may apply for the purpose a sufficient sum to be provided or raised out of the general fund of the foundation, by sale or otherwise, but for all the purposes of this clause they shall act subject to the consent and approval of the Charity Commissioners."

Mr. E. J. Reed, C.B., formerly Chief Constructor of the Navy, has received the honour of knighthood.

DEFECTIVE BILLS OF QUANTITIES.

In a paper on "Bills of Quantities and Measuring Builders' Work," by Mr. E. Hughes, read, as we have already mentioned, at the meeting of the National Association of Master Builders, held at Bristol, July 27, the writer makes some very strong statements in respect of the improper way in which bills of quantities are sometimes prepared. It seems desirable that these assertions should be made public, with a view to proper consideration of them:—

We frequently find surveyors measuring so many cube yards excavating and wheeling, omitting altogether the depth and distance to wheel, &c. The same applies regarding drains. I have known ornamental brickwork described as so many yards or rods of common brickwork, "the price to include all cutting, double course of blue brick plinth, moulded string-course, ornamental projecting stock-brick cornices, gauged arches," &c., &c., "as shown upon the drawings." I should like to know a builder who could properly price such work from such quantities.

I met with a recent case where an architect had succeeded in obtaining by competition the commission for an important public building, with an elaborate tower as part of the structure, built with dressed stone, the work being what may be described as of a "monumental" character. The quantities gave this work as so many cube feet of stone, including all labour of every description, this phrase being on the heading, and not with the quantity. The result of separate tenders for the upper part of this tower was that they varied from 500*l.* to 1,700*l.* The lowest tenders were undoubtedly priced as stone and setting only, omitting all labour.

I have before me quantities for a public building, for which the architect's charges are two per cent., wherein he describes so many "superficial feet of moulded both sides swing-doors, hung folding, including quarter-inch polished plate-glass upper panels, protected by six wrought-iron bars, and patent swing-hinges to stand open." No size of glass, no size or quality of bars, and no size or quality of hinges mentioned!

In many other items he gives superficial feet of doors, including best mortise locks, and rebated and moulded frames, and neither number of doors, quantity or size of frames, nor number, size, or quality of locks. You all know in the matter of locks "best" is a wide term. It means anything from 7*s.* 6*d.* to 75*s.* In one door he gives superficial feet of door, including 4-inch best butts, 5 by 4 rebated and beaded frame, two barrel bolts, strong chain, drop-latch lock (value 13*s.* P.C.), *and approved bell-pull*. Another item is, "Provide and fix cistern on strong bearers, and form trap-door," without dimensions or particulars of any kind.

In many items of this architect's quantities, in addition to jumbling up doors, locks, hinges, bolts, &c., by the foot he hangs on the words—"including painting." This is notwithstanding the fact that there is a separate bill for painting. Great numbers of items of importance are given by this architect as lineal measure with no sizes. Some items are described as "fixed," while others have added to them the words "including fixing." In the former case the builder cannot tell whether the item is to include materials or not. Another specimen is—"Superficial feet of *plain* 1-in. boards (see plan)." The last two bracketed words convince the builder that quite the opposite of *plain* is meant; but he is to be paid plain price.

I cannot for one moment believe that the architect who has issued these quantities has personally any hand in them, but they are in his name, and he is to receive the fees, although they have most probably been taken by some impostor who has succeeded in obtaining a place in his office. I say such measuring is nothing less than a fraud upon the proprietor. This architect holds an important public appointment, and the work in question is public work.

I have recently seen a surveyor's final measured account for a building which had been prepared in draft, then altered, checked, re-checked, and lithographed for the purposes of an arbitration by order of the High Court of Justice. On this surveyor being examined before the arbitrator he was forced to admit scores of errors in computation,—merely errors that would disgrace a charity school-boy. In one page of his account he admitted no less than six most stupid errors, several of them consisting of the pounds and shillings being placed in the wrong columns. For instance: eight and a-half feet at 4*d.* per foot was deducted as 2*l.* 10*s.* instead of 2*s.* 10*d.* This architect and surveyor made such an exhibition of himself that his client called the builder (who was plaintiff) aside, "threw up the sponge," and offered to pay debt, costs, and interest.

I have known in one church contract the surveyor omitting to add up an item of 10,000 ft., being the left-hand figure of a five-figured item in his abstract for stone facings. He also omitted the whole of the dressed stone, sills, jambs, and arches to the inside of all doors and windows; the whole of the brick lining to the church, and the gutters and down-pipes of one side of the church; besides other items, amounting in all to the value of 3,000*l.* to 4,000*l.* This work was done by the builder without obtaining one shilling in payment.

In another case I find a surveyor describing in a bill of quantities most elaborate carved mahogany newel-posts by the lineal foot. Thus, " feet run of eight by eight Spanish mahogany newel-posts, cut, turned, moulded, and carved to details to be supplied, including drops and finials where required." From this description and by the additional precaution of an examination of the contract drawings it is impossible for any builder to say what the real value of the work may be. It might be any sum from 10*s.* to 50*s.* per foot according to the caprice or conscience of the architect when he subsequently designed the work in detail.

The same surveyor described doors of an ordinary size, but containing about sixteen panels each, some of them with raised panels and bolection moulds, and the remainder with cusped tracery planted on the panels. These doors were described as ordinary doors, but with the words "see drawings." On reference to the drawings they were found to be ¼-in. scale only, on which it was impossible to show what work the architect might contemplate, when at a subsequent period (after the contract was made) he furnished details. Such details might show work worth any sum from 2*s.* to 6*s.* or 8*s.* per foot, and yet be in accordance with the ½-in. scale general drawings.

I have seen in another schedule for competition a number of ornamental wrought-iron grilles, or panels for doors, described simply by number, "to details to be subsequently supplied." It is impossible to approach the value of such work from such description; each grille might be worth any sum from 10*s.* to 10*l.*

In another case, an architect who was his own surveyor required a wrought-iron cresting on the top capping of some gates to the back-yard of a house, and described it by the running foot, without the height being mentioned, or a drawing of any kind to show the character of the work. The builder priced the work at 1*s.* 6*d.* per foot, or 15*s.* for a 10-feet gate. After the contract was settled, the architect furnished a detail that would cost 30*s.* per foot, or about three times the value of the gate itself. More than this: he claimed the right to order two additional gates and crestings to be supplied at the same contract prices.

This architect inserted in the same schedule a large sum as "provisions" for stained glass, grates, chimney-pieces, heating apparatus, stable fittings, &c., all of which goods he ordered himself from his own tradesmen, altogether unconnected with the contractor in any way, and he sent each of those tradesmen certificates for their account to be paid by the contractor. This work, being in a difficult country district, the contractor in his competition tender priced the work at home prices, and added ten per cent. at the foot of his estimate as the most convenient way to increase his prices. In the final account prepared by this architect he deducted all the provisional sums and the ten per cent. the contractor had himself added in his tender, and added the net amount of his certificates to his tradesmen, and further deducted a fee from the tradesmen, and further deducted a fee from the contractor for measuring the additions and deductions in connexion with these provisions.

The result of this system of dealing with the account was this:—The contractor's accepted tender provided for his being liable to a reduction of (say, for example) 500*l.* if the proprietor provided certain goods himself. These goods were so supplied, but instead of 500*l.* being expended the architect expends 600*l.* He orders the builder to pay his tradesmen 600*l.*, giving him credit for that sum net in the final account,

but debiting him with 550*l.* plus measuring fees. The contractor thus had to advance the money, or, in other words, he acted as banker to the proprietor, forfeiting his own legitimate profit as contracted for, and paid the architect a fee for the privilege of having been permitted or forced to do the work for nothing. This architect did not dispute the facts as stated, and he did not attempt to explain his account, but claimed absolute authority to debit or credit any sum he chose, and that his decision was final and binding.

I believe this architect charged altogether over five per cent. fees on the work done in respect of the first quantities and subsequent measuring of additions and omissions, and, as is often the case, the larger the fees the worse the work. The whole of the work so done was not worth so much as the paper on which the quantities were written, while the grossest possible ignorance of such work was exhibited.

In conclusion, the question will probably be put,—What remedy do you propose? This is a large and difficult question, which I will not at this time venture to fully discuss, but I will just give one or two sentences, and I have done.

1. I earnestly urge builders, individually and collectively, to do their best to put an end to such a state of things, by rejecting all quantities that show on their face they are not genuine, and are the work of unqualified persons. If an end be put to the demand for such quantities the supply will cease.

2. Insist upon the quantities being the basis of all contracts.

3. This Association should at an early date calmly consider the question as to whether it is practicable, in conjunction with architects' associations, to agree to some line of action, whereby impostors, calling themselves "surveyors," can be weeded out and prevented from following the profession of quantity and measuring surveyors; and that all men undertaking such work should, by some effectual means, qualify themselves, by licence or diploma of some kind, to prove their fitness for the duty. I understand some such plan is prevalent in Scotland, and it would be well if we could ascertain what the practice is in France, Germany, and Belgium.

THE DEATH-RATE IN SALFORD.

The Registrar-General's report for the 9th inst. says:—"The annual rates of mortality per 1,000 last week in twenty large English towns, ranged in order from the lowest, were as follow:—Bradford, 17; Newcastle-upon-Tyne, 18; Bristol, 19; Sunderland, 19; Wolverhampton, 21; Oldham, 21; Nottingham, 22; Hull, 23; Sheffield, 23; Leicester, 23; Portsmouth, 23; Leeds, 23; Plymouth, 24; London, 24; Norwich, 24; Birmingham, 24; Brighton, 25; Liverpool, 26; Manchester, 28; and *the highest rate was* 31 *in Salford*. The annual death-rate from the seven principal zymotic diseases averaged 6·9 per 1,000 in the twenty towns, and ranged from 3·5 and 3·7 in Newcastle-upon-Tyne and Bristol to 10·0 and 12·1 in Leicester *and Salford*." Week after week and month after month Salford is shown to enjoy this pre-eminent position. Thousands of people are dying before their time simply because they live, to use an Irishism, in Salford. Can nothing be done to stop this wholesale unnecessary slaughter? A complete investigation should be made immediately by thoroughly competent persons unconnected with the town, and their advice as to the best means of bringing about a better state of things should be followed at any cost.

Islington District Surveyorships.—At the Metropolitan Board of Works on the 13th inst., a report was presented by the Building Act Committee with reference to the district of West Islington, vacant by the decease of Mr. William Moseley, late district surveyor, recommending that the portion of such district bounded on the north by the centre line of Copenhagen-street and Elizabeth-terrace, and by the southern enclosure of the Agricultural Hall, be added to the adjoining district of St. James and St. John, Clerkenwell, and that the remainder of the district be divided into two portions by a line drawn down the centre of Camden-road, the part north of such line to be designated North-west Islington, and that south of the same South-west Islington; and further recommending that the usual course be taken for filling up the vacancies in the office of district surveyor for these two districts, that advertisements be issued inviting candidates for the appointments, and that the Board do proceed to the elections on Friday, the 8th of October next, at twelve o'clock at noon. It was stated that the income of the late surveyor was something over 1,000*l.* a year. The report was adopted.

MODERN MANSION.

Home hollow of swallow,
Mud hut 'neath the eaves,
To creep in and sleep in
Warmer than the leaves,
Made duly and truly:
Never bird deceives.

Not so you of the new
Mile-long-line estate;
Where lie thick run-up brick
Houses for the great,
False and smart with bad art,
Cheap beyond debate.

Glazton wall never fall,
Tell your tale to me;
Holy men there were then,
Worked, my God, for Thee:
Now selfish, gone selfish,
Stained with vanity.

Holy men, modern men,
Own the truth to me;
Can you get, will you get,
Churches fair and free,
With many—so many
Steeped in vanity?

Well, away! had brick lay,
Build the lofty pile;
Servants' laire up long stairs
Cellular and vile;
Dining-room—ruddy gloom
(Renaissance your style).

Rooms for night, inside bright
(In which Rossini,
With love-strain, long 'll reign
With poor Bellini);
Then to suit, outside fruit
And amorini.

"Let or Sold," long leasehold;
Tall the stories rise.
Bolt the bait, home ornate,
White against the skies:—
It is but a mud hut,
Though of larger size.

E. C. Ireland.

NEW BUILDINGS ON THE SITE OF THE QUEEN'S BENCH PRISON.

The site of the old Queen's Prison, which was some time ago purchased by Mr. Hobbs, builder, of Croydon, is now being rapidly covered with new residential buildings, and will shortly be occupied with a different class of tenants from those which, in past years, rendered it historically famous. The structures to be erected on the site are intended to be of a varied character, consisting of shops, residential chambers, and houses in flats, but mainly of the last-named class. The first block of these is already in a forward state, and will be covered in in the course of a few days. The block is situated on the south-west side of the site, having its principal frontage to Southwark Bridge-road, and extending to the Borough-road, where it will have its outlet, and thence into High-street, Borough. The title given to the new property is the "Queen's Buildings." The Southwark Bridge-road frontage of this block, which is 47 ft. in length, and 70 ft. in height, is in stock and red brick, with stone dressings, and of a rather ornamental character. It contains five stories above the ground-floor. The long return frontage extending from Southwark Bridge-road to the Borough-road, is of the same height, and contains the same number of floors, the ground-floor portion consisting entirely of shops. The lower portions of the Southwark Bridge-road frontage, including the ground-floor, and the first and second-floors, are, it is stated, to be appropriated as a coffee palace or tavern, on a comprehensive scale, combined with news-rooms, billiard-rooms, and other attractions. A new thoroughfare, to be called Scovel-road, 50 ft. in width, will run parallel with this block, between Southwark Bridge-road and the Borough-road, and on the opposite side of the street a similar block to that just described will next be erected, the remaining portion of the ground, on the north-east side, being ultimately intended to be covered with further blocks of buildings of a like character. It will be remembered that about the time negotiations were in progress for purchasing the site from the Government, a strong effort was made on the part of the vestry of St. George-the-Martyr to secure a part of it for the erection of public baths and washhouses, and it is stated that the local authorities will have the opportunity of securing, for this purpose, a portion of land on the south-east side of the ground, bounded by Collison-street and Montague-street. When the whole of the several blocks to be erected upon the site are completed, it is estimated that there will be upwards of 600 family tenements, having accommodation for an aggregate population of about 3,000 persons.

The buildings we are informed, have all been designed in Mr. Hobbs's Office, Mr. W. F. King having the charge of the architectural department.

VESTRYMEN AND SPECULATING BUILDERS.

MATERIAL FOR BAD MORTAR.

The Rotherhithe Vestry, at its meeting on the 2nd inst., devoted considerable time to the discussion of some very questionable proceedings on the part of a few of its members. It was stated by a member (we quote from the report in the *South London Press*) that certain material belonging to the parish had been found on the premises of certain members of the vestry.

Mr. Deavin said he would admit that he had some of the road sweepings on his premises. It was the custom for contractors to get rid of the stuff in the best manner they could, and he had on more than one occasion received money for taking it off their hands and utilising it. With respect to the sweepings taken off the vestry roads, he was asked,—as other vestrymen had been,—if he could take seven or eight loads, and he consented, as he knew it would save the parish expense to get rid of the material in such a way. The parish had to hire a shoot in order to dispose of these sweepings, and surely if other people could utilise them the parish would thus be saved much expense.

Mr. Bulmer said that before he made any observations he should like the inspector (Mr. Thomas) to say by whose orders the sweepings had been taken to the different premises where they were found.

Mr. Thomas said the sweepings had been disposed of by his orders. It was his (Mr. Thomas's) duty on all occasions to improvise a shoot for the disposal of this refuse, which must be removed as speedily as possible for sanitary purposes. They had always been to the expense and trouble of removing it in vestry carts to the shoots which they hired, but if anybody would have it they offered it to him in place of charging the shoot with it. The vestrymen who received the refuse did not apply to him; he (Mr. Thomas) asked them if they would take it, and receiving an answer in the affirmative, it was accordingly sent.

Mr. Bulmer.—Mr. Thomas asked us whether we would have some.

Mr. Thomas.—I give it not only to vestrymen, but to builders in general who want it.

Mr. Walker said he could not reconcile the admissions of Mr. Thomas with the statement he previously made with reference to this subject. His (Mr. Walker's) opinion was emphatically that no vestryman of the parish, no matter who he was or what he was, had a right to any material belonging to the vestry. In the present instance, it was found by the General Purposes Committee that Messrs. Bailey, Chafen, Bulmer, and Deavin were all concerned in this matter. It was stated by one of the gentlemen that one of his brother vestrymen had had no less than 150 loads of this kind of stuff, which was a sandy material quite fit for building purposes. Mr. Thomas, the inspector of pavements, said it was offered to all builders in the parish; but he (Mr. Walker) had asked several if they would like to have some, and the reply he received was that they would like very much to have the material as cheap as vestrymen got it.

Mr. Bulmer acknowledged that he had some of the scrapings of the roads, and, like Mr. Deavin, he was asked if he could take the stuff. (A voice: "You all do it," and laughter.) The material he received had been ground to a powder on the road, splashing everybody that passed in wet weather, and spoiling the railings he had newly painted.

Mr. Wilson said that if vestrymen would retain their self-respect, they must refrain from such acts as this.

Mr. Bulmer.—Is it worse than sending in a price for ironwork for tramways when you are sitting on a committee that is considering the same subject?

Mr. Williams said he had been round with the committee and inspected the sand in the yards belonging to vestrymen. He did not think the sand off the road was of any particular value, though doubtless of some value; but he did think it was time to object when he found, as he did in Mr. Bulmer's yard, forty loads of materials that would be valuable to the vestry. Mr. Bulmer stated that the contractor gave him that material as a matter of right, but Mr. Bulmer might also have added that there was a clause in the agreement between the contractor and the vestry whereby any material of value taken off the roads was the property of the parish. He (Mr. Williams) considered that the material in Mr. Bulmer's yard was worth from 3s. to 4s. per load, and he thought that the dabbling of vestrymen in such matters ought to be put a stop to. It was a matter of common notoriety that speculating builders in Rotherhithe rapidly made money when they became vestrymen.

The Chairman said it appeared to him, from what he had heard, that this material was of very little value to the parish. Moreover, the surveyor admitted that this kind of thing had been going on for years (cries of "Shame"), and it might be advisable that the matter should be referred to the General Purposes Committee to say what ought to be done in the future,—to see, for example, if some small acknowledgment could not be paid for this material.

At a subsequent meeting of the Vestry, the discussion of the subject was resumed, and on motion being made that the Vestry proceed to the next business, it was moved, as an amendment, that a vote of censure be passed on the surveyor (Mr. Thomas) for allowing the material to be delivered to vestrymen and others without the order of the Vestry. After many personalities and recriminations had been indulged in, the amendment was withdrawn, and the discussion terminated.

[It would appear, from this interesting discussion, that in Rotherhithe and its neighbourhood it is a common thing to use road *detritus* in lieu of sand as a constituent of mortar. Mixed, as such refuse necessarily is, with decaying animal and vegetable matter, it is totally unfitted for use as an ingredient in mortar,—on structural grounds because the animal and vegetable matters interfere with the chemical combination of the lime and sand, and so rob the mortar of its adhesive and cementitious qualities; and on sanitary grounds because the building-up into the walls of dwelling-houses of a mass of filth must inevitably promote the spread of disease, especially in situations where the walls so built are subject to damp.]

SALE OF FREEHOLD PROPERTY NEAR ALDERSGATE STREET.

Last week Messrs. Norton, Trist, & Watney sold, at the Auction Mart, several lots of valuable freehold property, in the City, situated in Bartholomew-close and Albion-buildings, near Aldersgate-street, and immediately adjoining the Albion Tavern. The property comprised nine lots, let on leases producing altogether an annual rental of 722*l.*, but said to be worth at the present time a much larger yearly sum. No. 20, Bartholomew-close, let on lease for a term of twenty-one years, from Midsummer, 1878, at a rent of 40*l.* per annum, was sold for 1,000*l.*; No. 14½, Albion-buildings, Bartholomew-close, let on lease at a rent of 150*l.* per annum, sold for 2,840*l.*; No. 15, Albion-buildings, rental 40*l.* per annum, realised 1,020*l.*; Nos. 16 and 17, Albion-buildings, rentals 50*l.* and 52*l.* 10*s.* per annum, were each sold for 1,300*l.*; Nos. 18 and 19, Albion-buildings, producing together an annual rental of 60*l.*, fetched 1,720*l.* The next lot, consisting of No. 14, Bartholomew-close, and occupying an area of 4,420 superficial feet, let on lease for an unexpired term of sixteen years, at a rental of 190*l.* per annum, was sold for 4,450*l.* A public-house, facing Aldersgate-street, at the corner of Bartholomew-close and Albion-buildings, known as the Goldsmiths' Arms, together with the adjoining dwelling-house, No. 14, Albion-buildings, let on lease for an unexpired term of sixteen years, at 140*l.* per annum, was sold for 2,880*l.*, the aggregate proceeds of the sale amounting to 16,510*l.*

Barrow.—The joiners in the employ of the Barrow Shipbuilding Company have struck work.

ON THE NUDE IN ART.

A THEORY.

Eve in her innocence shocks no society,—
She stands full of dignity, does not look shy,—
Adam looks on and sees no impropriety,—
Her husband admires her costume,—May not I?

But then, after eating the apple so recently,
Why paint her in fig-leaf all fitted awry?
Poor soul! Now she knows she's apparell'd indecently,—
Her husband won't look at her,—Why, then, should I?

When Perseus is shown saving beauteous Andromeda,
He does not feel shame when her charms meet his eye,
Nor does she, for the matter of that,—Not a bit of it,—
She wants no petticoats,—Why, then, should I?

When a tree is display'd with a lady fix'd tight to it,
The knight gets behind it the knot to untie.
We all praise his modesty,—Why, then, not copy it?
He won't stand in front of that tree,—Why should I?

And Phryne, who would not behave in a steady way,—
Why paint the old court where that beauty they try?
It's a matter of taste,—but, when she turns her head away,
When even Phryne turns away,—Why should not I?

J. Mackenzie.

PAVING NEW STREETS.

At the Marylebone Police Court Mr. John Nash, owner of a number of houses in Montpelier-road, Countess-road, and Dunollie-road, in the parish of St. Pancras, was summoned by the vestry for paving demands.

There were sixty summonses against the defendant, and the total amount demanded was 1,003*l.* 6*s.* 5*d.*

The defendant did not dispute the apportionments, but said he wanted time for payment, and asked for two years.

Mr. Shiel said he must ask the vestry for time. An order would be made for the payment of the money, with 12*l.*, the cost of the summonses and orders.

Surely the Act provides for the distribution of the payment over a number of years?

HEIGHT OF CHIMNEYS.

METROPOLITAN BUILDING ACT.

Last week, at the Marlborough-street Police Court, before Mr. R. Newton, the case of Korr *v.* Webster was heard, in which the complainant, as district surveyor of St. James's, Westminster, summoned Mr. William Webster, builder and contractor, for having disobeyed an order of the Metropolitan Board of Works to alter the construction of a chimney at the Criterion Restaurant, by providing and fixing an additional stay of H-iron, 9 in. deep, secured at the foot by a wrought-iron strip passing round the said chimney-stack "in the manner shown upon the half-inch scale drawing supplied by Mr. Verity, architect of the building, who appeared before the Board on the builder's behalf in respect of his disagreement with the said district surveyor." Mr. Taylor, solicitor, appeared for the defendant:—

Mr. Kerr, having been sworn, stated that in the month of May, 1879, the chimney in question was discovered by him to have been erected on the old building of the Criterion Restaurant without notice having been given. The chimney reached to a very great height, something like 40 ft., which was considerably more than six times the least width, the latter being the limit prescribed by statute. On discovering that the chimney had been so erected, he (witness) communicated with Mr. Thomas Verity, the architect of the building. They corresponded for several months and he was under the impression that Mr. Verity intended applying for the sanction of the Board of Works. He did not do so, however, and witness's patience being exhausted, he, in September, 1879, gave Mr. Webster, the contractor, notice to amend the work, and summoned him, in November, 1879, for neglecting to obey the notice. The case came before Mr. Mansfield, when the preliminary objection was taken that the Criterion was a public building, and although witness contended that the clause in regard to public buildings could not safely be held to apply to a chimney, Mr. Mansfield eventually decided that it was a public building. After that the dispute between witness and defendant was, by agreement, referred to the Board of Works, and the result was that they ordered the work to be amended in the manner set forth in the present summons.

Mr. Newton.—Did you say that Mr. Mansfield decided that the Criterion was a public building?

Mr. Taylor.—Yes. It is a public building, being licensed for dancing and all the rest of it.

Mr. Newton.—That does not make it a public building.

Mr. Kerr.—When we got the decision of the Board, Mr. Verity signified that their order would not be obeyed, and therefore I had to bring this summons before you.

Mr. Taylor then proceeded to take a number of technical objections, which were ultimately overruled by the magistrate.

Mr. Taylor.—If you are against me on the question, you can make an order, so that we can appeal against it.

Mr. Newton.—Very well. I will make the order; and when the Queen's Bench next sits you can ask for the order to come before them, and move to quash it.

Mr. Taylor.—Yes; we will either do it that way, or leave it to be enforced.

Mr. Newton then made the order, observing that Messrs. Spiers & Pond would find it much cheaper in the end to do what Mr. Kerr asked than to waste time and money in litigation.

It seems to us that the public are indebted to the district surveyor for his persistence in this case. An important regulation of the Building Act, having in view the safety of the public, has been notoriously disregarded, and money and ingenuity have been expended without stint to prevent its enforcement. We have a strong opinion as to the course which has been taken in this case by the parties acting for Messrs. Spiers & Pond.

BREACH OF BUILDING BYE-LAWS.

DAMP-PROOF COURSES.

At the Highgate Police Court last week, Messrs. George Cooper & Henry Perkins, builders, of Hamilton-road, Manor Park, Finchley, were summoned before Mr. J. H. Lermitte, at the instance of the Finchley Local Board, for erecting two dwelling-houses with improper materials, and not causing the whole ground surface to be properly asphalted or cemented. There was a second summons against the defendants for neglecting to cause every wall of such buildings to have a proper damp course of sheet lead, asphalte, or slates, or other materials impervious to moisture, beneath the level or lowest timbers. And there was a third summons for neglecting, within a reasonable time of erection, to give notice to the surveyors or Board of their completion.

Mr. Stevens, solicitor to the Board, prosecuted.

The evidence of Mr. Brooking showed that the damp course put in was of roofing felt, which would in a short time become useless for the purpose of preventing the damp rising, and the houses would, in consequence, be unfit for habitation.

In reply to the magistrate, the witness said the houses would have to be pulled down to put another damp course in.

The defendants admitted the facts to be substantially correct, but contended with regard to the damp course that in other parishes builders were allowed to put in roofing felt, and they thought they could do so in Finchley.

Mr. Lermitte said it was allowed in Finchley until lately, when the new bye-laws were made, of which defendants had had a copy. The defendants, for not complying with them, would have to pay, on the first summons, a fine of 40*s.*, a like amount on the second summons, and 5*l.* on the third, together with 4*l.* 7*s.* cost.

The defendants, after paying the fines, asked whether they would have to make good the damp course, because, if so, they would have to pull down the houses.

Mr. Lermitte replied that defendants would have to satisfy the Local Board, whose surveyor would, no doubt, give them notice of what they would require them to do.

SEWERAGE AND WATERWORKS.

The Sowerby Bridge Sewage Scheme, designed by Messrs. Ulsby & Gray, civil engineers, of Halifax and Sowerby Bridge, has now received the approval of the Local Government Board. Mr. Godfrey Rhodes, solicitor, clerk to the Local Board, received on the 9th of August inst. the official intimation that the plans and estimates were passed, and sanction granted to borrow the amount (15,143*l.*) required to carry out the works, repayable as to the sum of 10,643*l.* in thirty years, and the remaining 4,500*l.* in fifty years. The works comprise four miles of main sewers, with all necessary manholes, ventilating-shafts, and flushing arrangements. Also two wrought-iron syphons under the river Calder, one cast-iron crossing under the Rochdale Canal, and one under the Ryburn, together with the tanks, buildings, &c., which are designed upon the best modern principles for economically and effectually treating sewage. The outfall works will be constructed in the Holmes, between the Lancashire and Yorkshire Railway and the river Calder, immediately opposite Messrs. Norris's Chemical Works. Mr. Hanson's process of treating the sewage was explained by the patentee at the public inquiry, held by Mr. Robert Morgan, C.E., on the 11th of June last, and has been approved by the Local Government Board in conjunction with this scheme.

Frith-hill, Godalming.—The waterworks at Frith-hill, Godalming, which have been some time in hand, consist of a well about 62 ft. deep, sunk in close and fine sand, very hard to work, and very difficult to exclude from the inflow of water, but which has happily been accomplished. The engineer is Mr. Jabez Church, of Great George-street, Westminster. A reservoir 80 ft. by 60 ft., holding 360,000 gals. for the supply of the town, is fed by the pumping-engine at the rate of about 7,000 gallons an hour. A circular

iron tank, about 20 ft. deep, with capacity of about 28,000 gallons, and standing 45 ft. above the upper level of the reservoir, is to be used for houses situated at a higher level, chiefly those connected with Charterhouse School. This iron tank is enclosed in a water-tower, constructed of Bargate-stone and red brick, having curved projections on the four faces corresponding with the curve of the iron tank inside, standing on four massive piers connected by pointed arches. The whole structure is crowned with a battlemented cornice, an angle turret corbelled out in brick and stone-work rising to the highest point of all. The care with which this has been studied by the architect, Mr. C. F. Hayward, F.S.A., is evident from the detail, and the successful result is seen for many miles round. The total cost appears to have been about 10,000*l.*

Slough.—A new system of sewers, about seven miles in length, has been laid throughout the town. Storage-tanks, an engine-house, and engine driver's cottage have been built; two pumping-engines of ten-horse power each have been erected by Messrs. J. Watt & Co., of Birmingham; a rising main, 2,830 yards in length, has been laid, and a portion of a farm of twenty-five acres has been laid out for irrigation. The principal feature in the works is the separation of the rainfall and subsoil water from the sewage. The house connexions are not yet made, but after careful testing it is asserted that the leakage into the sewers at present amounts only to six gallons per minute, or less than one cubic foot, and this notwithstanding that some of the sewers are laid in a soil containing water nearly on a level with the water of the Thames. The surface water-drains to carry off rainfall are connected with the town sewers which were laid some years ago. The works are designed and have been carried out under the superintendence of Messrs. R. B. Grantham & Son, Mr. F. Smith being the clerk of works.

Stapleton and St. George's, Bristol.—At a recent meeting of this Board, the Chairman made an extraordinary statement to the effect that certain new sewers had been so constructed as not to admit the Stapleton sewers as arranged between the two Boards. This was owing to an error of about 2 ft. in the level, the mistake having been made in the designs of Messrs. Ashmead, who prepared the plans for the sewers. He added that several plans had been suggested for remedying the matter, the most feasible of which appeared to be the proposal for constructing a new sewer from the junction of Fishponds and Stapleton roads, across the pathway near the Barton Regis Workhouse, and connecting the St. George's intercepting sewer 200 yards north of St. Mark's Church. At a subsequent meeting, Messrs. Ashmead said they had failed to discover satisfactorily what had led to the error, and left themselves in the hands of the Board. The cost of the plan determined on for rectifying the error was shown to be 750*l.*, and, the Board taking the matter in good part, it was arranged that Messrs. Ashmead should pay 200*l.* towards it, and make no charge for their services in connexion with the required work. It is hard to understand how such a mistake occurred.

Bentham.—On the 10th inst., Capt. R. C. F. Hildyard, one of the engineering inspectors of the Local Government Board, held an inquiry at Bentham, near Settle, Lancashire, into a proposal by the Settle Union Sanitary Authority to borrow the sum of 3,000*l.*, for thirty years, from the Public Works Loan Commissioners, for the carrying out of a scheme of improved water-supply, according to plans prepared by Mr. E. Firth, C.E. The scheme is a gravitation scheme, and it is proposed to take the water from the source of a small stream called the Bright Syke, on Burnmoor. That stream, after flowing for a very short distance, joins another small stream, Gill Beck, and, after receiving numerous feeders in its course, flows into the river Wenning. The present water-supply of Bentham is principally from wells, and, according to the medical officer of health, Dr. Barry, is so largely polluted as to increase the rate of mortality.

New Board Room, Fulham.—At the last meeting of the Fulham District Board of Works, it was unanimously resolved that Mr. A. C. Bean, the Board's surveyor, be paid 175 guineas for his extra services and out-of-pocket expenses in connexion with the new Board-room and alterations at Broadway House.

JULIUS SAX'S MECHANICAL AND ELECTRIC WATER GAUGE.

To enable the engineer in the basement of the Prudential Assurance Company's Offices in Holborn to know how the water stands in the cistern at the top of the building, 100 yards off, Mr. Sax, whose electric bells are well known, has fitted up one of his mechanical and electric water gauges. This apparatus consists of two parts:—First, the mechanical indicating water-gauge fixed at the top of the cistern; and, second, an electrical counterpart which may be fixed at any distance from the cistern.

The mechanical water-gauge carries a metal float, which is so arranged that its rising and falling will cause the hand on the dial to move forward or backward, as the case may be, and if once set so as to point on the dial the height of the water in the cistern, the hand would always follow the same, and so indicate it.

The hand on the electrical dial is made to follow the movement of the hand of the mechanical dial by reversed currents. If the pointer of the electrical dial is set to correspond with the pointer of the mechanical dial, the former would always follow the latter whether it went forward or backward, and so show the state of the cistern at any distance from it.

The mechanical dial is also arranged to set an alarm-bell ringing when the water in the cistern has reached either the highest or lowest point.

The arrangement appears to be perfectly efficient.

ARCHÆOLOGICAL SOCIETIES.

London and Middlesex.—The annual summer excursion of this society took place on the 10th instant to Enfield, when about eighty of the members and friends assembled at the Grammar School, to hear papers read on "The History of Enfield," by Mr. J. O. Ford, and on "The Church and its Monuments," by the vicar, the Rev. G. H. Hodson. The company then inspected the house forming part of the old palace, which contains a beautifully-panelled room of the Elizabethan period, and a chimneypiece of most elaborate design. Progress was then made to Oldbury Camp, and to "Durrant's," a brick-built moated house, once the residence of the famous Judge Jeffreys. "Forty Hall" was next visited, where, by the kindness of the owner, the fine pictures and house (erected by Inigo Jones) were inspected. The next session will commence in November, when the evening meetings will be resumed at 4, St. Martin's-place, Charing-cross.

Sussex.—The annual general meeting and excursion of the Sussex Archæological Society was held on the 12th inst., at Boxgrove. New rules for the government of the society were adopted, and thanks were, on the motion of Mr. Gordon M. Hills, passed to Mr. Tower for past services in editing the "Sussex Archæological Collections." Mr. Lacy W. Ridge, architect, read a paper on Boxgrove Church and Priory. After alluding to the early history of the Church and Priory with which it was connected (as exhaustively described in the papers published in the Society's volumes), Mr. Ridge said that of the first transitional period (from Norman to Early English) they had the ruined nave, Norman in general tone, but pointed in its arches, and first presenting that system of coupled bays which gave so marked a character to the choir; the arches of the crossing with the pointed arches and great circular caps and bases which swept round and gathered up the old sharp-pointed mouldings of the piers and arches, so characteristic of a state of transition wherein the pointed form was applied experimentally, and the due subordination of arch and pier was not yet reached; the arcaded bell-story, heavy in its proportions and its details, with square abacus and coarsely-moulded but pointed arches; and last, probably quite late in the transition, the bell-story, with circular-arched openings, but having on their inner arches a moulding under-cut and refined to an extent far in advance of any of the preceding work, which might well be a standing warning not to trust too implicitly in assigning dates to buildings by the form of the arch. Coming to the Mediæval period, when the apsidal east end no longer satisfied the architectural taste of the day, and pointing out that in no cases were the changes more apparent than in West Sussex churches, Mr. Ridge showed the close relationship of design between the choir of Boxgrove Church and the presbytery of the cathedral at Chichester. He concluded by alluding to the somewhat burning question of the day amongst archæologists as to the dual use of Boxgrove Church for monastic and parochial purposes. A vote of thanks was accorded to Mr. Lacy Ridge for his interesting paper; and at the request of the Rev. W. Burnett, the vicar of Boxgrove, the exterior of the church and conventual buildings were described by Mr. Gordon Hills, who said that, although the fragments of the Priory were scattered, enough was left to enable the general arrangements of the monastery to be traced. Directing attention to the arches running at right angles from the north side of the church, he said they might be, and had been, taken as belonging to an early church; but any one acquainted with monastic buildings would see that it was the entrance to the chapter-house. Halnaker House (the ruins of the entrance of which are good specimens of cut-flint work,—even the quoins and arches being of cut flint) having been visited, the excursionists drove to Goodwood Park, where, in the Society's large marquee, they sat down to luncheon. The company, which numbered 220, was presided over by the Bishop of Chichester. Goodwood House was afterwards visited, by permission of the Duke of Richmond and Gordon.

THE FORCE OF HABIT IN MATTERS OF TASTE.

Sir,—Reading the remarks made in your excellent leader of Saturday week on fashion in decoration, recalled to my mind the subject which forms the heading to this letter, a subject to which I have long desired to direct public attention. It is an old adage that "use is second nature"; nevertheless, this great fact is lost sight of, important factor though it be, in giving tenacity of existence to wrong in everything.

The force of habit is taken very little note of in discussing matters of taste, though it is upon this modifying factor in our nature that the eccentricities of fashion in life, literature, and art are enabled temporarily to usurp the thrones of the right and the beautiful. It is upon the modifiability of the human nature by habit that Chinese, Japanese, Gothic, and other eccentric styles become tolerable and persistent, and we even meet with men who ought to have been superior to such corrupting influences in taste, who have become fascinated by dwelling upon some peculiar and eccentric style, till they fell entirely under its dominion, became adapted to, and believed in it; and by precisely the same process that bag-wigs, powder, patches, ruffs, hoops, &c., came to be thought the thing, and to have their day.

The Mediæval artist and people were in all probability totally insensible to all those quaintnesses of style which to us moderns appear as pronounced and as eccentric as the costumes of the time. Men become by habit insensible to a dominant bias in their surroundings, just as they do to the tone of objects illuminated with a prevailing hue. The value of this factor of "habit" must not be underrated. The force of habit ought to caution us against forming a too hasty conclusion respecting the characteristics of the taste of our own time, for if those styles which now strike us as being so peculiar, so eccentric, appeared to be destitute of bias, or peculiarity, to those who practised and contemplated them, may not ours exhibit to the eyes of posterity an equally strange and eccentric spectacle?

There can be but little doubt that there is a style which is free from all peculiarities, an "everlasting" style, free from all bias,—using the word everlasting in the same sense as Addison, when he spoke of sculptors clothing their statues in an everlasting drapery, to escape the fashions of the time. There is an everlasting right in art, as there is in ethics, and it is this central taste and style, the taste and style "for all time," which should be striven after, which we should endeavour to realise by eliminating every form of peculiarity or eccentricity from each and every of its manifestations.

W. Cave Thomas.

The New Free Library, Newcastle-on-Tyne, which will contain 20,000 volumes, is to be opened on Monday, Sept. 13.

NEW PUBLIC BUILDINGS AT ASTON, BIRMINGHAM.

On the 12th inst. the memorial stone of the new public buildings for the Manor of Aston, now in course of erection in the Witton-road, was laid by Dr. Keyworth, Chairman of the Local Board of Health. Building operations have been in progress for about two months, and the foundations have been constructed. Two years since the Board advertised for competitive designs for public offices, free library, baths, and other buildings, and in response a number of architects submitted their designs. The Board very wisely referred the selection of the most suitable designs to Mr. Alfred Waterhouse, A.R.A., who in due course reported in favour of those by the then firm of Alexander & Henman, architects, of Stockton-on-Tees and Middlesbrough. The Board adopted the recommendation, and eventually, when Mr. Henman, having disconnected himself from his former partner, had settled in Birmingham, entrusted him with the superintendence of the work and the remodelling of the plans, necessitated by the plea for economy in consequence of the depressed state of trade in the district. The new buildings consist only of the public offices of the Board and rooms for the Free Library, under one roof, the erection of the baths and stabling being for the present deferred. There are, however, many in the manor who consider these to be necessary requirements, and consequently trust that the Board will take them in hand at the earliest possible date.

At the angle of the Albert and Witton roads, with a separate entrance in Witton-road, is the Free Library, with a large and well-lighted reading-room, lending library, and reference library, the whole having a floor area of over 2,000 superficial feet. The entrance to the Public Offices, being in Albert-road, gives access through an open porch and vestibule to the ground-floor, where are situate the rate collector's public and private offices, the medical officer's room, and public and private offices for the sanitary inspector; also a public waiting-room, lavatories, &c. A stone staircase ascends to the first floor, where are situate the Board-room and two committee-rooms over the library department, offices for the clerk, sub-clerk, surveyor, building surveyor, and the drawing-office, as well as another waiting-room for the public, lavatories, &c. In the basement is the fire department, with standing-room for two fire-engines, firemen's rooms, and hose-room; and there is ample store room. The frontages will be of brick and stone. The present contract, taken by Mr. W. Robinson, of Spring Hill, amounts to 8,270*l.*

FOOTINGS ON ANOTHER MAN'S LAND.

Sir,—I have contracted to build a house for a freeholder who wishes his footings placed on the adjoining freeholder's property, so that the frontage of his building may be to the full extent of his property, otherwise he will have to set back 1-1 in., which will be lost. Will any of your subscribers kindly give me their experience on such a matter, as the adjoining freeholder objects to the projection of the footings being on his property? A Small Builder.

*** The statement is not very clear. On the broad question, a man has no legal right within the metropolitan districts to place his footings on an adjoining owner's land, though it is constantly done, and may be almost said to be justified by custom. The district surveyor would doubtless assist our correspondent. Building Bills which have been brought before Parliament have contained a clause giving right to a building owner to place footings on adjoining owner's ground.

PROPOSED THEATRE IN BEAUFORT-BUILDINGS.

Sir,—The article in your issue of the 7th instant, on "The Proposed Theatre in Beaufort Buildings," being calculated to prejudice my client, the plaintiff in the pending action of Emden *v.* Carte, I ask you to give insertion to the following:—

My client claims as an essential part of his plans the placing of the carriage and principal entrances in the street described by you as from the Thames Embankment to Savoy-place; and further, that this street was actually re-made and opened in consequence of his negotiations (commenced so far back as the middle of 1878) with the Metropolitan Board of Works.

On a recent motion to the Court Mr. Carte gave an undertaking not to use my client's plans.

Frede. Tudor, Solicitor for Mr. Emden.

August 13th.

PITCH-PINE.

Sir,—Referring to the letter in last week's *Builder*, allow me to remind "Pinus" that pitch-pine is not a "hard wood," and consequently inserts moisture; and when we change the wording in our specifications that we are so accustomed to,—viz., "deal-cased frames, *oak* sunk and weathered cills, brass axle pulleys, and best patent flax lines," let the substitute be, not a *softer material* for the cill, but, as armour-plated vessels have taken the place of the wooden walls of Old England, let the substitute be a "hard wood,"—say teak, for instance,—which is cheaper than oak, and makes a capital cill except as to colour; and being a "hard wood," it throws off the moisture, so essential in a cill to a window-frame, and, indeed, most other cills. The above preamble does not, of course, apply to first-class work, when we should have our wainscot frames, &c., at all events, wainscot pulley stiles; neither does it apply to work that has not to stand any longer (on account of the wear and tear) than wood paving, referred to in the ably-written letter from "A Civil Engineer" that appeared in the *Builder* for the week ending the 7th of August last. William H. Pipe.

I have been looking with some little anxiety for a categorical reply to the inquiry of "An Architect" contained in your issue of the 31st ultimo as to the fitness of pitch-pine for window-cills.

Interesting and instructive as is "A Civil Engineer's" general dissertation on woods, in your number of the 7th, I am at a loss to find in it any direct answer to the inquiry. I know it is one in which more than your first inquirer are interested. Woods that will stand well betwixt wind and water have nothing to do with the matter. The pitch-pine is not intended to be used either for piles or for camp-sheds, but for window-cills; and until I have much better information that pitch-pine, with its natural indication of resin and turps, is not as good a material as can be used for sash-cills (saving, of course, English oak), I must venture to enter a *caveat* against the inference that is to be drawn from "A Civil Engineer's" otherwise instructive letter. Another Architect.

SELF-PROTECTION FOR ARCHITECTS.

Sir,—For the chaotic state now existing with regard to English architecture we are mainly indebted to an ignorant class of so-called architects, not only ignorant of the first principles of syntactic art, but even deficient in the elements of ordinary education; not only ignorant of the *five orders*, but of classics, mathematics, and the higher branches of arithmetic. Why do not architects use the same means of keeping pretenders at a distance that members of the legal and medical professions, and even market gardeners and florists, adopt? I mean the use of the Latin language. There might then be some hope of putting an end to that source of disfigurement of our towns, "the pleasing school."

Walter Scargill.

PROVINCIAL NEWS.

Halifax.—A large mill for the Halifax Flour Society was opened recently. The society affords a striking instance of the power of co-operation. At the meeting, Mr. Councillor Pearson, president, said the first mill built by the society was opened in 1848. This mill was fitted with eight pairs of stones, and corn-grinding machinery, and was worked until 1863, when a larger mill, with a grinding capacity of twenty pairs of stones, was erected, partly on the same site. In May, 1872, the Bailey Hall estate was purchased for the sum of 21,654*l.* 13s. 8d., and one of the buildings standing upon it was altered and adapted for corn-milling purposes, at considerable cost, but was only used for about six months. In 1877 the ground was partially cleared for the erection of the new mill, warehouses, and other premises, and building operations were shortly afterwards commenced, from plans supplied by Mr. Richard Horsfall, architect. The new buildings are large, and fitted with machinery of the most modern construction. Thirty pairs of stones were already fixed, fourteen of which were now running, and it was expected that the other sixteen pairs would be in full operation in a few weeks. The total working capacity of the new mill was fifty pairs of stones. The total cost of the new mill has been 10,200*l.* It was stated at the meeting that since the formation of the Flour Society the sum of 160,000*l.* had been distributed amongst its members.

Devonport.—The memorial stone of the new Public Hall now in course of erection in Fore-street, Devonport, was laid on the 28th ult. We recently (vol. xxxviii., pp. 481, 483) published view and plans of the building, of which Mr. Samuel Knight, of London, is the architect. Mr. Matcham, of Plymouth, is the contractor for the erection of the building, which is estimated to cost about 10,000*l.*

Non-Arsenical Papers.—The Council of the Sanitary Institute of Great Britain have awarded to Messrs. W. Woollams & Co. a medal "as a special mark of merit" for their paperhangings "free from arsenic," exhibited at the late Croydon Exhibition. In our notice of this exhibition we mentioned that Messrs. Woollams' exhibits had been reserved for examination by experts.

CHURCH-BUILDING NEWS.

Paddington.—St. Martha's Mission Chapel has been erected both as a mission chapel and chapel-of-ease to the neighbouring church of St. Mary Magdalene. It stands on the site of "Desborough House," said to have been the residence of General Desborough, in Cromwell's time. Portions of the house were found to be of timber-framing, with brickwork filling-in. The building had been modernised into "Strawberry Hill Gothic." At the back had been built a boys' school, using some of the old rooms of the house as class-rooms, &c. It was therefore determined by the vicar, the Rev. R. Temple West, to retain these school buildings, and enlarge them by extending them over the whole area, and to build the chapel above them. These works have now been carried out under the architects, Messrs. Carpenter & Ingelow. The chapel consists of a chancel and vestry, organ-chamber over, nave, and side aisles, with a staircase at the north-west angle occupying the space of one bay of the aisle. The arcades have moulded brick arches, with Portland stone columns standing on cast-iron columns and stanchions in the schoolroom under, all these being tied together and also tied to the walls by rolled iron and riveted girders, which also carry the chapel floor. The internal facing is of red brick, the walls being lined with tiles up to the string-course under the windows. The reredos and the lining of the chancel walls are not yet executed. The fittings and the screens are in pitch-pine, and the body of the chapel is seated with chairs. The exterior is faced with white Suffolk bricks for the purpose of throwing as much light as possible into the girls' school on the opposite side of the narrow court. Wood blocks are used for the floor of the schoolroom and chancel; the altar is of cedar, and executed by Mr. J. Forsyth; the organ is by Messrs. Hedgland. The contractor is Mr. Scott, of South Molton-street, the ironwork being executed under him by Messrs. Shaw & Co. Mr. Nash has been the clerk of works.

Blankney (Lincolnshire).—St. Oswald's Church here has just been restored at the cost of Mr. H. Chaplin, M.P. It is an interesting Early Pointed rebuilding of a still earlier church of the same period; the nave has arcades, each of three wide and lofty arches, the columns of which have delicately-moulded capitals and bases, the latter resting on a projecting stone surbase, which forms a seat round the column. The aisles had been altered in the fourteenth century, and traces of their two-light windows remained, with the water-tables of the steep early roofs. The chancel has long, narrow lancets, with a very early three-light window, with intersecting tracery, in which there had not been any of the soffit cusping usually found in such windows. The tower is a rebuilding (some fifty years ago) of a fine Perpendicular one, with great coupled windows, rich parapet, and pinnacles of a local type. The north aisle of the chancel is of Perpendicular date, and takes the place of an Early English aisle or lady-chapel. The whole church had been modernised, and presented, with its whitewashed walls and ceilings and high pews, a trim and "respectable" appearance, but its fine roofs had been removed and re-used as joists (which were found utterly rotten). All tracery had been cut out, the floor raised 2 ft. above the old one, the chancel shortened, and high pews and galleries had been erected; while a great vault, 5 ft. above the pavement, occupied the whole of the "Chaplin Aisle" (the north aisle of the chancel). Under the direction of Messrs. Carpenter & Ingelow the church has been brought back to the appearance it presented in the fourteenth century. The chancel has been restored to its original length, and the Chaplin Aisle also lengthened, the vault in it being reconstructed below the pavement. New high-pitch roofs have been erected, excepting to the Chaplin Aisle, where the original low-pitch one has been restored, re-using some fragments of the ancient one. The floor has been restored to its original level, and the porch rebuilt, introducing its ancient archway,—brought from an adjoining stable-yard. A new arch has been made in the tower, as this feature had not been reproduced when the tower was rebuilt. The whole has been re-seated with movable open benches, and the Chaplin Aisle is separated off by rich screens of oak, in the positions where ancient ones had existed. The great chancel screen has not yet been executed, nor has the reredos. The east window is filled with stained

glass by Messrs. Clayton & Bell. The west window is by Mr. J. Pace. All the works have been executed by Mr. Halkes, of Dunston.

Newcastle-on-Tyne. — Trinity Church, New Bridge-street, Newcastle-on-Tyne, has just been re-opened, after undergoing important alterations and improvements. Messrs. Copland & Rollo, and Mr. James Smart, Newcastle, were the contractors for the several departments of the work. Mr. J. J. Lish, Newcastle, was the architect.

Hackney.—The foundation-stone of a new church, to be erected on the site of the old South Hackney Church, Well-street, at a cost of about 1,250*l.*, was laid by Mr. W. A. Tyssen-Amherst, M.P., on the 11th inst. The architect is Mr. Gilbee Scott, and the builder Mr. Thomas Boyce, Hackney.

STAINED GLASS.

Houghton.—A three-light window has just been placed in Houghton Church, Walsingham, Norfolk. The subject is, in the centre, "The Crucifixion," and, in the side-lights, the figures of the Blessed Virgin and St. John. The window has a ruby background, with leaded conventional foliage. It has been executed by Messrs. Gibb & Howard.

Bradford (Yorks.).—Four additional stained-glass windows have been placed in the Church of St. John, Horton-lane, Bradford. They stand side by side within the great west arch of the church, and immediately beneath, and, as it were, crowned by the large rose-window of that arch. Each is a single light, and is occupied by a figure of one of the four Evangelists. These windows are from the studio of Messrs. Powell Bros., Leeds.

Derby.—There has just been placed in the east end of the church of St. Andrew, Derby, a memorial window, in memory of Charles and Martha Humphreys. It is in the style of the fifteenth century, from the atelier of Messrs. Lavers, Barraud, & Westlake, of London. The two chief lights are occupied with two New Testament and two Old Testament pictures, viz.: The Annunciation, The Nativity, Moses and the Burning Bush, and the Fall of Man. The late Councillor Humphreys was for some years churchwarden of St. Andrew's, and this window is a very beautiful token and memorial of his connexion with the edifice.

Miscellanea.

Cavendish College, Cambridge.—A new wing has been opened. It contains, besides a lecture-room, accommodation for thirty-four students and three tutors. The chairman, Prebendary Bunton, in his address, said that a new college in an old university, if it were not a mere intrusion and impertinence, must show that it satisfied the requirements of an enlightened public opinion in the university and the outside world. Cavendish College fulfilled the first of these conditions by furnishing an education which was at once inexpensive and complete, and combined necessary discipline with the advantage of university life. The financial success of the scheme is now assured, the strictly inclusive charge of 84*l.* per annum having been proved sufficient to cover all expenses of board and tuition.

Competitive Designs for Christmas and New Year Cards.—Mr. Raphael Tuck, fine-art publisher, has offered fourteen prizes, amounting to 500*l.*, for the best original sets of designs for Christmas and New Year cards. Mr. H. S. Marks, R.A., Sir Coutts Lindsay, bart., and Mr. G. H. Boughton, A.R.A., have agreed to act as judges. All designs submitted will be exhibited in the Dudley Gallery.

Revolving Shutters. — Messrs. Salmon, Barnes, & Co., of Ulverston, have just completed the fitting-up of Child's Bank, Temple Bar, with their iron revolving bank shutters, worked by their patent balance-weight motion, with special arrangements for raising or lowering them from the inside.

Iron Sashes.—We are asked to mention, with reference to the illustrations of No. 16, Token-house-yard in our last, that the whole of the iron sashes used in that building were made by Messrs. Burt & Potts.

Imperial Yacht "Livadia." — Messrs. C. H. Sharp & Co., of 104, Newgate-street, have received orders for their "Crown Ejector" for the ventilation of this yacht.

Bournemouth Pier.—The length of the new pier is 833 ft.; for a distance of 650 ft. it is 35 ft. wide, but for the remaining distance it is 110 ft., whilst the decking in the centre part of the sea has been slightly raised. At the entrance there is an ornamental structure, with covered resting-place, &c., arranged so as to give prominence to the approach. Here there are also lavatories and waiting-rooms, and over the centre portion of the structure is a small clock-tower, in which it is proposed to place an illuminated clock. The building itself is of pitch pine and plate-glass, with majolica panels. It has been painted and decorated. Immediately inside the pier there is a wide open space which has been laid with Minton's tiles. The pier itself is constructed of iron, with pitch-pine decking; the narrow part is supported by seven clusters of iron screw piles, and beneath the broad end there are fifty-six piles, braced together. Running round the exterior of the broad end, and passing under one part of the pier, is an inclined landing-stage for steamers and boats, having a length of about 1,060 ft. The lowest part is only covered by a few inches of water at high tide, and the other parts are at all times accessible. It is constructed of open plates, with timber piles, and being quite independent of the pier itself, enables vessels to approach the larger structure without striking it. Light shelter-boxes, fourteen in number, are placed at regular intervals on either side of the narrow part, and are formed of glass, so that whilst resting the visitor is able to view the entire bay. The Commissioners have obtained sanction from the Local Government Board for the erection of a handsome pavilion at the platform end of the pier, the cost of which would be about 6,000*l.*, which sum was included in the 30,000*l.* which formed the original estimate. There is no probability, however, of this being proceeded with at present. The engineer of the structure is Mr. Eugenius Birch, C.E., and the contractors were Messrs. Bergheim & Co.

The Results of Strikes.—The ironmasters of Lanarkshire last week resolved to blow out their furnaces and stop making iron rather than pay more wages. This illustrates the laws which regulate wages more pointedly than any amount of argument. Wages are regulated by the demand for labour; and, as the ironmasters can do without any labour at all, it is not likely they are disposed to pay an artificial price for the little they want. Supposing there are 10,000 men getting 1*l.* a week, and they strike for an extra shilling. The employers prefer to stop work. These workers will lose 10,000*l.* in a single week, a sum that it would take them twenty weeks to regain, even if they got the advance; and three weeks would cost them more than a twelvemonth's advance to get back. It is strange that workmen are so slow to learn that it is only secretaries or union delegates that prosper by strikes. If they had a rule in their unions that no man should be eligible for office except he was open for a job, and that all union work should be done gratuitously, they would have better advice and less misery from strikes.—*Glasgow News.*

The Southwark Music Hall and Theatre of Varieties, known as the "South London Palace," has been re-opened after re-decoration and alterations. The designs of Mr. Thomas Rogers have been executed, so far as the gilding, &c., was concerned, by Mr. J. T. Warren, of Earl's-buildings, City-road. The lighting, by means of twenty-two pendant chandeliers, is by Defries & Sons. The reserved stalls have been enlarged and furnished by Lyons, of Holborn, and the bar-fittings have been decorated and painted by Mr. C. King, of Blackfriars-road. The new act drop, painted by Grieve & Son, represents a distant view of Westminster Bridge and the Houses of Parliament. The orchestra has been lowered, and the addition of a new cigar stall and a tea and coffee buffet, at which latter non-intoxicating drinks are sold, are features in the alterations, which have been wholly carried out under the direction and supervision of the surveyor, Mr. Edwin Clarke.

The New R.C. Church of St. Joseph, Ramsbottom, the foundation-stone of which was laid on September 27th, last, is nearing completion. The church is built in the Early English style, from the designs of Messrs. Bird & Whittenbury, of Manchester. As opened, it will consist only of nave and aisles, constructed at a cost of about 2,400*l.* At some future period a spire and other portions will be added, the cost of the complete design being estimated at upwards of 3,000*l.*

Liverpool Deputy-Surveyorship.—At the last meeting of the Liverpool City Council it was resolved,—"That, having regard to the long and faithful service for upwards of thirty-five years of the Deputy Corporation Surveyor, Mr. George Handson Rollet, he be relieved from the more active and responsible duties of his office, and that he be retained upon the staff at 300*l.* per annum, being two-thirds of his present salary, with the understanding that he affords to the Finance and Estate Committee from time to time, when called upon, any information or assistance they may require from him; this resolution to take effect from and after the 31st of December, 1880."

Royal Indian Engineering College.—The following, in order of merit, are declared by the Civil Service Commissioners to have been the successful candidates at the recent open competition for admission to the Royal Indian Engineering College, Cooper's-hill, Surrey:—Samuel P. H. Dyson, Henry R. Hackman, Adolphe E. Orr, H. E. Pellereau, Cyril E. A. Jones, Thomas H. Clowes, Edward H. S. Napier, Henry M. J. Bacon, John N. A. Eaton, Henry H. Green, Frederic J. Robinson, James M. Jamieson, Thomas T. Bonhote, Alfred Rowland, George W. Appleby, Cyril V. Joakim, Benjamin Douglas, Thomas R. J. Ward, Henry S. Jones.

The Obelisk.—The first of the two sphinxes intended for the pedestals at the foot of Cleopatra's Needle on the Embankment is now about to be reproduced in metal at the Eccleston Works, Pimlico. The casting will be about 5-8ths of an inch thick, and the colour of the metal as it runs in is, we are told, to be graduated, so that the face will be lighter in tint than the body. The second sphinx will afterwards be proceeded with. It is to be hoped no more time will be lost, so that the monument may be completed. Some elaborate lamp-standards for Northumberland-avenue are in course of production at the same foundry.

Trade Unions Congress.—The Thirteenth Trade Unions Congress will be held at Dublin during the week commencing the 13th of September. The Parliamentary Committee, of which Mr. Broadhurst, M.P. for Stoke, is secretary, state that they are meeting with the hearty co-operation of the various Irish trades, and that at least thirty Irish delegates will attend the Congress. Dr. W. Neilson Hancock, Q.C., Professor Ingram, LL.D., Fellow of Trinity College, and Mr. Thomas Brassey, M.P., have undertaken to deliver special addresses.

Clacton-on-Sea Improvements, — The slipping and disintegration of the cliffs, and consequent wasting-away of the land on the Essex coast, have led to the formation of a Board of Commissioners, under an Act obtained this session, for the purpose of raising money to carry out certain sea-defences at Clacton-on-Sea. Designs for a new sea-wall, with promenade, concrete groynes, and other works, have been prepared by Mr. Charles W. Whitaker, of Westminster, and these works are to be commenced immediately. The sea-wall and promenade are to be about a mile and a quarter in length, and the face of the cliff is to be laid out in slopes and paths of an ornamental character.

Repairs to Thames Bridges.—At the last meeting of the Metropolitan Board of Works, the Board accepted the tender of Mr. Manley, amounting to 427*l.*, for painting the ironwork of Albert Bridge; the tender of Messrs. Nowell & Robson, amounting to 4,198*l.*, for works of repair to the carriage-way of Albert Bridge; the tender of Mr. Cook, amounting to 3,700*l.*, for altering and repairing the carriage-way and footways, and repainting the ironwork of Wandsworth Bridge; and the tender of Mr. J. Knight, amounting to 4,697*l.*, for paving the carriage-way of Waterloo Bridge with granite.

The Employers' Liability Bill.—In the House of Commons on Wednesday, Mr. Gorst moved an amendment that the provisions of the Employers' Liability Bill be extended to Government workmen. This was negatived, and the Bill was read a third time and passed without a division.

Tylers' and Bricklayers' Company.—The following gentlemen were elected, on the 10th inst., master and wardens of this company for the year ensuing:—Master, Mr. Augustus Bird; upper warden, Mr. Stanley George Bird; renter warden, Mr. Frederick Mansfield.

A Presbytery and Sacristy are to be built at South Bank, near Middlesbrough, for the Rev. Thomas Holland. New schools to accommodate 250 children will subsequently follow. Mr. Martin Carr, of Sheffield, is the architect.

The Old Monastic Houses of Oxford.—On the 5th inst., the Rev. Father Goldie, S.J., gave a lecture in the public room attached to the Church of St. Aloysius, St. Giles's, on "The Old Monastic Houses of the City." The lecturer said that in 1111 Canons Regular of St. Augustine were installed in the Church of St. Frideswide, and continued here till 1542, when they were transferred to other houses to make room for the grand college contemplated by Cardinal Wolsey. The monastery of Osney was also in the hands of the Canons Regular of St. Augustine, and stood close to the cemetery outside the Great Western Station. It was one of the largest monasteries in England; the church measured 352 ft. long by 100 ft. in width. The Dominicans came to Oxford in 1221; here it was that Robert Bacon, elder brother or uncle of the celebrated Franciscans, became a Dominican monk, and having taught theology previously, continued to do so after his profession. He was an intimate friend of St. Edmund of Canterbury. The Franciscans, or Grey Friars, came in 1224, and found a home between Littlegate and St. Ebbe's Church. The Carmelites, known as White Friars, came in 1238, and lived in Worcester-street; it was here that St. Simon Stock graduated in 1244. Later on they received from Edward II. the royal palace of Beaumont, facing their convent. The Austin Friars came in 1252, and took up their residence in Holywell parish, outside the City wall; it was in their hall that the public defensions in theology were carried on till the middle of the fifteenth century, and the disputations in logic and philosophy till the dissolution. The Benedictines possessed Cloucester Hall from the year 1283, on the site now occupied by Worcester College; it was here that Thomas of Walsingham, and Winchcombe, the chronicler of Evesham, were educated. Durham College was founded in 1290, in Broad-street, by the Prior of Durham Abbey, for the young men from his monastery, and St. Mary's Hall was erected by the Canons Regular, for the same purpose, in 1435; Erasmus was here a guest in 1498. Archbishop Chichele built a house of studies for the Cistercian monks in 1436, and the church attached to the same was not consecrated till as late as 1530. The building is now known as St. John's College.

Oxford Main Drainage Works.—Acting on counsel's opinion, the Oxford Local Board have been unable to act upon a proposal to award their engineer, Mr. W. H. White, a gratuity of 1,000*l.* in consideration of extra services in connexion with the new main drainage works of the city. The total cost of the works, excluding the purchase of land, has been upwards of 120,000*l.*, and they were carried out and successfully completed by Mr. White, who prepared all the plans, specifications for contracts, took out quantities, and generally superintended the whole works without the assistance of any consulting engineer. It is calculated that if a consulting engineer had been employed his charges and commission would have amounted to 6,000*l.* at least. Mr. White's salary since 1873 has been 360*l.* per annum.

Arbitration: Lambeth Infirmary.—At the meeting of the Lambeth Board of Guardians on the 14th inst., a letter was read from Mr. Taylor, the builder of the new infirmary, asking the Guardians to devise some means of coming to a settlement with him, the arbitrator, Mr. Stephenson, being still very ill, and it is uncertain when he will be well enough to resume the arbitration. Mr. Smallman observed that, in the event of the arbitrator not being able to resume the arbitration, there was a possibility that the whole case would have to be gone through again. Up to the present the Guardians had incurred expenses amounting to over 550*l.* It was stated that Mr. Taylor's claim was 6,000*l.*, but that, while he had offered to take 3,000*l.*, the Guardians only offered 1,000*l.* It was resolved to lay the matter before the Board's solicitor and the architect, to try and effect a settlement.

The Stratford Vegetable Market.—The Great Eastern Railway Company's fruit and vegetable market at Stratford has proved so successful that it has been enlarged. Messrs. Bangs & Co. were the contractors for the work, their foreman being Mr. Hollow. The central vaenue of the enlarged premises is nearly 700 ft. in length and 50 ft. wide, and the twenty-one compartments, or warehouses, are well adapted for the transaction of any trade. There are several lines of railway which afford every facility for the conveyance of goods.

Health Precautions for Factory Operatives.—A recently-published German work gives details of the precautions taken to preserve the health of the workmen in a large manufactory of coal-tar colouring materials, on the river Main, where more than a thousand workmen are employed. The men are not only requested, but practically required, to spend twenty-five minutes a day in the bath, and this time is reckoned as a portion of the working-hours. Bath tubs of special construction are provided for the use of those engaged in the violet and green rooms, while all the workmen actually occupied with colours receive clean suits of clothes every week from the proprietors.

Viollet-le-Duc.—It may not be uninteresting to those familiar with the deceased artist's works, to learn that the proposal to erect a monument to his memory has resolved itself into the resolution to publish, with the subscriptions gathered and yet to come in, a volume of a hundred plates, producing the more remarkable compositions of the deceased artist, —not alone his purely architectural designs, but those be prepared for the decorative painters, the sculptors, the metal-workers, and the carpenters. It would be difficult, we imagine, to find a means of keeping alive his memory which would be more in accordance with the undeviating modesty of the late eminent architect.

International Exhibition at New York in 1883.—The Act of Congress incorporating an International Commission for holding a World's Fair at New York in 1883, calls for the appointment of two commissioners from each State and one from each Territory, these to be joined to the commissioners named in the Act, the entire number to constitute a commission for initiating and conducting the enterprise. Pursuant to this Act the necessary appointments have already been made, and the Commission will soon commence active work.

The Value of Health.—The Ashford Local Board (according to the *Daily Chronicle*) recently appointed Dr. Wiglesworth, of Hamstreet, a village near that town, medical officer of health for their district, which comprises a population of 10,000, at a salary of 25*l.* per annum. The Local Government Board refused to sanction the appointment at such a salary, but the Ashford authority have now appointed Mr. Philip Phelps, another local surgeon, at the same stipend, after a proposition that the salary should be 15*l.* It remains to be seen what further steps the Local Government Board will take.

Completion of Cologne Cathedral.—At ten o'clock on Saturday morning, the 14th inst., the last stone of the cross ornamenting the top of the pinnacle of the second of the two great spires of the cathedral of this city was finally fixed in its place. On all the public buildings and many private houses flags waved in honour of the event.

Death of a French Sculptor.—M. Lemair, the French sculptor, died on the 4th inst. at the age of 82. Among his best-known works are statues of Kleber and Hoche, and Louis XIV. at Versailles, and the Madeleine front in Paris, representing Mary Magdalen at the feet of Christ.

TENDERS

For Holy Trinity Church, Burton-on-Trent. Mr. J. Oldrid Scott, architect:—

J. & R. Roberts, London	£21,872	0	0
Silver & Son, Maidenhead	21,777	0	0
Pattinson, Sleaford	21,436	3	5
Colls & Son, London	21,049	0	0
Shaw, Westminster	2,998	0	0
Chamberlain, Bros., Burton	20,912	0	0
Dove, Bros., Islington	20,320	0	0
Fast, Melton	20,192	0	0
Bromwich, Foster, & Co., Rugby	20,045	0	0
Thompson, Peterborough	19,847	0	0
Chatham, Jones, & Co., Ruabon	19,413	10	9
Dobson, Colchester	19,389	0	0
Booth & Sons, London	19,130	0	0
Baines	19,059	0	0
Law & King, Lutterworth	18,879	0	0
Collins, Tewkesbury	18,400	0	0
Hewitt, Leicester	17,987	0	0
Lowe & Sons	17,883	0	0
Horsnan & Co., Wolverhampton*	17,713	3	10

* Accepted. The contract sum being 17,142*l.*, owing to a slight modification.

For the construction of a service reservoir, Bala Waterworks. Mr. Thomas Roberts, engineer:—

Davies, Portmadoc	£230	0	0
Hughes, Portmadoc	234	0	0
Jones, Tremadoc (accepted)	250	0	0
Jones, Penygroes	248	0	0

For the return stalls of the choir (the Mildmay Memorial), St. Alban's Cathedral. Mr. George Gilbert Scott, architect:—

Thompson, Peterborough	£1,496	0	0
Farmer & Brindley (accepted)	1,213	0	0

For Colchester drainage:—

Neave	£48,884	8	0
Smith & Co.	48,667	19	6
Marshall	47,515	0	0
Cook & Co.	46,543	0	0
J. W. Neave	43,427	0	0
Wickerson	46,239	0	0
Botterill	45,844	0	0
Cadus	43,500	0	0
Everitt & Son	42,879	0	0
Hayward	42,648	0	0
Lee & Son	42,445	0	0
Saunders & Son	41,850	0	0
Pearson	39,500	0	0
Trimm	36,720	0	0

For proposed Children's Convalescent Home, St. Leonards-on-Sea. Messrs. Fowler & Hill, architects. Quantities by Messrs. Fowler & Hugman:—

Dove Bros.	£6,595	0	0
Kirk & Randall	6,220	0	0
Crockett	6,000	0	0
Lowrance	5,800	0	0
Howell & Son	5,690	0	0
Jones	5,575	0	0
Hughes	5,388	0	0

For houses and shop in Norman road, St. Leonards-on-Sea, for Mr. W. Phillips. Messrs. Jeffery & Skiller, architects. Quantities supplied:—

Avis, Hastings	£4,843	0	0
Elliott & Warman, Hastings	4,789	0	0
Cruttenden, St. Leonards-on-Sea	4,583	0	0
Harman, Hastings	4,493	0	0
Cousens, do.	4,480	0	0
Jenkin, do.	4,400	0	0
Rodda, do.	4,270	0	0
Vidler, do.	4,233	0	0
Parks, do.	4,207	0	0
Geary, do.	4,182	0	0
Jones & Co., Gloucester (accepted)	4,181	0	0

For Green Bank Branch Railway. Messrs. Myres, Veevers, & Myres, engineers and architects. Quantities supplied:—

Ward	£1,032	12	1
Heathcote	1,007	6	4
Saul	997	17	7
Alston	977	10	0
Hothersall	902	15	0
Christian (accepted)	898	0	0

For the fitting and furnishing of the Chesterfield Union Industrial Schools, Derbyshire. Messrs. Rollinson & Son, architects:—

Heathcote	£1,510	16	0
Langley Bros.	1,408	0	0
Stevenson & Co.	1,390	0	0
Joyce & Attenborough	1,389	15	0
Stone	1,354	3	0
Statham	1,320	0	0
Kay & Sons	1,280	0	0
Glossop	1,256	0	0
Johnson, Mansfield (accepted)	1,214	0	0

For the erection of outbuildings to the Chesterfield Union Industrial Schools, Derbyshire. Messrs. Rollinson & Son, architects:—

Bridge	£437	0	0
Glossop	409	0	0
Hoole	385	0	0
Wright	377	6	0
Walker	377	0	0
Joyce & Attenborough	373	10	0
Kay & Sons	370	0	0
Knowles	339	0	0
Margerrison, Barlow, near Chesterfield (accepted)	336	0	0
Oough	316	10	0

For the Clarkson Memorial, Wisbech, designed by the late Sir Gilbert Scott, R.A.:—

	In Kotton stone.	In Ancaster stone.
Piersy & Co., London	£1,870 0 0	£1,760 0 0
Farmer & Brindley, London	1,639 0 0	1,589 0 0
Pattinson Bros., Sleaford	1,645 0 0	1,445* 0 0

* Accepted.

For additions to the Wilts and Dorset Bank at Christchurch. Mr. Fred. Bath, architect:—

Davis & Son	£964	6	0
Hyde	924	14	0
Cooper	836	8	0
Jenkins & Son	819	0	0
George	730	0	0
Walden (accepted)	702	15	0

For additions to a residence at Milford, Salisbury. Mr. Fred. Bath, architect. Quantities supplied:—

Wort	£671	2	4
Matthews & Tomkins	636	11	1
West	595	8	0
Harris	547	14	0
Walker	543	6	0
Dolman	542	0	0
Cooper	536	10	0
Young & Sons (accepted)	520	0	0

For roads and sewers on the Old Park Estate, Enfield, the property of Mr. S. Sugden. Mr. S. Hickson, surveyor:—

Bell (accepted)	£2,095	0	0

For the erection of ironing-room, offices, and shops, Marsh-lane, Southampton, for the South Hants Steam Laundry Co., Limited. Mr. W. H. Mitchell, architect:—

Brinton & Bone	£1,739	0	0
Rowland	1,698	0	0
Chapman	1,666	0	0
Dyer	1,580	0	0
Crook (accepted)	1,547	10	0

For the erection of a villa residence in the Overhill-road, Lordship-lane, for Mr. James Henderson. Mr. R. Peters, architect. No quantities:—

Watson & Dennett, Dulwich (accepted)	£1,450	0	0

For gardener's cottage, including fence-walls, Finchley, for Mr. A. Saunders. Mr. Walter Graves, architect:—

Cooper (accepted)	£332	0	0

For alterations and additions to two houses, Wimbledon-hill-road. Mr. Alfred G. Olley, architect. Quantities supplied:—

Brazier, Wimbledon	£1,972	0	0
Ackermann, Wimbledon	1,854	0	0
Rodwell & Smith, Brixton	1,695	0	0
Harmer, Wimbledon	1,649	0	0

For offices in Fisherton-street, Salisbury, for Messrs. Toomer Brothers. Mr. Fred. Bath, architect:—

Cooper	£284	0	0
Young & Sons	280	0	0
Harris (accepted subject to revision)	235	0	0

For repairs to the lodge at Lewisham Cemetery. Mr. Horace T. Bonner, architect:—

Godart & Co., Mile End	£344	0	0!
Carter, Deptford	325	0	0
Davis, Peckham	289	0	0
Jeal, Lewisham	268	0	0
Taylor & Sons, Upper Thames-street	249	0	0
Higgs, Dorset-square	248	0	0
Benson, 19, Red Cross-street	219	0	0
Ayres, Woodford	210	0	0
Buchan, Camberwell	195	0	0!

For building two houses, Sidcup. Mr. Horace T. Bonner, architect:—

Smith & Scarborough, Peckham *	£1,150	0	0

* Accepted.

For alterations to the Green Dragon, Bermondsey-street, Bermondsey. Mr. Horace T. Bonner, architect:—

Godart, Mile End (accepted)	£173	0	0
Higgs, Dorset-square	163	10	0
Pitcher, Mile End	155	0	0

For the erection of a dairy, The Broadway, Wimbledon, for Mr. A. Gorton. Mr. William Crisp, architect:—

Dunford & Langham	£703	0	0
Johnson	558	0	0
Row (accepted)	518	0	0

For lodge, mortuary-house, boundary-fences, ground-work, and drainage, at St. James's Church, Enfield Highway, for the Enfield Burial Board. Mr. F. W. Searle, surveyor:—

	Lodge, mortuary, boundary-fences, &c.			Ground-work and drainage.		
Patman	£820	0	0	£428	0	0
Coote	795	0	0	—		
Bell	772	1	9	626	3	4
Fairhead	762	0	0	400	0	0
Bentley	725	0	0	655	0	0
Linzell	725	0	0	450	0	0
Harris & Wardrop	694	0	0	400	0	0
Angood	687	0	0	—		
King	275	0	0	725	0	0
Meston	—			359	0	0

For repairs, decorations, &c., at 5, Park-crescent, for the Lord Mayor. Mr. William Wimble, architect. Quantities not supplied:—

Macintosh	£432	0	0
Colls & Sons	326	0	0
Jackson & Graham	317	0	0
McLachlan & Sons	312	0	0
Vernell & Griffiths	299	0	0

For cottages and shop, for Mr. Thos. Phipps, Swindon. Mr. William Drew, architect:—

Henly	£1,125	0	0
Pettifer	1,044	0	0
Conway	978	0	0
Franklin	931	0	0
Webb	912	0	0
Cavill (accepted)	900	0	0

For alterations at the Foresters' Arms, New Swindon, for Messrs. Arkell & Sons. Mr. William Drew, architect:—

Kent	£238	0	0
Phillips	220	15	0
Henly (accepted)	205	13	0

For new hilliard-room, &c., at the Great Western Hotel, New Swindon, for Messrs. Arkell & Sons, of Kingsdown Brewery, Swindon. Mr. William Drew, architect:—

Webb	£768	0	0
Phillips	759	0	0
Looker	742	10	0
Wiltshire (accepted)	734	12	0

For additions to dwelling-house in Castle-street, Salisbury, for Mr. George Fulford. Mr. Fred. Bath, architect. Quantities supplied:—

Hale & Sons (accepted)	£600	0	0

For two detached villa residences, Middle-lane, Hornsey, for Mr. L. Koller. Mr. J. Farrar, architect:—

Grover	£4,573	0	0
McFarlane	4,405	0	0
Smith	4,396	0	0
Lawrance	4,379	0	0
Conder	4,270	0	0
Mattock Bros.	4,233	0	0
King	4,198	0	0
Harper	3,708	0	0

For new front to premises, Canal, Salisbury, for Messrs. Watson & Godden. Mr. Fred. Bath, architect. Quantities supplied:—

Wort (accepted)	£350	0	0

For coffee tavern and mission-hall, Coleman-street, London Wall, for the Society of Friends. Messrs. Lee & Tregelles, architects:—

Holland & Hannen	£9,227	0	0
Conder	8,848	0	0
Ashby Bros.	8,794	0	0
Brown	8,723	0	0
Woodward	8,410	0	0
Brass	8,395	0	0

Westwood House, Sydenham. — The alterations and additions to this house, from the designs of Mr. Pearson, R.A., exhibited by him in the late exhibition of the Royal Academy, are being carried out by Messrs. Veitch & Close, Stanhope-street.

TO CORRESPONDENTS.

E. C. S. (shall have attention next week).—T. R. H. (great risk would be run unless the plans were delivered).—W. T. N (should send other names and amounts).—G. R. W.—U. & O.—G. E. R.—W. B.—J. G. S.—T. B.—J. G. & G.—P. G. S.—D. O. J. & Co.—W. & Co.—D. W.—C.—W. H. P.—J. B.—J. R.—S. F. B.—W. B.—V. & C.—W. O.—A. C. O.—F. W. S.—W. C.—T. V.—F. B.—H. T. B.—T. K.—W. D.—S. B.—An Old Carpenter.—S. B. & Co.—I. & A. C.—Mr. D.—C. W. W.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

NOTICE TO SUBSCRIBERS.

THE INDEX and TITLE-PAGE for Volume XXXVIII. (January to June, 1880) was given as a Supplement with our Number for July 10.

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The Builder.

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ILLUSTRATIONS.

CONTENTS.

Bricks, and their Historical Interest.

IN the antiquity of the brick as a building material it is needless, nor is it indeed our intention, to insist. The great national collections of Europe, the British Museum foremost in the number, show us bricks, sun-dried and baked, from the ruins of Nineveh, and from the days of that city to the present moment bricks have never ceased to be an important instrument in the hands of the builder. That throughout Asia Minor they were largely employed we have seen only very recently proved in these columns, M. Rayet, in his work on Miletus,* having shown that the far-famed palace of Crœsus was built of no more costly materials than honest brick; what those bricks were, and their quality, are even to this day appreciated by the natives, who, for many centuries, have plundered the ruins to build or to patch up their own even more ruinous houses. The use of bricks among the Romans, who largely employed them as building materials, as we see in the familiar instance of the Temple of Concord, has been more than once the subject of the inquiry of industrious antiquaries, for the Romans were not content with producing the flat, tile-like brick which is so often to be met with in the lower portions of antique structures scattered over the Empire, and that are known in England, but their bricks were indelibly stamped with the mark of their maker, the names of the reigning consuls, and sometimes the year. From this source, then, more than one patient archæologist has gathered a rich store of information. But few inquirers have ventured far on the apparently arid and difficult road, which has hence remained little explored. Some curious information has, however, been lately thrown on the question by the researches of a French antiquary, M. Descemet, who has published in a recent number of the *Bibliothèque des écoles d'Athènes et de Rome*,—an excellent publication, founded in 1877 and now at its seventeenth number,—an article on the "Inscriptions doliaires latines" or Roman brick-marks, more especially relative to the *gens Domitia*, in antique Rome the most renowned brick-makers.

From an epigraphical point of view the brick-marks of the Romans have aroused the attention of more than one archæologist, but the difficulties which have stood in the way of procuring the stamps, added to the enigmatical nature of the inscriptions themselves, have led the inquirers to fields where the results were more showy and more easily obtained. M. Descemet has long been known to the antiquarian world; as far back as 1857 his "Fouilles de St. Sabina" attracted no little attention, as also, in 1876, his study, "Sur quelques Règles de Briques antiques," published in the *Bulletin de Correspondence Archæologique*. In possession of a valuable collection of stamps of his own, together with copies from the brick-stamps of the Vatican Museum, M. Descemet had at his disposition more than ordinary sources of reference, and the result of his study has been the work the title of which is above given.

The Italian antiquaries of the seventeenth and eighteenth centuries, Nardini, Ciampini, and their contemporaries, had not largely drawn on the store of historical information afforded by the Latin brick inscriptions; Fabretti was, indeed, the first to set into any order the more remarkable of these, but his efforts were merely tentative; his collection of inscriptions was unclassified and incomplete. It was reserved to the worthy Abate Gaetano Marini, the curator of the Vatican Museum at the close of the last century, to put together in a methodical manner the stamped bricks of the choice collection under his control; this task he admirably performed, preparing a learned catalogue which however remained at his death in an incomplete and manuscript form; but, such as it is, this manuscript, preserved in the Vatican Library, has proved a mine of information to all subsequent writers. Marini's catalogue was arranged with admirable order and carefully classified, each brick of the collection being the subject of numerous commentaries.

In spite of Marini's method, M. Descemet has adopted another system more suited to the requirements of the day, as rendered necessary by the considerable additions made to the list of brick inscriptions since the recent excavations. In his introduction, M. Descemet has carefully shown the importance of the study of these brick inscriptions by which the date of the erection of a building may be approximately ascertained. But as the author hastens to add, the fact of bricks bearing dates, or stamps being found in certain spots, is not, of course, conclusive evidence to the archæologist. Thus, in 1844, at Aix, in Provence, a brick of the year 123 was found, stamped with the mark of a Roman workshop, but the presence of this brick can alone be accounted for by the effect of accident, as it was scarcely possible that a town near Marseilles, so long famous for its pottery, should receive its bricks from Rome. On the shores of the Adriatic, at Pola and Zara, and in other towns of Istria and Dalmatia, the existence of a large number of bricks bearing the stamp of Rimini would tend to show that the brick trade, which still exists on both sides of the Adriatic, can be traced back at least eighteen centuries.

But apart from the geographical information these stamped bricks afford, the inscriptions they bear throw not a little light on an ill-known state of Roman society,—the education of the slaves, who though we have classic evidence proving that they were placed under schoolmasters, would seem to have little profited by this education, as the inscriptions it was their duty to stamp could only have had their letters placed upside down or transposed (as they are often found) by persons unable to read, who copied as well as they could a model under their eyes.

How these stamps and brick inscriptions were made is a point of some uncertainty. Had the ancients moulds, or did they use movable types? This latter method would suppose a great invention of the fifteenth century to have been forestalled. M. Descemet, who devotes some pages to the discussion of the question, concludes in favour of the mould, such as we see examples of in more than one national collection. The stamp was cut in relief, or incised, and then,—like the hatter-print of the present day,—made use of. As for the character of the spelling to be met with, this would naturally arise from the want of education of the workman.

Among the various other points considered by M. Descemet, the reason why the Roman bricks bear the date of their production is not the least curious; but when Pliny's advice to the architect is remembered, only to make use of bricks when two years old,—"*ædificiis nonnisi bimos probant*,"—an explanation may, perhaps, be found. A point has been omitted by M. Descemet,—one to which attention is drawn in a recent able article in the *Revue des Questions Historiques*,—in his neglecting to refer to the palms, pine-cones, and animals so often found stamped on the Roman bricks. It is now known that with the potters whose name represented or recalled any object or animal, this object he stamped on the pottery or brick of his make. Thus, where we meet with the stamped image of a wolf, we may be sure that the workman's name was Lupus.

As the title of the work shows, it is alone to the brick inscriptions relative to the *gens Domitia* that attention has been paid. Why this *gens* has been chosen the author explains. It would appear that the *gens Domitia* possessed the largest and most important of the brick manufactories of ancient Rome. Apart from this, the *gens* takes no mean place in the history of Rome; in the person of the virtuous Marcus Aurelius, it ascended the imperial throne. From the brick inscriptions gathered, the wealth of this emperor would appear to have been enormous, as we learn by the large number of workshops his *gens* employed, in company with those

* See *Builder*, *ante* vol. xxxix., p. 39.

of the *gens Aria* which he inherited through his marriage with Faustine.

The interest of this quiet and apparently little-inviting study would be thus seen to be great. Its historical value is no less appreciable. We are comparatively far from the days when the history of ancient times was merely gathered from former texts; the aid afforded by numismatics and epigraphy is largely called into requisition by the more serious modern historians. This little work of M. Descemet shows us how, even from the humble sources of the brick inscriptions, important facts may be gathered. The careful and beautifully-cut Roman stone inscriptions, so easy to read, are not sufficient; the research can be carried farther, as we see, for instance, in the study by M. Dumont on the ceramic inscriptions of Greece,* and even more strikingly in the delightful study which M. Dressel published some time since on the shattered *débris* of Monte Testaccio.† M. Descemet's inquiry into the brick-marks of ancient Rome has already yielded some curious information; it is to be hoped that his success will encourage him to further study in this yet far from exhausted field of archæological research.

BUILDING AND SCULPTURE IN LIVERPOOL.

The most important building in progress in Liverpool at present is the new Law Courts, which form a large rectangular block in the rear of the municipal buildings. The building is solid and sensible, rather than picturesque, in this respect forming a curious contrast to the Police Courts' building, at Manchester, in which picturesqueness of arrangement and effect was perhaps even too obviously aimed at. The Liverpool building is Italian in style, of very orthodox type in the main; the principal entrance-door is treated with some originality in detail, and seems to be an excellent bit of mason's workmanship. The building is now approaching completion as far as the shell is concerned. Not far from it the two principal Liverpool papers—the Liberal *Daily Post* and the Conservative *Courier*—are established in large and handsome premises opposite to each other; the latter has been there for some little time,—the building for the former is nearly new, and is noticeable as being one of the few specimens in Liverpool of the recent brick-style which has become so popular in London. The building has been carried out by someone who understands the style in question as at present accepted. The workmanship is excellent, and some of the detail in the lower part of the building is good, absolutely; the upper portion is good, relatively, that is to say, it is good in the eyes of those who care for festoons in cut brick, and that kind of *rococo* ornament. These buildings form part of the new lining of the wide street which was made some years ago as a central line of route from the Pier-head and Town Hall neighbourhood up to St. George's Hall and its *place*, cutting through a number of small alleys and back streets,—doing for Liverpool, in fact, pretty much what in London we are waiting to see done between St. Martin's-lane and Tottenham-court-road. The new street, however, has been slow to fill up with new buildings, and has still a good deal of blank margin. The Law Courts before mentioned abut upon it, and have their principal entrance from it. From this street a good view is obtained of the buildings on the rising ground where St. George's Hall stands; the group of buildings on the left, the Free Library, Picton Reading-room, and the Art Gallery, showing in a very agreeably varied perspective,—the Reading-room looking better here than from a nearer view, since its domed roof can be seen. When mentioning the opening of the Reading-room some time ago, we noticed the very large amount of echo in it, yet hoping that this would not be a serious drawback in a room intended for reading, and not for speaking in. We have since heard, however (and the fact is worth record for the attention of those who have to build reading-rooms), that the echo has proved a very serious annoyance, the merest whisper in some parts of the room sufficing to disturb readers very much. The room is evidently more or less modelled on the British Museum Reading-room, and the reason why an annoyance from echo is felt in it which is not felt in its prototype we take to be merely the difference of size. The British Museum room is undoubtedly a success (except in regard to its abominably bad ventilation), but then it is so large that speech in a low voice does not disturb the air sufficiently to awake the echo always latent in a circular building. The Liverpool room being so much smaller, the disturbance of the air caused by speech has not distance enough to allow it to break up and be lost before reaching the walls, and it all comes back again with its original force little diminished, and focussed probably on to some unfortunate person who happens to be in the right position to receive the full benefit of it. There is no doubt that for the arrangement of the traffic and service of a reading-room the circular form is the best, as a matter of planning: and we should opine that the matter of echo might have been very easily dealt with, while leaving the circle, for all practical purposes of administration, intact. Instead of building the walls in a regular curve, in such a case, let the general plan of the circle be followed, but let the walls be built in sections canted slightly in alternate directions from the tangent of the circle, — in other words, forming a continuous zigzag with very obtuse angles. The varying direction of the wall-planes would thus break up and disperse echo, while preserving the circular form in the main. It wants nothing but a little exercise of common-sense, the quality in which modern architecture is so sadly deficient.

The middle portion of the view we are now taking from Victoria-street is filled by the western flank of St. George's Hall, with Elmes's admirable adaptation of Egyptian architecture in Greek form, the centre of which is cut across by the unsightly old church of St. John the Evangelist, the churchyard of which forms a large waste triangular space abutting against the flank of the Hall. One can hardly venture to expect the ultimate removal of the church, though it has not a single architectural feature to redeem it, and is a great eyesore in regard to the view of the Hall in its rear, but some attempt might be made to render the churchyard less waste-looking, by laying it out afresh and making it a little ornamental. A straight path has just been made across it (at least it seems quite a recent operation), a flagged footway, raised above the level of the churchyard, as a short cut from the lower to the upper angle of the churchyard, continuing the line of street, which the churchyard intercepts: this should have a good-looking railing, and, if possible, a row of small trees on either hand. Both this churchyard and another, that of the Corporation Church of St. Nicholas, near the pier-head, seem to want reform very much: that of St. Nicholas, which is finely situated, so as to overlook the river, is becoming gradually surrounded with a better class of buildings (offices, &c.) than before, but the churchyard itself is a desolation, —old battered gravestones, with grass showing fitfully between them. The churchyard is a public thoroughfare, the shortest footway between the pier and the Lancashire and Yorkshire Railway Station, and its present condition is not reputable. There are, of course, difficulties in dealing with churchyards so full of old graves as these; but something must be done with them sooner or later, and it might as well be "sooner." The example has been set in different parts of London (East London especially) as to what may be done in the way of making disused burial-grounds into places agreeable to those who are not yet buried; and the larger provincial towns should follow the example.

The new half of the London and North-Western Railway Station (that known in "Bradshaw" as "Lime-street") is now open for traffic. The station is now probably the largest in area, though not the longest, of all provincial terminal stations, and great expense and trouble must have been incurred in widening the railway approaches, and throwing open part of the tunnel with this object. The whole station is now comprised under two great iron roofs of very large span, the new roof starting from iron columns contiguous to and coupled with those which carry the eastern side of the old roof. The old part of the station is fronted towards the street by Mr. Waterhouse's North-Western Hotel; the new portion, if the present termination represents, as it apparently does, what is ultimately to be the visible elevation, has been fearfully bungled from an architectural point of view. There is a slight angle in the line of ground at the end of the station, that is, there must have been some such angle in the boundary-line of the property to give any excuse for the treatment of the front, which is bent at an obtuse angle outward, just in the centre, without any attempt to mask the deformity by treating the design of the front in accordance with this circumstance. The "design" consists, in fact, of nothing but a row of pilasters under the end of the iron roof, and this pilaster front is broken-backed, and the end roof-principal the same. Anything more gratuitously clumsy in appearance could hardly have been done. When one considers how much effect might be got out of railway stations if they were treated with average architectural taste, it is really vexatious to see this kind of thing done.

Since we last said anything about Liverpool the town has become the seat of an episcopal see, a fact which we allude to merely to mention the pro-cathedral church, the old parish church of St. Peter, which stands on one side of the street named after it, Church-street. Here is another large and disused churchyard with which something ornamental should be done: part of it, a strip lining the street, was disturbed a good many years ago in the necessary operation of widening the street. As to the church itself, it certainly is a very staid, respectable, rather dingy edifice, and yet there is a certain character about it, and it is one of the relics of old Liverpool, for both of which reasons we hope the town will not by any means be led into removing it to make way for a new church; the site for the latter, when the money is forthcoming, had much better be found elsewhere, and the old building left as a church of historical interest, and possessing, moreover, an interior very well adapted for congregational worship and capable of some "treatment" in a decorative sense.

The rebuilding in a better style of Lord-street, Church-street, and Bold-street, which, nearly in a line with each other, form the principal shopping streets of Liverpool, seems to proceed much more slowly than elsewhere: we have before noticed the same thing in Manchester, where every street seems in course of improvement and beautifying except the main street, Market-street. Probably the reason of this is that the shops in such streets usually are old concerns with a well-established connexion, the owners of which find no object in spending their money on making a show. Street rebuilding seems a little quiet at present in Liverpool, but a great deal has been done of late years, and much of it is very good. Classic tendencies prevail in the newer buildings, but it is often Classic with considerable variety and novelty of detail, and we should certainly say that on the whole a better and more dignified taste is shown in the aggregate of the more recent Liverpool street buildings than in the often eccentric and "fussy" Gothic which has been developed in Manchester in similar edifices.

In the *place* which is formed contiguous to St. George's Hall and the Library and Art Gallery, of which the Wellington Column (a parallel of the Nelson Column in Trafalgar-square) is the central object, there is now a fountain, by way of completing the reminiscence of Trafalgar-square; a much better fountain, as a design, however, than the two on that famous site, with a basin supported by figures well modelled, if not suggestive of anything very original or romantic; and the fountain seems to be liberally supplied with water, and makes a very pleasant episode in the centre of the irregular open space. An effort to combine foliage with architecture is made hereabouts; the Art Gallery has its sloping green embankment and some shrubs within its balustrade, and there are shrubs in large tubs round the fountain. Stone-ware vases would look better. The analogous position to that which the National Gallery occupies on "the finest site in Europe" is here occupied only by the rather mean-looking small shops and houses of "Commutation-row," which skirts the upper side of the *place* and faces the spectator ascending the rise between the Library and St. George's Hall. If there could only be a good excuse found for the erection of a really fine building flanking the upper side of the *place* where Commutation-row now stands, forming a background to the Wellington Column and the fountain, and a culmination of the architectural effect in this direction, such an improvement would be more effective than anything, and would give the best finish to what has in it

* See Archives des Missions scientifiques.—2ème série, tom. v.

† See Annali dell' Istituto di Corresp. Archæol., tom. L., 1878, pp. 118—192.

even now the making of an effective and stately architectural combination.

One point in connexion with the Art Gallery, which in general we have previously described, may be mentioned: the has-reliefs in the long panels on each wing of the building have now been completed; the space only was left for them before; and they are worth a word, as they appear to be an attempt to treat subjects of the present day as motivee for architectural sculpture. What is their precise intention we do not too hastily assume to understand, but they would seem to represent the procession to open the Gallery—at least, there is recognisable a carriage-and-four, one of the occupants of which is taking off his hat, presumably to an applanding crowd; and the general movement of other figures, mounted and unmounted, in the composition, confirms the idea of a procession. This is no doubt precisely the same kind of reference to events of the day which characterised the Panathenaic frieze of the Parthenon, and the has-reliefs of the Arch of Titus and of the Trajan column, except that in the Panathenaic frieze we opine that there was rather less of realism and more of conventional treatment than some critics have thought. It certainly seems very like common sense to treat architectural sculpture on the same principle, in regard to the events of the day, which was employed in a good deal of the ancient architectural sculpture which we now admire or feel interested in. We entirely approve of making the experiment, at all events; and yet how is it that, even while commending it in this sense, we find it impossible to escape from a certain sense of the ludicrous in looking at it? Is sculpture, after all, an anachronism in regard to modern life? Are we too practical and self-conscious to look at such things with the simplicity of feeling with which they were once regarded? This would hardly explain our different estimate of the Trajan and Titus basreliefs, either; for Rome when those were done was highly artificial and self-conscious herself. Is it that historical events and the lapse of time impart to the old sculptures an interest and a dignity which are perhaps really adventitious, and which did not belong to them in their own day?

"Or is the Caucasian played out?"

as "Truthful James" suggests in one of Bret Harte's lyrics: are modern life and modern costumes and manners too devoid of dignity or sentiment to have any interest in sculpture, or to look otherwise than semi-ludicrous when so treated? It is to be feared the last is nearest the truth. Anyhow, it may be admitted that for general decorative effect in regard to the architecture of the building this does as well as anything else; considered in detail, it will be perhaps (if it stands well) more interesting to future generations, to whom it will represent a fact in the town's history, than to spectators at present. But we suspect that for present enjoyment, sculpture is an art for idealism, not for realism. The realism of the present day is pictorial, not sculpturesque.

This subject of architectural sculpture reminds us of the omission which still remains, without apparently a thought of supplying it, in the great building of Liverpool, St. George's Hall. We have over and over again called attention to the fact that Elmes's building is entirely incomplete without the sculptural decoration which was intended; and that to leave it as it is is doing the greatest injustice to the memory of its architect and to the building itself, which is certainly the most remarkable effort in reproducing Greek architecture which modern Europe can show. The building was intended to have statues on the screens between the square columns, and has-reliefs on the square panels below, which remain to this day waiting to be worked. There has been great profession of activity about art in Liverpool of late years, and yet the one thing which ought to have been done first has been utterly overlooked, and seems likely to be so still, for it does not appear as if any one either knew or cared anything about it. If the money expended on the colossal statues in connexion with the Art Gallery, the effect of which is very doubtful, had been expended in making at least a beginning of completing the sculptural decoration of St. George's Hall, it would have been much more sensibly and suitably laid out. It is really astonishing that so much should be said, and so much money have been spent, and so many speeches made in Liverpool about the encouragement of art, and that the most obvious claim on the attention of those who wish to promote artistic production there should be persistently overlooked. If the Liverpool amateurs and connoisseurs wish us to believe that they know and care as much about the promotion of art as they say they do, let them "turn to" and encourage the much-neglected and illused modern sculptors, by giving some of them commissions to execute the sculpture for want of which their most remarkable building has been standing all these years unfinished and forlorn, a discredit to the taste and enterprise of the town.

ON SOME POINTS IN THE LAW OF LIGHT AND AIR.

One may fairly doubt whether any subject causes more litigation than does that of the right to light and air. Of course, in many cases the only question in dispute is one of fact: whether, indeed, there has been such a deprivation of these elements as will enable a court of law to interfere, or whether the person who comes to the court for protection has any right to the light and air which he claims, so as to enable him to ask for the protection of the law. Sometimes, however, in spite of the number of decisions which have been given from time to time on this subject which are purely legal in their nature, and set forth some principle of law, others are given of a similar character which show how difficult it is to say that any branch of law can be considered as finally and definitely formed. The questions which were raised in the recent case of the Ecclesiastical Commissioners for England *v.* Kino (19 *Law Journal* Reports, Chancery Division, p. 529), which was decided during the current year, first of all by Vice-Chancellor Hall, and next by the Court of Appeal, can hardly be said to be quite novel ones. But the fact that the Court of Appeal thought it necessary to deliver elaborate judgments on the points submitted to them,—"very interesting points," as they were styled by Lord Justice Bret,—shows that, until this decision, the law on the questions argued could not have been considered as settled, so as to be a firm and undoubted guide for those who might desire to ascertain their rights. More than one point was raised in the arguments touched on in the judgment, but there are two to which we specially wish to draw the attention of those who are interested in the law relating to buildings.

The first was as to the right of the owner of the site of a demolished building, which, before it was pulled down, had a right to light and air through certain windows, to prevent a neighbour from building so as to diminish the light which would have come to those windows if they remained as they were. The point had been before Lord Justice Giffard, in December, 1869, in the case of Staight *v.* Burn (39 *Law Journal* Reports, Chancery, p. 289), and had been decided in favour of the applicant. That case, however, seems by some to have been assumed to have been decided on collateral points, and, indeed, the question of alteration of the premises does not, from the report, seem to have been argued at any length. In the judgment of Vice-Chancellor Hall in this last case the decision of Lord Justice Giffard is not mentioned at all, and the application is characterised by the judge as being "one which has not hitherto been presented to the Court." Accordingly it was dismissed by him, and so came before the Court of Appeal.

The facts of the case, so far as they were required to raise the point of law, were comparatively short and simple. Under the provisions of a certain Act of Parliament, the Church of St. Dionis Backchurch, and the fabric and site, with all its rights, easements, and appurtenances, became vested in the Ecclesiastical Commissioners in fee simple. In the south side of this building there were three windows, each 6 ft. 6 in. wide and 12 ft. high, and another nearly 6 ft. wide and 3 ft. high, occupying the arch over the south door. These had acquired the right to light. Under the Act of Parliament, this church was pulled down, careful plans and measurements of the edifice having previously been taken, so as to preserve a proper record of the position and extent of the ancient lights. The church, it may interest our readers to know, had been rebuilt by Sir Christopher Wren, and we may, perhaps, be permitted to ask once more whether it is advisable to pull down these historical buildings in this summary fashion. But this is only by the way; we are now concerned with the legal rather than the artistic or antiquarian character of this church. Since it had been pulled down, the defendant had begun to erect a new building opposite, and it was already carried up to the height of 30 ft. Hence arose the action. It may also be well to add that the site of the church had been put up for sale in June, 1879, as building land, but had not been sold, and also that after the issue of the writ, but before the motion for an injunction came on, the Commissioners had erected a temporary wooden structure, with apertures corresponding to the old windows. Under these circumstances, as we have already mentioned, Vice-Chancellor Hall considered that the Commissioners had no right to ask the Court to protect the ancient lights. But the Court of Appeal was of a different opinion, and considered that they could issue the injunction which was asked for. The cardinal point of the decision was, perhaps, most clearly expressed by Lord Justice Brett, who pointed out that the question first of all was, whether there was such a right, and next, whether there was evidence to show that it has been abandoned. If it has not been abandoned, then the right still exists, and so existing entitles the owner of it to ask the protection of a court of law. But this general proposition seems to be qualified by the proviso, so to say, that the windows are within a reasonable time to be restored, because if they are not it would obviously inflict great hardship upon an adjacent owner if he were prevented from building when after all he would not interfere with any one's right. In the present case, Lord Justice James remarks, "If the windows should be restored, as I believe they will be;" and Lord Justice Cotton states, "Upon the evidence, and from the position of this property, I should say we must arrive at the conclusion that within a short time, having regard to its situation, not only will the land be sold, but that it will be covered with buildings, and I think we may come to the conclusion that the purchaser will put up his buildings so that the windows may have the enjoyment of the old right of light." It is clear, therefore, that the proviso, as we may call it, is pretty sure yet to come for further elucidation before the Courts of Law, but when it does it will, as it seems to us, be chiefly a question of fact whether the owner of the ancient lights has abandoned his right to them. Thus if it were proved that in the buildings to be erected no provision was made for preserving the windows in the original places it might reasonably be presumed that the right had been abandoned. To those who, like most of our readers, are accustomed to matters connected with buildings, other instances will suggest themselves. It is satisfactory, however, that the law is now clear that by pulling down a building with ancient lights the right to such lights is not *ipso facto* abandoned.

The second question decided in this case is one which, as Lord Justice Brett says, deals with a subject which it is startling "to find relied on either as a kind of legal doctrine, or as a rule of evidence which is to make a *primâ facie* case." That is the angle of 45°. As Mr. Banister Fletcher has pointed out in his little work on "Light and Air" (p. 68), this angle of 45° is of no real value, and the sole question is, has there been a substantial interference with a plaintiff's light? For Lord Justice James points out in vigorous terms that "the rule of 45° is a matter of very slight importance. It may be an element in the case, but it is a very small one indeed. It is only to be used as a sort of test in the absence of any other mode of arriving at a conclusion, but it is no rule of law,—no rule of evidence, no presumption of law, and no presumption of evidence, except of the very slightest kind." That is pretty downright language, and after it no one can rest under the delusion that the angle of 45° is of much value in questions as to the diminution of light. No doubt some of the language of previous decisions, such as that of Lord Selborne, in the City of London Brewery Company *v.* Tennant, has caused the idea to get abroad as to the value of the 45° test: it appears to have arisen, to quote Lord Justice Cotton, "from referring loosely to the Metropolitan Building Acts without looking at the clause." In fact, if the Metropolitan Local Management Act, 1862, s. 85, is examined, we find the foundation of the error, and see the falseness of the conclusions drawn from it. Thus the case we have been discussing is further of service, since it has cleared away the ground in regard to a matter

likely to cause much misapprehension. We have, in fact, in questions as to the diminution of light, only this one point to decide,—is there a real interference with an existing right? If there is, no amount of scientific theories,—of rules taken from legislative enactments,—will suffice, and the plaintiff must inevitably succeed in obtaining the protection of the Court. There can therefore be no question that from the date of the decision in the case of the Ecclesiastical Commissioners *v.* Kino, a more settled state of the law on this point will certainly exist, and the litigation between these parties will have been most valuable in the interests of owners of buildings, and for the assistance of those who have to aid them by their professional advice.

AIDS TO THE STUDY OF ART.

Public opinion, both in the House of Commons and in the Press, has responded with unusual unanimity to the plea that aid should be given to the study of art by the transmission to the various local centres of art-teaching throughout the country of such duplicates or copies of the *chefs-d'œuvre* of our metropolitan museums as can be spared or provided. As to the importance of providing the students with the best available models and examples, there is but little that is new to be urged. The question of duplicates is a more complicated one. It is urged by those who should know what they are talking about, that the duplicates, properly so-called, possessed by the British Museum, are few, and that their money value to the parent institution is greater than their art value to the subsidiary establishments. As to this, however, there is some evidence that the sale of what are called duplicates is a mistake. The market value of such articles is rapidly on the increase. Not only so, but many engravings or rare books which may be roughly described as duplicates, are really distinct states, or stages, of the work of the engraver or of the printer. As such, they not only are of value as illustrating the history and procedures of art, but they greatly enhance the value of those better-known originals to which reference is usually made. Thus, whether we regard it as a purely financial question, or look at it on the broader grounds of art, it may prove a matter of very short-sighted policy to sell these so-called duplicates.

One thing strikes us with reference to this part of the debate. The curators and managers of our museums are at present the only persons who can speak with full information, if even they can do so, on the subject of the treasures in their keeping. The teachers and students of art are naturally desirous of being able to form their own opinions on the subject. This points to the imperative need of accessible catalogues. One man tells you that the vaults of the British Museum are full of priceless and hidden treasures, which might, to great advantage, be distributed through the country. Another man replies that the so-called treasures are little better than rubbish. No one can tell which view is correct, or where the line should be drawn between the two opposite views. The first step, therefore, to enable the educated part of the public to form an independent idea of the subject is to draw up a list of what these treasures are. On many grounds this is desirable, and the fulfilment of this requirement seems to us to be a necessary preliminary to any rational discussion of the subject.

The second part of the debate referred to copies. Here it should be remembered that the most famous works, especially those of sculpture, can only be known to the untravelled Englishman by the medium of copies. Again, the art of facsimile-copying is one that may be said to have been born within the last half or even quarter of a century. For some things, such as goldsmiths' work, bronzes, and medals, the *facsimiles* produced by the electrotype process may be said to deserve the title. There is, it is true, a very curious process of discolouration to which these electrotype works are subject, which may, possibly, in the course of years, greatly deteriorate their value. In cases of silvered or gilt electrotypes of which the substance is of copper, we have ourselves been surprised to witness the effect of this process, although we have not seen it anywhere mentioned. The British Museum now offer the invaluable boon of providing casts or electrotypes of their coins and medals at merely the lowest cost price. We have repeatedly availed ourselves of this advantage. Nothing can be more perfect than the facsimile when sent home. In such cases as the Papal medals, or the noble tetradrachm of Lysimachus, bearing the head of Alexander the Great, he would be a very good judge who could tell the copy from the original, apart from the test of weight. But leave the electrotype in your cabinet, or even carry it about as a trinket. The copper seems to weep through the silver or gold of the coat, and gradually the medal becomes discoloured. A sharp rub with a bit of wash-leather will restore the original beauty. But each time that this is effected a portion of the surface metal is removed. The gold becomes more cupreous, and sooner looks dirty; the silver more and more rapidly blackens. In fact, truth avenges itself, and the facsimile, however clever, is not permanent.

There is thus a limit to the durability and value of the most perfect reproductions,—those of the work of the goldsmith, the medallist, or the jeweller. As to bronzes, the durability may be greater. With regard to marble statues, the use of plaster-casts is familiar to us all. It is not every one, however, who has had the opportunity of comparing the effect of a good cast with that of the original. We do not think that all that is possible is often effected by the caster. The rawness of the white of the ordinary plaster-cast is distressing. In most cases when it has been attempted to obviate this it has been done at the expense of sharpness of detail. What is requisite is to reproduce the tone, colour, and apparent texture of the marble as carefully as the electrotypist reproduces those of his model. The waxlike finish of the finest statues, or the granular appearance of certain marbles, can, no doubt, be produced in apparent facsimile, if it be made worth the while of the skilled copyist to do so. It is idle to expect this from the man who produces casts for sale, or who is limited in his labour by being told that such and such is the outside that his work ought to cost.

With these points of reserve, the labours of the copyist may be made available, with great advantage, for our local museums. There remains the further method of reproduction,—photography. Here, again, there is a special danger. Photography lends itself so readily to effects which charm the uneducated eye,—by the very magic of their artless reflection,—that the offence they cause to the educated eye is but too apt to be overlooked. Take, for example, the fine permanent photographs of Italian sculpture which were originally taken in Rome, and which are now reproduced, we suppose, in London. The effect, at the first glance, is that of the Venus itself. The solid *impasto*,—if we may borrow the term,—of the carbon actually deposited on the paper has all the force, and fifty times the durability, of a chalk drawing. What can be more charming? What, indeed? but for one terrible defect,—the utter want of proportion due to the lens of the camera. The bolder the figure, the more pronounced is the distortion. After a time this distortion becomes so painfully apparent to the eye, that the idea of representing sculpture by photography is condemned by the judge of art. For the guidance of the pupil, at all events, these imposing pictures would be wholly misleading.

And something of the same sort is to be said as to the representation of great paintings by photography. Here, indeed, the laws of perspective are less obstructive to success. In dealing with a flat surface the disproportion due to the various distances of the different parts of a statue from the lens is avoided. The difficulty is not destroyed, but it is greatly diminished. But here arises another check. It is the chromatic difficulty. We may obtain, for example, a full-size photograph of one of the noblest of the Madonnas of Raffaelle. The drawing is perfect,—or nearly so; the expression,—how is it that the expression is not there? That quality which the engraver calls colour is absent from the photograph, or at least it is incorrectly given. The effect of the various pigments used on the light which is reflected from the surface to the camera is quite different from that which it produces on the eye. Roughly, indeed, this is known to all photographers. But how far, and in what direction, the change of aspect is effected is not known. We could produce an example in a proof photograph of a well-known picture in the National Gallery,—secured before the artist had time to "finish it,"—that is to say, to remove the effect which he neither expected nor liked. A visible patch covers the forehead of the Madonna. On observing this, the first thing to be done was to revisit the picture, on which no such blemish was remembered to exist. Neither did it,—or at least did it until a magnifying-glass was introduced. Then it became clear that the restorer had been at work! So well had he done his work, that he deceived the unaided eye. But the optical action of the pigments on the reflected light caused instant detection. In this way, besides the well-known action of the photographic process in refusing some tints and deepening others, the colour of a painting is often wholly misrepresented by the photograph.

There remains, however, one function of photography, especially of permanent photography, of which the value is unquestionable. That is, in the reproduction of drawings and sketches. Here we may look for absolute *facsimile*, if the paper be properly provided; and here, we may add, we have at once the means of preserving and of multiplying the most precious and most perishable portions of that great heritage of art which has come down to our days. As a rule, the sketches of the greatest masters seem to emanate more directly from their genius than do the paintings themselves. The more laboured and successful a painting, the more instructive are the preliminary sketches. And of how many designs have we the sketches alone? Photography fails to give a correct idea of such a painting as the Transfiguration, or as the Madonna di San Sisto. But photography can produce a true facsimile of Leonardo's drawing of the Virgin seated on her mother's lap, which was some years ago on the walls of Burlington House for a short time, and which then struck us as being, all things considered, the most exquisite work of human art on which our eyes had been privileged to dwell.

FROM THE BANKS OF THE SEINE.

We remember to have heard Horatio Greenough (the sculptor who, in the estimation of the Americans, stands only second as an artist to the painter Washington Allston), on his return from the United States, where he had endeavoured to pass through Congress a grant for some expenditure in works of art, remark that the sole interest he met with on the part of those to whom he applied was an antagonistic one, and this, we are afraid, is the interest too often taken by the Governments of Anglo-Saxon countries. Here in France it certainly cannot be said that the Parliamentary interest in art is an antagonistic one; there is a Minister of Fine Arts, and a very large and ungrudgingly-voted Fine-Arts Budget. Though millions may be expended on the army and navy, the Government have long since made up its mind on the political importance of the encouragement of the fine arts. While it would be far from desirable for our Government to take so active a part in the management and conduct, so to speak, of the fine arts, as is the case here in France,—a feature which daily gives rise to sad complaint,—a somewhat wider encouragement and assistance might be afforded by them to the arts. What this encouragement is in France, and of how substantial a nature, may be judged from the number of works of art which the Minister of Fine Arts has recently commissioned out of the budget for 1881, consisting of a long list of statues, busts, medallions, and pictures, the mere enumeration of which, and the towns for which they are destined, would amply suffice to fill a column of the *Builder*. The metropolis, Havre, Rouen, Amiens, Rheims, Versailles, Grenoble, and a large number of other cities, are to be enriched with memorials of their great men; in this manner the golden spur of emulation is industriously kept bright, and a large number of artists are worthily employed. The total amount allowed for these works of art is 430,000 francs, or some 17,000*l.*, the greater part of this expense being borne by the State, though a certain number of the towns mentioned have voted considerable sums to aid the general funds. In addition to these commissions there are a certain number of other works to be executed, but not yet decided upon, for which the Minister of the Fine Arts will ask for an increase of 4,000*l.* in the Art Budget. This, however, is but part of the sums allowed. In 1879 the Fine Art Budget unanimously voted, amounted to no less than 7,579,530 francs, or something more than 300,000*l.*,—53,000*l.* for commissions and purchases of works of art at the annual exhibitions; about 27,000*l.* for the art educational

establishments; about 33,000*l.* to the national museums; another 53,000*l.* to the historic monuments; to the Conservatoire, subsidised theatres, and the encouragement of music, 87,000*l.*; to the national manufactures (the Gobelins tapestry works, the Sèvres porcelain works, &c.), 37,000*l.* When the many thousand pounds annually spent by the Paris Municipality in the purchase of works of art are added to the sums expended by the Government, it will be seen that there is no lack in France of official money encouragement to the fine arts.

Last week the "French Association for the Advancement of Science,"—a somewhat more recent establishment than our own venerable British Association,—held its annual meeting in the antique town of Rheims, under the presidency of M. Senator Krantz, the illustrious engineer to whose energy France owes the Great Exhibition building of 1878. In his inaugural address M. Krantz recalled the objects of the Association: to give to science,—now the source of such universal wealth,—the help which the Government cannot always distribute in an equally efficacious manner; to encourage students, freed from the trammels of official tradition, to seek and to open new ways side by side with the beaten paths on which advance the greater number. The association has assured for its use considerable funds, recently increased by several generous legacies; and in the past year it was able to distribute nearly 60,000 frs. in subsidies for scientific research. The first day's meeting was a busy one, several lectures occupying the afternoon: one on the geology of the district; another on the "Hygiene of the Eye-sight," which attracted much attention; as also a lecture from a member of the French Institute, in which was traced a history of the wool trade of Rheims. Of these lectures, that by M. Javal on the care due to the eye-sight was, perhaps, the most instructive. The important question of the necessity for the consideration of the lighting of school and other rooms, was treated with the seriousness that the subject requires. The rest of the lecture was occupied with a more or less technical study of the use and value of convex and concave glasses; a large share was devoted to the consideration of the widely-spread defect of astigmatism, in reality easily overcome by the use of glasses the surface of which is cylindrical in lieu of being spherical; due credit was given by the lecturer to Thomas Young, the discoveror of astigmatism, as also to the eminent astronomer Airy, the first to urge, some fifty years ago, the use of cylindrical glasses. There are undoubtedly thousands who suffer from fatigue and weakness of their eye-sight, and whose cause of suffering would immediately cease were they to use appropriate spectacles or glasses. In the cases of slight astigmatism, or with those whose profession can be reconciled with comparatively defective visual power, their astigmatism may be neglected without great risk; but when this defect exists in a marked degree with a person who lives, so to speak, by his eyes, the inconvenience becomes intolerable.

Parochial Work in Islington. — The annual report of the Vestry of Islington, lately issued, says that there are 105 miles of roads and 206 miles of footpaths over which the jurisdiction of the Vestry extends. During the year some 60,695 yards of granite, Victoria-stone, flints, ballast, &c., were used on the roads and footpaths, as well as 1,876 ft. of new granite kerbing. All or part of twenty-nine new streets were taken to and paved during the year; a total length of roadway of 17,789 ft.,—the length of pavement being 39,147 ft. Twenty-eight other streets have been surveyed, and estimates prepared for making-up, &c. The cost of dusting and slopping, which is done by the Vestry staff, during the year amounted to 10,893*l.* 11s. 8d. In this amount, in addition to the actual outlay, are included estimated charges for interest on the loan obtained to meet the original cost of the Liverpool-road stables, and for interest on the cost and depreciation in the value of the Macclesfield-wharf and other depôts, and for depreciation of horse stock. Watering the roads cost 2,178*l.*, of which 1,017*l.* was paid for hire of horses. Sewerage works of various kinds were executed at a total cost of 4,139*l.* One thousand three hundred houses were drained at private cost. The total cost was 14,759*l.* 18s. 6d. Plans and sections of sewers, &c., to be constructed at private cost were completed, the cost being estimated at 2,758*l.*

EXISTING ANALOGUES OF STONEHENGE AND AVEBURY.*

RESEARCHES IN THE MEDITERRANEAN.

Among the various matters connected with these strange and impressive monuments to which the learned have given attention, is that of discovering some precedent or authority for the structures, or at least an example of their design or construction; and it must be admitted that these endeavours have so far been unsuccessful. But there seems a generally-received opinion that there is at least evidence in classical writers that temples prior to that of Solomon, and of course, therefore, among many nations long after, were mere enclosures, open alike to the heaven above and the winds around. It must be admitted, however, that no structure like Stonehenge has been described.

There are three points for consideration in connexion with Stonehenge:—

1st. It is a structure of at least two periods widely separated. The materials and dimensions of the earlier structure differ altogether from those of the later and grander erection.

2nd. It is not mentioned by writers of antiquity, unless one passage, very doubtful as to locality, be admitted.

3rd. It must have been fully known to the Romans, as Roman pottery and other remains attest. Yet it is not mentioned by them.

To these points a 4th may be added, viz.:—That it occupies a very central position amongst the great sepulchral memorials of the ancient British people, and possibly of as sacred a locality of a still earlier race.

On the first of these points my opinion is exactly opposed to that of Mr. Cunnington, who considered that "the grand erection was first made, and the smaller circle and oval of inferior stones were raised at a later period, for," he continues, "they add nothing to the general grandeur of the temple, but rather give a littleness to the whole, and more particularly so if you add the too small trilithons of granite."

It is more natural to suppose that as we go back into the times of primitive occupation, the smaller stones would be erected, and the larger when wealth and power were more at command. The material of the smaller stones is that generally used by the earlier settlers.

Roman roads lead to the neighbourhood, and Roman pottery and relics have been found. I will only notice on this point that the silence of Latin writers is remarkable.

It may be observed here that the handling of the stone appears unlike that of any monument of Celtic erection in Brittany or Britain.

I have been led to form some conclusions on Stonehenge and Avebury by an expedition lately prosecuted by me in the Mediterranean, where, in some of the islands, I have found monuments which appear to me, though hitherto quite undescribed, to throw much light on these structures, if not, indeed, to present analogues of construction, with additions, which I believe are as without example as the great Wiltshire monuments themselves.

These consist of enormous *enceintes* of Cyclopean walls, within which are lofty conical erections capable of supporting a vast concourse of persons externally, and many of which are clearly connected with a part in each of such *enceintes* devoted to solemn rites. These reserved parts are always, when the wall has not been destroyed, surrounded by an inner enclosure. Within these latter are the remains of circles of monoliths, in the centre of which, as a rule, is a lofty table or altar composed of a large block resting horizontally on an oblong, placed vertically, and forming the letter T, the *tau*. In some cases a third stone is erected, and this has a rude cap-stone,—it cannot be called a capital; these are rare in the present condition of these remains; they appear eminently symbolic,—in short, this and the *tau* represent the two chief symbols of Phœnician worship.

The stone tables are very remarkable; a vast and heavy cap-stone, frequently 12 ft. long by 3 ft. wide and 2 ft. thick, carefully fashioned, and always in the same form, is poised on a vertical oblong, about 9 ft. wide, and only 1 ft. thick, standing out of the ground 9 ft., presenting a square superficies of a thin slab to the sight; there is no cement, nor any mortise, and yet I ascended, with other persons, on the cap-stone without causing the least oscillation. In one case, however, at what was evidently the grand temple, the cap-stone to the chief table has a mortise, into which the upright is inserted as a tenon, and this is so adroitly done, although evidently not wrought with iron tools, but merely battered with stone implements, that a slight touch of the hand causes vibration, though the stone is perfectly safe, and the natives assert that it vibrates constantly in a high wind. Here we have an approach to the mortise and tenon system of Stonehenge, the only example I am aware of. In several cases, at remote distances in the islands, are found the upright columns, with rude caps, arranged in the form of the trilithons of Stonehenge, though with the cap-stones, and a rude transverse block or lintel above, forming a construction of five stones in lieu of three. Locally these are called dolmens, and, in several instances, there are pure trilithons, or one block resting on two uprights.

The great *enceintes* generally contain three vast conical erections, apparently intended for different purposes: some are solid, with an external ascent,—clearly watch-towers, or serving also, it may be, as places whence the ceremonies in the sacred enclosure might be observed; some are hollow, with doors high up above the ground, indicating places of refuge; there are others, again, the purposes for which are less apparent. The grand temple, surrounded on all sides, and at a distance of some miles, by these lofty cones, is in the form of a pyramid, with the angles rounded off, an immensely strong structure, and not dissimilar in the size of its enormous blocks, and the thickness of its walls, to the well-known Cyclopean works at Tiryns, in Greece; many of the stones are 9 ft. long by 3 ft. to 5 ft. thick. Within the walls is a semicircular chamber, with its base to the south, arranged in tiers of stones, in form of a Greek theatre. The building is about 80 ft. square at the base, has been about 60 ft. high, and the entrance to the hall is about 20 ft. from the ground, to which height the building appears to be solid, the floor being at that level. Whatever purpose Silbury Hill served, any one of these structures would fulfil. East of this pyramidal structure are the remains of an early city, not unlike the walls on the Rivel Mountain, near Snowdon. The defending wall to this pyramid, guarding also the sacred enclosure and the city, is 14 ft. thick and 10 ft. high in its present ruinous condition, and has a number of deep recesses, like the Pelasgic portals at Norba, in Italy, and is formed of stones, some of which measure 15 ft. in length, and resembles in the greatness of its dimensions the vast Cyclopean wall at Samothrace, illustrated by me in the *Builder* by a drawing made in that island. In tumuli near this old city evidences of cremation have been found. There are other widely different but equally remarkable structures, but I confine myself in this paper to the above. In the Island of Minorca alone, although at a distance of thirty miles from each other, and with a range of mountains between, even the extremely remote and all the intervening remains of this kind could have almost instantaneous communication with each other, as tested by me; and I believe a careful survey of the district between Stonehenge and Avebury would show that either by ancient barrows or natural heights, communications could be made between these places. Excavations near these structures have, as at Stonehenge, produced Roman remains, though it need hardly be said the structures are not Roman. It is, however, clear they were known to the Romans. One very curious point arises here. In the Island of Minorca, near to the great port (Mahon, so named from a Carthaginian general named Mago), the stone tables are of larger dimensions, more careful workmanship, and apparently, unlike the others, wrought with metal tools, although the conical structures are not so important. They have all the appearance of later and more careful construction, and it is near these that the largest quantity of Roman remains have been found.

With the politic and conciliatory custom of the Romans in adopting the worship of the respective localities they governed, these later stone tables appear to me identified as restorations of previously existing and possibly of then decaying monuments. In short, on a more magnificent scale, of altars, or deities, or both, as the case may be.

In such case they assume the precise condition of the more vast portion of Stonehenge. The smaller circle and the two small trilithons clearly show the nature of the earlier structure, and the Roman occupation of the locality shows the interest the Romans felt in it. The prin-

* By Dr. Phené, F.S.A., read before the British Archæological Association at Devizes.

ciple of wrought-stone monuments is not British, still less so the mortise and tenon, though the latter was clearly known to the constructors of the ancient monuments in the Mediterranean islands just described, and it is highly probable that rude stone structures, long since removed, in Spain, Africa, or Gaul, may have suggested this method to the Romans.

My impression is that as the Romans consolidated their power by alliance with, and granting freedom to, the nobles of the countries they governed; as they considered the worship of the local deities of other lands meritorious, and no abrogation of or detraction from the honours claimed by their own deities of Rome, they could show this in no more comprehensive way than by restoration or augmentation of that temple in Britain which was in the centre of the deceased nobility of the land, and in the vicinity of what was clearly the great wardmote or gathering-place of the British at Avebury.

On the other hand, there is evidence enough to show, both in the mortise and tenon construction, and in the vastness of the stones (those of Stonehenge are smaller than the great monoliths in Brittany), that the artificers, or at least designers, may have been of Phœnician origin, the monuments of the Balears being Pelasgic of the oldest type. The Pelasgi were a people with whom the Phœnicians were in communication, and all the features of Stonehenge and Avebury have analogues in the islands between the African continent and Europe. In any case that Stonehenge is not a purely British structure is clear.

Dr. James Fergusson, who is not fond of attributing great antiquity to any monuments, allows that the remains on these islands may be coeval with the period of the Trojan War. Having repeatedly examined the route of the ancient traffic in tin through Gaul, I feel clear in stating that they seem to follow a line from Africa, where several trilithons exist, by the Atlantic shore and islands to Britain; a trilithon being found on the coast in Brittany, at St. Nazaire, and one in the Ile D'Ouessant. Dr. Fergusson admits the art of the construction (*i.e.* the design) may have travelled from Africa to Ireland, and thence to Wiltshire; in which I think he is right. The only authors on these remains are the Count de la Marmora and Don Juan Ramis. The former states that ill-health prevented his examining these monuments except in a few instances, of which he gives examples. The latter does not even appear to me to have made personal inspections. To these facts I attribute the very incorrect drawings and deficiency in statements respecting them. The only two Englishmen in Majorca—there are no resident English in Minorca—were the British Consul, son of Dr. Mure, the writer on Greek classical history, and Mr. Waring, an engineer, nephew of Mr. Waring, the antiquary. The latter, in making excavations, had found some curious Roman remains, but neither gentleman had investigated the ancient remains. I received great kindness from both, and much assistance from Mr. Mure; and in Minorca from several of the leading families. The word Talyots, from the Spanish *atalaya*, watch-tower, is admitted by the well-informed on the island to be a modern term applied to these structures by the Minorcans, but to have no significance, though it seems not far from the purpose. My investigations lead me to believe that these places were depôts of valuable articles of commerce, in which the Phœnicians traded, that, in short, they were the great depôts of Carthage, though probably established long before the settlement of that city. The cult of Astarte, under the form of the crescent, is more beautifully illustrated in Minorca than in probably any other place, while the numerous *taus* multiply the three-membered cross (T) of Tyre.

I find a quotation from Homer, and also from Pindar, which I have not had time to verify, that there was a place in the Balearides, supposed to have been the palace of Saturn. I can imagine no place more suitable for this description than what I have called the great temple.

Welsh Slate.—A bed of excellent slate is said to have been discovered near Llanarmon, Mynydd Mawr, which will increase the slate-producing area of the Tanat Valley against the time when a railway shall be constructed in that direction.

GLASTONBURY ABBEY.

Dr. E. A. Freeman, President of the Somersetshire Archæological Society, in the course of his inaugural address to the members of that body at their annual meeting, held at Glastonbury on the 17th inst., elsewhere mentioned, said that the history of Glastonbury was the history of its abbey. Without its abbey Glastonbury was nothing. The history of Glastonbury was not as the history of York or Chester, Lincoln or Exeter; it was not as the history of Bristol, or Oxford, or Norwich, or Coventry. It was not the stirring history of a great city or of a great military post. The military, the municipal, and the commercial history of Glastonbury might be written in a small compass, and it would very largely belong to modern times. The history of Glastonbury was a purely ecclesiastical history,—a history like that of Wells and Lichfield, of Peterborough and Crowland. Again, unlike the history of Wells and Lichfield, but like that of Peterborough and Crowland, it was a purely monastic history. No one who had read the Great Charter should fail to know that there had been bishops of Glastonbury; but Glastonbury looked upon its bishops as only momentary intruders, and was glad to pay a great price to get rid of them. But even the short reign of the bishops did not affect the purely monastic character of Glastonbury. No one ever tried at Glastonbury, as was tried at Winchester, Coventry, and Malmesbury, to displace the monks in favour of secular priests. But, again, among monastic histories, the history of Glastonbury had a character of its own which was wholly unique. He would not insult its venerable age by so much as contrasting it with the foundations of yesterday which arose under the influence of the Cistercian movement, and which had covered some parts of England with the loveliest of ruins in the loveliest sites. Those ruins played but a small part, indeed, in the history of this Church and realm. Glastonbury was something more than Netley and Tintern, than Rievaulx and Fountain's; but it was something more, again, than the Benedictine houses which arose at the bidding of the Norman Conqueror, his house, or his companions; it was something more than Selby and Battle, than Shrewsbury and Reading. It was, in its own special aspect, even more than that royal minster of St. Peter, which came to supplant Glastonbury as the burial-place of kings. Nay, it stood out distinct, as having a special character of its own, even among the great and venerable foundations of English birth which were already great and venerable when the Conqueror came. There was something at Glastonbury which there was not at Peterborough or Crowland, in the two minsters of Canterbury, and in the two minsters at Winchester. Those were the works of their own people; they went back to the days of their ancient kingship, and some of them to the days of their earliest Christianity—but they went no further. They knew their beginnings, their founders, and their history; their very legends did not dare to trace up their historic foundations beyond the time of their coming into this island. But here, in Glastonbury, alone among the great churches of Britain, they instinctively felt that on that spot the name of England was out of place. They walked with easy steps, with no thought of any impassable barrier, from the realm of Arthur into the realm of Ina. Here alone did a legend take upon itself to go up, not only to the beginning of English Christianity, but to the beginning of Christianity itself. Having dwelt with erudition on the history of Glastonbury, Dr. Freeman passed on to make some remarks on the general aspect of the subject, which, he said, directly connected the peculiar character of the buildings with the peculiar history of the place. There was a special character about the church—to be accurate he should have said churches—of Glastonbury, because there was a special character about its history. He conceived that there was a time when Glastonbury was a group of small churches,—the Celtic fashion of building where Roman usage would have dictated the building of one large church. One of these, the oldest and most venerated, the old church,—the wooden church,—lived on, and by living on stamped the buildings of Glastonbury with their special character. It lived on to be the scene of the devotion and the bounty of Canute, and to give way only to the loveliest building that Glastonbury could show, the jewel of Late Romanesque on a small scale, the Western Church, corruptly known since the fifteenth century as St. Joseph's Chapel. That church represented the wooden basilica. But to the west of the ancient wooden church there arose in English times a church of English fashion, a chapel of stone. The wooden basilica and the Church of St. Dunstan had both perished,—not a stick was left of one, not a stone of the other. But both were still there in a figure. Each had its representative. The great eastern church stood for the stone church of English Dunstan; the lesser western chapel stood for the wooden chapel of British Gwrgen, or more likely of some other long before his days. Had the two vanished churches not stood there in the relation in which they did stand to one another, the minster of Glastonbury could never have put on a shape so unlike that of any other minster in England. Nowhere else did they find, as they found there, two churches,—two monastic churches,—thrown together, indeed, in after-times into one continuous building without, but always keeping the character of two wholly distinct interiors; for nowhere but at Glastonbury was there the historical stats of things out of which such an architectural arrangement could grow. Nowhere else did the church of the Briton live on, untouched and reverenced, by the side of the church of the English.

The members subsequently visited the abbot's kitchen. Mr. Parker said this building had been assigned to the reign of Henry VIII., but he believed it could be assigned to the date of Abbot Breinton, 1335-41. A friend of his who had looked round the building was of opinion that it should be termed the abbot's kitchen, not the Abbey kitchen. If they had known nothing of its history they could say at once it was a fourteenth century building. The striking point was the louvre, a very common feature in the common kitchen; but here, inside, the arrangement was absolutely unique, and he knew of no place where there were three or four air holes. The nearest approach to it was Durham. To make it complete there ought to be four chimneys at the four corners, and if the visitors wanted to see something like that they must go to Exeter. Another peculiar feature was the hoards by which they could close one side; many of these were remaining at the present day. If the four corners were taken away they might imagine this to be the Chapter-house.

The Rev. Mr. Fowler, of Durham, who was called on by the President, said in every great monastic building there were three kitchens, the monastic kitchen proper being connected with the refectory in which the monks took their meals. In Benedictine buildings the kitchen was found outside the refectory. In Cistercian buildings the refectory, instead of forming one side of the quadrangle, ran north and south; such was the Abbey kitchen—a building grouped round the quad. Then there was the infirmary kitchen, in which various kinds of food were cooked; and there was a third kitchen, the abbot's kitchen, for the exercise of the hospitality of the abbots to persons outside the monastery. The building before them he had no doubt was the abbot's kitchen, as distinguished from the Abbey kitchen.

The party next proceeded to St. Joseph's Chapel, which occupies the extreme west end of the ruins. This, said Mr. Parker, stands on the site of undoubtedly the first church dedicated to St. Mary, as distinguished from the stone church said to have been dedicated to St. Peter and St. Paul. The great feature of it was that it stood clear and distinct from the church proper. Very many other places had churches and chapels which have been absorbed by the main building. Another peculiar feature was the crypt. The building did not appear to have had a crypt originally, but it appeared to him there must have been some reason for carrying the walls down so far as to allow of the crypt being formed. He thought the little wooden church was at a lower level, and that, disturbing it as little as possible, the architect was able afterwards, in the fifteenth century, to add the crypt. They had actually lined, almost veneered, the walls when they inserted the crypt, so that not one vestige of the masonry of the twelfth century was to be seen. Some details in the mouldings seemed to show it was made at two periods, the first part the eastern, the second the western. They had Norman zigzag mouldings carved out to the fullest extent, and yet they had the great feature of the thirteenth century, the tooth.

The next move brought the party to the place

where the big tower was, and there Mr. Parker pointed out that this large church was like most of the cathedrals, but not filled up with chapels. There was nothing to interfere with a good cross church. It was 400 ft. long, and very well-proportioned. Mr. Fowler proceeded to discuss the place of the high altar, and Mr. Neville Grenville said when Professor Willis examined the ruins he pointed out where it should be, and with a crowbar sounded and got at the foundations.

THE ARCHITECTURAL ASSOCIATION IN EAST ANGLIA.*

The week of the excursion, without storm or showers to speak of, proved well-chosen for the purpose, and the members were carried without the incommodity of fierce sunshine by autumn harvest-fields, with the reapers at their work, and not infrequently made to realise the existence of well-timbered hedgerows along the margins of the decent roads of central and Eastern Norfolk. A little ceremony, according to old custom, took place before the dispersal,—this year under the presidency of Mr. E. C. Lee, the president for the session 1880-81. The excursion always begins the work of a new session, since Mr. Edmund Sharpe showed so admirably the way in which such gatherings could be managed, and left his example in the memories of a sufficient number of active spirits who were all-unwilling to forget the lessons they had learnt, and who could put them to use for the benefit of others. Mr. Fowler (of Louth) received due thanks for his lucid descriptions of many of the buildings, and Mr. F. C. Penrose for acting as guide very pleasantly on the Walsingham and East Barsham day. The clergy showed the party much goodwill, and the good offices of Mr. Lee Warner at Walsingham may also be mentioned, and the charming guidance of the Marchioness of Lothian through and around her wonderful house at Blickling.

The breaking-up of the party—gathered from many parts of the three kingdoms, from thirteen counties, in fact, London supplying the largest contingent, and Ireland the next largest—then set in with vigour, the comfortable head-quarters, the Norfolk Hotel, in St. Giles-street, resuming once again the even tenor of its way. Norwich turned out by no means so bad an excursion-centre as croakers might have imagined. It is true that by some odd chance the old builders hereabouts omitted to recognise so thoroughly as they might have done the requirements of an Association excursion. They put down at Norwich itself a goodly store of notable work, but failed to fill the district immediately adjoining, as such well-intentioned persons would have done without fail if they had known all that was in the womb of the future. An ideal excursion for students should include some interesting town or city as head-quarters, and a thorough scouring of a district near it, girdled by a circle struck with a radius of some fifteen miles. Then the vehicles can leave the hotel-door about nine in the morning and keep in gentle movement from village to village,—making a loop at the end and coming back by another road between six and seven in the evening. After several days of this kind of exploration a plentiful hunting-ground will have been well traversed in every direction, and the spoils stored in note-books, sketches, and memories. Norwich is, however, in a figurative and Pickwickian sense, an oasis in a desert; and thus Mr. Pink, the organising secretary, had to deviate from traditions, and lead the party by a dozen miles of railway journey out and home again to the well-stocked areas in which they were to find sport and take pleasure therein. Such a leap over the less-promising twelve miles to the direct north of Norwich carried everybody to Aylsham on the Tuesday, and the great churches of Aylsham, Cawston, and Salle, and the church and hall of Blickling were reached by road. On Wednesday North Walsham became the starting-point for Trunch, Knapton, Edingthorpe, and the remains of Bromholm (pronounced Broome) Priory, upon the sea in the cliff district of north-east Norfolk,—a lonely run back to Worstead enabling the useful though lightly-spoken-of railway to do service again on returning. Turning from the north to the south-west, Wymondham was reached by rail; and by cross-country routes, Attleborough, Great Ellingham, Hingham, and Deopham were connected in a loop. The district to the south-east of the head-quarters had been proposed for another day, as it affords specimens of Norman at Thwaite, Hales, Gillingham, &c., a class of work not furnished in such plenty by the examples selected from the other districts. The very characteristic church of Beccles—a typical East-Anglian church with continuous clearstory, no chancel arch, with nave and aisles, and two-storied south-porch of rare merit—would have been visited at the end of such a day. In the balance now-a-days, however, church architecture does not outweigh civic and domestic work of merit; and a programme which is to be looked upon as a work of art must contain a proper share of Tudor or Stuart work, and non-ecclesiastical work will be regarded with favour. Censorious people, who have a bad habit of seeing part of a case, have hinted that the great church-restoring movement has gone by,—that town churches in non-Gothic styles will soon be *en règle*, and that the young men are turning their attention to the demands which buildings for trade and habitation will make upon their energies, and meeting half-way the promise of a future which is to lead a few to fame, and one or two to decent competency. The beautiful brick-work of East Barsham need, however, make no one look shamefaced who expresses a wish to visit it, and a secretary's motives in arranging for a visit need not be subjected to very severe analysis. Near by it the Wells and Fakenham Railway now runs, and visitors are not so rare as in the days when Cotman etched the façade, the gatehouse, and the groups of gables and chimneys, and Kepton (in 1811) illustrated them for the publications of the Society of Antiquaries; or, as in the days when the elder Pugin devoted a dozen plates to them in his "Examples," or, as in still more recent days—albeit, forty years ago—when Mr. Penrose sketched, with loving care, this rare brickwork of the end of the fifteenth and the beginning of the next century.

We must be contented just now with a general indication of the scope of the excursion and a note of the districts visited, and congratulate the members of the Architectural Association on the eleventh excursion which they have planned and carried out. As it happens that activity is being shown in visiting the monuments of the past in more than one district,—and it is possible to feel compunction when consuming too much partridge,—considerations less topographical than architectural may be agreeably postponed to a future number.

* See p. 229, *ante*.

THE PROGRAMME OF THE SOCIAL SCIENCE CONGRESS.

A good deal, as it seems to us, will depend on the results of the approaching Congress of the Social Science Association at Edinburgh. It is undeniable that the last meeting at Manchester was not a very successful one, in regard to numbers of attendance and general interest in the proceedings, although the intrinsic interest of the papers and discussions was fully up to the usual mark, perhaps beyond it. The comparative non-success of the meeting was, perhaps, the more remarked because it had been thought that Manchester, more than most places, was a peculiarly advantageous place of meeting, where there was sure to be a great deal of interest in many of the subjects considered, as well as a large attendance. We believe, however, it was well understood that special circumstances, connected with the depression of trade in a manner that peculiarly affected Manchester, had a good deal to do with the rather disappointing result. A really successful meeting is almost a necessity now, after the rather flat meetings at Cheltenham and Manchester, and it may be said that if a successful meeting cannot be realised in Edinburgh it cannot anywhere. There is everything in favour of the rendezvous: a fine city, a society comprising much intellectual vigour, and the probability that some of the questions to be discussed will have new light thrown on them, owing to the different point of view from which some of them are probably regarded in the Scottish capital, as compared with that which is taken south of the Tweed. Under these circumstances we should pretty confidently look for a good meeting at Edinburgh, such as will give a further impetus to the Association at a critical period of its career.

We have already given the heads of discussion in the Health, Economy, and Art Departments. The first question in the Health Section is one which covers a great deal of ground, and, in fact, is concerned with the whole question of the administration of sanitary legislation, and therefore rightly comes first on the list. From the question of legislation in regard to the sub-division of sanitary areas and the appointment of sanitary officials, the second question comes down to the more detailed consideration of the application of sanitary legislation to existing buildings, and also the means of improving their condition with due regard to economy; in other words, the subject includes the questions, What is it best to do to Existing Buildings, and How can we best insure its being done? This combination of two objects in one morning's subject would render the adequate discussion of the question a somewhat complicated affair, and it will be necessary, if it is to be kept disentangled, to keep readers of papers and speakers very close to the point, otherwise the discussion of a question so framed will tend to run a very erratic course. We should have thought there would have been more probability of arriving at a satisfactory and definite conclusion if the question had been subdivided, and the latter half of it made the subject of No. 2 question; and the first half, How to apply or improve legislation for buildings, considered separately as special question No. 3. There is too much matter in the subject to be fully disposed of in one morning's talking if it is to be gone into thoroughly. The third question, as arranged, the Means for the Prevention of the Pollution of Streams, is no doubt a very important one, so important and so large that we can hardly hope it will be fully considered at the last special meeting, which is usually shorter and less fully attended than the earlier ones; and it would probably be much better to reserve a power of adjourning this question for future consideration, and giving the two days to the full discussion of the subjects included under the second special question, which ought to have a peculiar interest for Edinburgh, one of the most picturesque and unsanitary of cities.

In the Art Department, the first subject, in regard to the desirability of a school of dramatic art, subsidised either by private or public funds, is one which takes up the subject which has now been considered at two separate meetings of the Association,—at Cheltenham, where the question of a National Theatre was considered, and at Manchester, where the moral and social aspects of the modern drama were the subject of discussion at a very full and interesting meeting. It is gratifying to find that the improvement of the drama is arousing so much interest, and especially that it does so in the capital of Scotland, a country which has certainly not been hitherto a favourable soil for dramatic art. The second question in the Art Section, the possible or probable advantage of reviving "the old system of master and pupils" in artistic education, and its effect upon the development of historical art in the country, may lead to some interesting conversation, especially if some of the artists will give us their views on the subject, but we very much doubt if it can lead to anything practical. Suppose the meeting decide in favour of "the old system of master and pupils," will that either induce any one painter to take pupils, or induce the Academy to close their school? We do not believe that any system is in fault, or that an old system can be deliberately revived with any good effect. If a large proportion of our leading painters were induced definitely to try the *atelier* system, it would only be a kind of artificial pose, adopted with the view of seeing whether such an experiment would make a revived historical art; and we have certainly no belief that it would. The use of the discussion will be to elicit opinions, and awaken interest in the subject of artistic education, but it can hardly lead to anything definite.

The final question in the Art Section, How can the Musical Education of the Middle-classes be Improved? may be a very practical one, if rightly handled. It should be remembered that there are two ways of looking at the subject. Music may be regarded merely as a means of providing a little innocent recreation for the family circle, or as the study of a great art of expression in sound. Those who regard it in the former light are quite content if people learn enough to amuse them, and some of the apostles of this social view of music have invented, and are continually urging, the use of certain special

methods of notation, &c., whereby the learner may be taken a certain distance with less trouble than in learning the ordinary notation—but *only* a certain distance. Those who take the larger artistic view of the subject know that it is a far greater gain in the long run for any one to master the language in which the whole of music is written, than to learn a little corner of it only by any back-stairs method. The Committee of Council on Education have recently adopted this view, and ruled that the full grant for musical education should only be given for those who have learned the established notation. They have taken, we believe, a wise step, in opposition to a great deal of remonstrance on the part of the upholders of pet theories, and we hope the Art Section of the Social Science Congress will strengthen their hands, and not make the consideration of the subject the occasion of recommending any patent nostrums of musical education.

ANOTHER RAILWAY COLLISION.

A COLLISION occurred in the Bleamoor Tunnel, near Ribblehead Station, on the Midland Railway, on the 19th current, by which, fortunately, no one was seriously injured, but which narrowly escaped being one of the most frightful catastrophes that has occurred on any English line. If anything could add terror to the calamity of the dashing together of two trains, it is that it should occur in a tunnel. The serious character of the collision in question is also enhanced by the fact that the immediate cause,—or rather an immediate cause, was the failure of an air-brake. The machinery of the brake by some means or other got out of order, and the train was stopped by this unwelcome automatic action in the tunnel. The Pullman express was due in a very short time, and was soon heard entering the tunnel. One of the guards of the arrested train ran back towards the mouth of the tunnel, and placed fog-signals on the line. Owing to this the driver of the Pullman train put on his brakes, but not in time to stop before he came in collision with the guard's van of the preceding train. This was completely smashed by the blow; one of the carriages was also much damaged, and thrown off the line, as was also the engine of the Pullman train. But for the notice given by the fog-signals, the catastrophe would have been terrible indeed.

It will, in the first place, be remarked that the brake-power proved, in this instance, a source of danger. It must be remembered, however, that but for the brake-power in the following train, the mishap would have been of tenfold amount. The question as to which is the best system of brake is one on which the occurrence may, indeed, throw some light. The possibility of a brake being so deranged as to stop a train in full course is a very serious one. But the point is not one that throws any doubt on the importance of full and readily-available brake-power. It only, indeed, enforces that necessity.

There is, however, a more serious question in this particular case. The improvement in safety which has of late been so happily remarked on our railways is mainly due to the general introduction of the block system. Without undervaluing the brake, it must be admitted that its utility is secondary to that of the efficient working of the block system. In the present case, the proper use of that system, and the proper observance of the rules for working the line, would have prevented the collision. It is the rule that a train should not be allowed to enter the tunnel until the preceding train has got clear out of it. Whose fault it was that the rule in the present case was broken it will be necessary to ascertain. It is obvious that the safety of passengers is quite illusory if the regulations on which it depends may be thus neglected. The train broke down half-way in the tunnel. It is impossible that the signal that it had left the tunnel should have been given. Under these circumstances it is unpardonable that the Pullman train should have been allowed to enter, and to enter, moreover, at the usual speed. A thorough investigation—first of the neglect of rule, and secondly of the character of the brake used, and the nature of its disarrangement—is imperatively demanded.

We may add that the verdict of the jury in the Wennington accident is in full accordance with the warnings we have given on the subject of the education of the workman. The verdict was to the effect that the speed of the train at the spot was greater than the conditions of the line warranted, and that the brake power was totally inadequate. The jury added the recommendation that special instructions as to speed, &c., should be issued in cases of all curves and crossings at all corresponding with the one at Wennington; and that a more complete inspection, by a duly-authorised person, should immediately follow upon any alteration of levels, &c., made by platelayers. They further added that crossings and guard rails on curves should receive special attention. This is the application, in one especial instance, of the rule of which we have urged the general necessity. When we find that an assistant engineer, on being asked by the Coroner at Berwick on the 19th current, "At what distance would a train without brakes be drawn up?" replied that "He could not tell," it is tolerably clear that practical technical education is not in a satisfactory condition. It is to be hoped that the feeling of satisfaction at the escape of the 19th inst. will not diminish the care with which the lesson thus afforded is laid to heart. We hope that the presence of mind of the guard who applied the fog-signals will not be unrewarded.

ARCHÆOLOGICAL SOCIETIES.

Somersetshire.—The annual meeting of the Somersetshire Archæological Society was held at Glastonbury on the 17th, 18th, and 19th inst., under the presidency of Dr. E. A. Freeman. The Council, in their report (read by Mr. C. J. Turner, secretary), after expressing regret at the death of the late president of the Society (the Rev. Precentor Meade), stated that the Society had maintained its position as regarded numbers, which were nearly the same as last year. The Council, however, found considerable difficulty in meeting the expenses of the Society, and were forced, from want of funds, to abstain from helping many undertakings and making many acquisitions which would be of benefit to the cause of local knowledge. Through the intervention of one of the vice-presidents (Mr. W. Long, of Wrington), the Council had the opportunity of buying for 100*l.* the interesting and valuable collection of manuscripts, books, &c., relating to the county of Somerset, made by Mr. Serel, of Wells. An appeal for subscriptions for this purpose had produced the sum of 85*l.* A committee appointed by the Society had been enabled by private subscription to make extensive excavations at Penpits, and the result of the investigation was embodied in a report in the volume of proceedings for the year. The President then delivered his inaugural address, some passages of which we print on another page. The Bishop of Bath and Wells, on behalf of the Society, thanked the president for his discourse, and Mr. G. T. Clark spoke in terms of eulogy of the address. Mr. J. Parker then read a paper on Glastonbury Abbey. In the afternoon the Abbey buildings,—the Abbey Church, kitchen, barn, and tor,—were visited. In the evening at half-past six there was a public dinner at the George Hotel, and at half-past eight a public meeting was held in the Town Hall, when papers were read. During the year several donations, including some bronze implements, had been made to the museum. The business of the meeting at Glastonbury was resumed on the 18th inst., when a meeting was held in the Town-hall, at which papers were read on "An Ancient Plankway at Shapwick," by Mr. Dymond, and remarks thereon were made by Mr. Boyd Dawkins, the Rev. H. H. Winwood, and others. The society then visited the different places of historic interest, including the hospital in Magdalene-street, the hospital chapel at the rear of the Red Lion Inn, St. Benedict Church, and St. John's Church. After luncheon there was an excursion through the neighbourhood. The first halt was made at Meare, where a building which was originally the residence of the keeper of the fisheries under the abbot, an office of considerable importance in Catholic times, was visited. At the Manor House, the residence of Mr. T. Look, a very fine hall, 60 ft. in length, was inspected; and at the parish church the Rev. W. Hunt stated that the chancel was of the time of Edward III. After driving to Shapwick, the party inspected the Manor-house and the church, and visited on the return journey the Abbot's Manor-house at Sharpham, once the residence of Fielding, the novelist. On the 19th, the society visited the earthwork at Ponter's Ball, where the fosse is still visible. At West Pennard Church is a remarkable octagonal tower of the reign of Edward IV., and a fine west window. The side of the tower had been faced for the convenience of the parishioners playing tennis on Sunday afternoons. The inside of this church appeared to have been extensively recast in the time of Henry VII. West Bradley Church was described as of the time of Henry IV., and contained a curious chancel roof and windows of the domestic character, and the Norman font was well worth notice. Near here was an ancient tump or barrow. At Baltonsborough Church the Rev. W. Hunt pointed out that the nave was broad and without aisles, and that there was an exceedingly good gable cross. The old oak benches, with fifteenth-century mouldings, were looked upon with interest. Here is a curious stool of repentance. Barton St. David Church was remarkable for its octagonal tower, and its chancel arch of the time of Henry III. Butleigh Church was next inspected, and the society was entertained at tea at Butleigh Court, the beautiful residence of Mr. Neville-Grenville. The society finished its proceedings by a visit to Street Lias Quarries.

Essex.—The annual meeting and excursion of the Essex Archæological Society recently took place, Saffron Walden being the *locale*. The annual report, read by Mr. H. W. King, called attention to the frequent loss and destruction of sepulchral monuments and painted glass during the progress of modern church restoration. The last *Journal* of the Society contained a record of the abstraction of valuable (fourteenth and fifteenth century) glass from Rochford Church. Some years ago a much larger quantity was removed from the Churches of North Ockendon and South Shoebury; while the record of the loss of sepulchral monuments which has taken place during the last forty years is much larger and far more serious, and, were a catalogue prepared, would prove somewhat startling. There are reports of churches where the whole of the sepulchral slabs have been buried. Such is stated to be the fate of the memorial of Strype, the historian. Recently the attention of the Council has been called by public correspondence to similar losses at South Weald, one of the abstracted brasses having been publicly advertised by a private possessor. This, it is believed, will be restored, and the present vicar has signified to the Council his desire to replace any that can be recovered. The historical value of sepulchral heraldry and inscriptions cannot easily be over-rated. They serve as ready indices of names and dates to the public records, and valuable discoveries have been made by their sole aid, and are daily depending upon them. The existence of such a learned society as the Harleian alone proclaims their importance to the historical genealogist. Mr. G. E. Pritchett, architect, and others endorsed these remarks. It was decided to hold next year's meeting at Chipping Ongar. The parish church was described by Mr. C. F. Hayward, F.S.A.; and Mr. H. Ecroyd Smith, having read a paper entitled "Notes on an Ancient Cemetery at Saffron Walden," a visit was paid to Audley End, by permission of Lord Braybrooke.

AN ARCHITECTURAL MEDLEY.

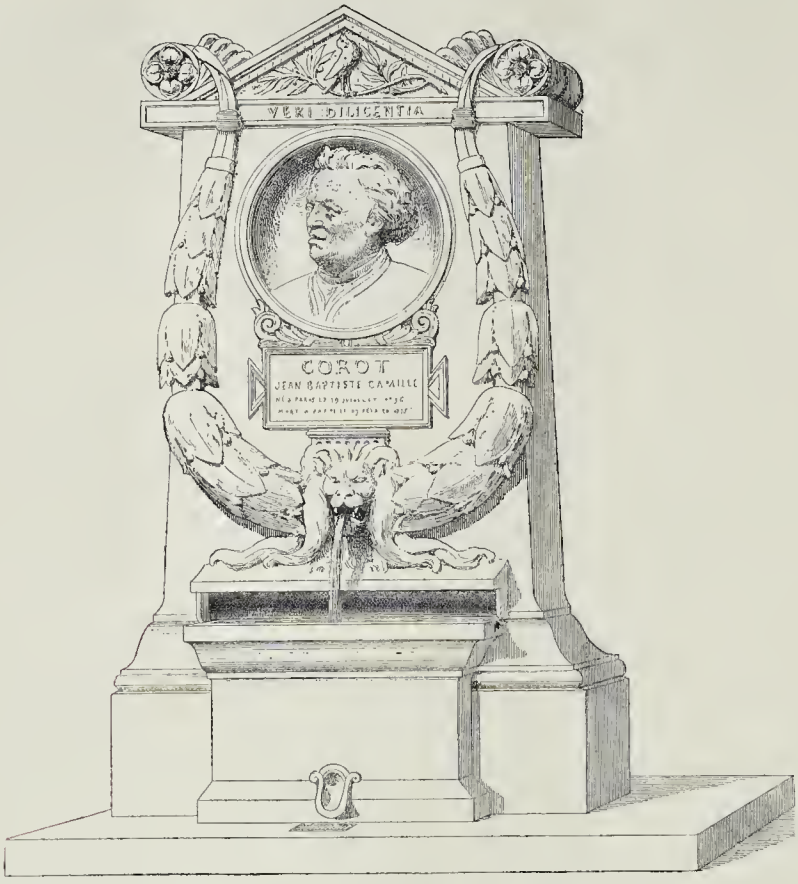
NOTWITHSTANDING the prosaic nature of our every-day life, there lingers amongst the members of the profession and the friends of architectural art a strong regard for what may be termed romantic and picturesque architecture. Of the former class there are several leading architects who work in this style, producing some most charming half-timbered domestic buildings, with quaint chimney-stacks, and studied irregularities.

Of the purely picturesque style, many of the "Queen Anne," or "Free Classic" buildings are good examples. Whilst admiring the beauties of this class of work, our better understanding will not permit us to subscribe to that excessive indulgence in architectural patchwork which is characteristic of some recent structures. We cannot approve of the desire to ape antiquity; to make a new house look like the "patchwork of centuries," with all the quaint conceits of Mediæval buildings, not growing out of necessities, but stuck on.

Many of our architects can and do produce good substantial nineteenth-century edifices, characteristic of modern requirements, modern advancement, and modern thought, while

> "Some by old (forms) to fame have made pretence,
> Ancients in phrase, mere moderns in their sense."

In the accompanying illustration an endeavour



MONUMENT ERECTED AT VILLE D'AVRAY, FRANCE, IN MEMORY OF COROT.

bas been made to incorporate some of the peculiarities of style advocated by several architects whose works are prompted by adoration for the romantic, picturesque, and antiquated. The drawing is intended to display the vagaries sometimes indulged in, at the same time that it conveys a not untruthful representation of what a building might ultimately become with the varied additions of several generations.

Whatever may be its merits as a drawing and fanciful composition, the author of it desires it should be looked upon as a warning against the too-free indulgence of individual whim, constituting, as it does, a gentle satire upon designs, whereof it may be said,—

"Such labour'd nothings, in so strange a style,
Amaze the unlearn'd, and make the learned smile."

Jas. Geo. Buckle.

COROT'S MONUMENT.

In May last, as we mentioned at the time, a monument to the memory of Corot, the French landscape-painter, was set up at Ville d'Avray. The body of the artist rests in the cemetery of Père La Chaise, where there is a fitting tomb. The monument we illustrate is set up on a triangle of turf near the late residence of the master. An inclosure of trees isolates it from some neighbouring houses which form the termination of Ville d'Avray, and affords a fitting background for the structure. It is wholly of white marble, and takes the shape of a fountain. On the face of the main block is a medallion of Corot, by M. Geoffroy Dechanme, and in the tympanum of the small pediment that surmounts it is a dove in bas-relief above these words, "*Veri diligentia.*"

CREWKERNE GRAMMAR-SCHOOL.

This building is now being erected under a scheme of the Charity Commissioners, and will take the place of the old school-buildings, the foundation of which dates from about the year 1499.

The present buildings, situate close to the church, almost in the centre of the town, afforded no scope for extension or improvement, and the governors resolved to acquire a fresh site. The spot selected is just outside the town on the road to Yeovil, and is perhaps as fine a site as could be obtained in any locality, including splendid views of the surrounding country; and the buildings will form, when completed, a prominent feature from the London and South-Western Railway as the town is approached.

The school is designed to accommodate about sixty boarders and ninety day boys, and is arranged so as to be capable of extension. The master's house is entirely self-contained, the dormitories being arranged over the school, class-rooms, &c., with bedrooms for the assistant-masters adjoining.

Provision is also made for the sick and convalescent and matron's and nurse's rooms, and a detached building for infectious cases is to be erected.

The baths, lavatories, and sanitary arrangements are provided for in a distinct block outside the main building, attached by a lobby with cross ventilation, and arranged on sanitary principles.

There is a large basement for cellarage, and a laundry and fives courts, plunge-bath, &c., are to form part of the scheme. The recreation grounds are of large extent.

The water supply is obtained from a well sunk on the site to a depth of 100 ft., and the drainage will be connected with the main drainage of the town.

The buildings are being constructed of Crewkerne stone, with dressings of Ham Hill, and the roofs are to be of slate. All inside woodwork is to be of pitch-pine, varnished.

The architects are Messrs. John Giles & Gough, of Craven-street, Charing-cross, London, whose designs were selected in competition.

The builder is Mr. Trevena, of Plymouth, whose contract amounts to between 6,000*l.* and 7,000*l.* He is rapidly carrying out the works, under the supervision of Mr. Mansel, the clerk of works. It is hoped that the buildings will be ready for occupation in twelve months.

Wyman & Sons, Printers, Great Queen St.

CREWKERNE GRAMMAR SCHOOL.

JOHN GILES & GOUGH . ARCHITECTS.
28 CRAVEN STREET, CHARING CROSS.

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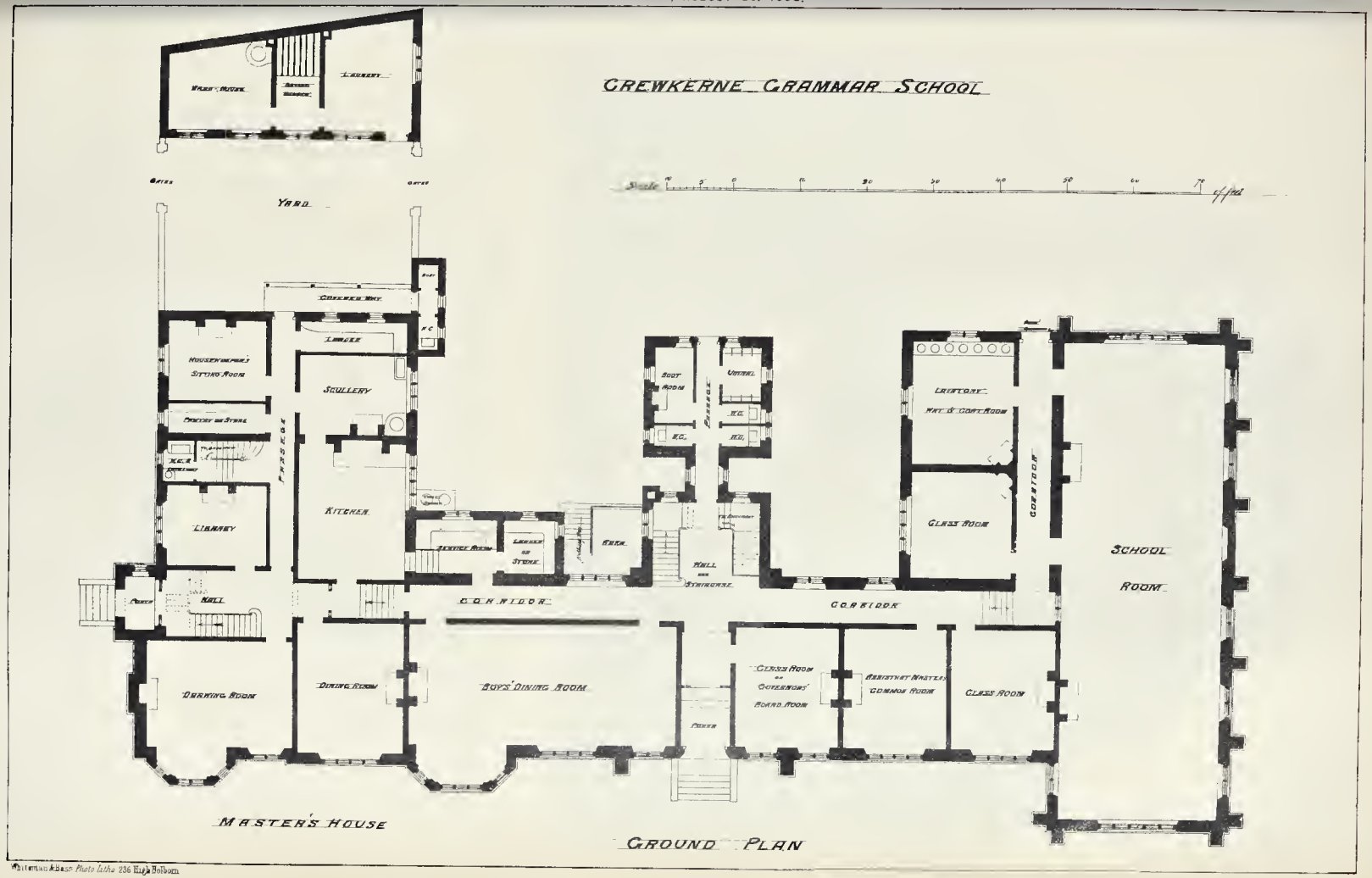
MEDLEY.



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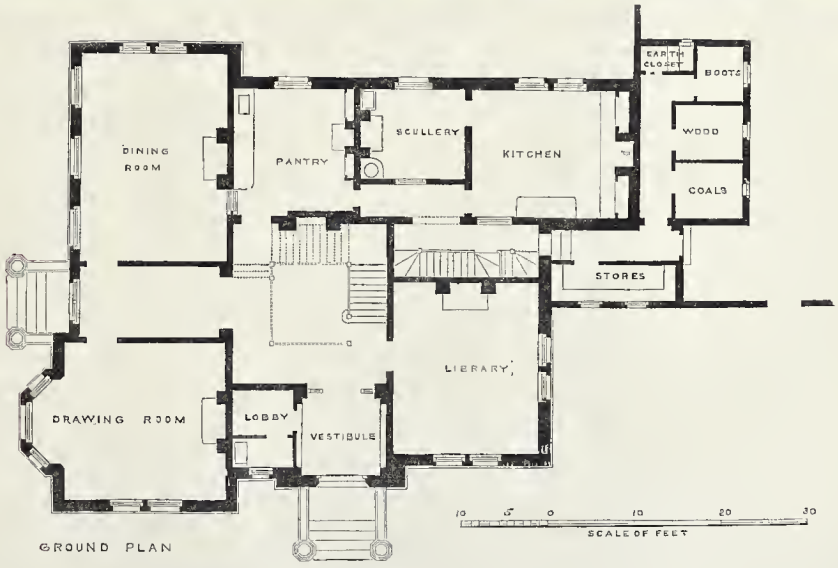

VICARAGE HOUSE, CUDHAM.—Mr. Charles Innes, Architect.

NEW HOUSE AT CUDHAM, NEAR SEVENOAKS.

The house illustrated in our present number has recently been erected, as a residence for the Vicar of Cudham, by Mr. Sampson Copestake, the patron of the living. It is built on an elevated site at the back of the church, and commands extensive views of the country for miles round. Owing to the situation being so much exposed, the external walls are built hollow, connected together with bonding bricks; and they are faced with white gault bricks from Dunton Green, and red brick arches and bands. The oriel window, front doorway, chimneys and other dressings are of red and white terra cotta, from Messrs. Johnson's Works, Ditchling, Sussex, who also supplied a great part of the red bricks. The central hall is two stories in height, lighted from the top by a lantern light, with a gallery on the first floor from which the bedrooms open. Stabling and farm-buildings are built at a short distance from the house, and correspond in style; also a gardener's cottage overlooking the walled kitchen-garden.

The works were carried out from the designs and under the superintendence of Mr. Charles Innes, architect, of Queen-street, City; Mr. Read acting as clerk of works. Messrs. Payne & Balding, builders, of Bromley, Kent, executed the foundations and basement story of the house, the gardener's cottage, and the boundary walls. Mr. Deards, of Webber-row, Blackfriars, built the superstructure of the house; Messrs. Simpson & Sons executed the tile pavings, and Messrs. Homfray & Co. the pneumatic bells.

The total cost of the works, including stables, gardener's cottage, and walls, is about 9,000*l.*

THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT DEVIZES.

In the account which we published last week (p. 229) of the proceedings of the first three days of this conference, we mentioned that on the opening day the visitors inspected the churches and Castle of Devizes. At St. John's Church, after examining the outside of the structure, the party seated themselves in the nave whilst the rector, the Rev. J. Hart Burges, D.D., read a paper on the origin and architectural points of the edifice. He said it was one of the most interesting specimens of Norman architecture that existed; the chancel, tower, and transept were built about the same time as the castle, and probably by Roger, Bishop of Salisbury, whose beautiful structures were the wonder of the age. So solidly were his courses of stone laid together that his contemporary, William of Malmesbury, had said that the stones looked like one block of masonry. The tower was perfect in construction, and the inside was covered with the most florid intersecting Norman arches. The chancel he hoped to improve ere long by altering the painting which existed there, but before that was done he intended to place a coloured window over the west door.

Mr. Loftus Brock returned thanks to Dr. Burgee for his paper. He said the churches in Wiltshire were very different from those which they visited last year in Norfolk, and were nearly all of cruciform type. He differed a little from Dr. Burges as to the age of the church. He thought that in the troubled times during which Bishop Roger lived they would not have had time for building such a structure. He thought between 1152 and 1160 was the time in which the church was built. Under the tower there were pointed arches on the narrow sides, and semicircular arches on the longer sides. They did not know of pointed arches being used earlier than 1150. It was a very rare thing to see a tower which was not square. He only knew of two or three in the South of England besides this one.

The party next proceeded to St. Mary's Church, and then to Devizes Castle.

At the evening meeting in the Town-hall, on Tuesday, the 17th, the first paper was read by Dr. Stevens, on "The Discovery of Palæolithic Flint Implements, with Mammalian Remains, in the Reading Drift." Dr. Stevens said he had well examined the drifts at Ealing, Ealing Dean, and Acton, but had never found so many and such interesting implements as at Reading. In September, 1879, he visited the north side of the Reading valley, but had not found anything. In the following month he searched in the south side, and there found a very interesting hatchet and a curious pointed tool. He next examined the Grovelands, Redlands, and Westlands drifts, and in the latter found a splendid hatchet of quartzite. Of the implements some were not worn, and could not have travelled far; while others were water-worn, and must have been washed down from the higher levels. On the 6th of February, 1880, he found, 5 ft. down in the gresnsand, part of a mammoth's bone, and also a well-pointed instrument. This was an important discovery, and established the fact that the deposits were made at the same time, and that the mammoth and the race of men who made the instrument were contemporaneous. Near the same spot he found also a bone of a carnivorous animal, which proved that lions and other tropical animals then inhabited these regions, but were driven southward, before the intermediate seas had been formed, to reach the more congenial climate of Africa. He was persuaded that the inhabitants were a race of fishers, like the Esquimaux, who were driven by the floods and ice of winter to seek the higher lands. This would account for the finding of similar flint implements in the higher districts, and which the pick and shovel of 1880 had succeeded in bringing to light. Dr. Stevens was warmly thanked for his interesting paper, and Mr. G. R. Wright, F.S.A., said he should like to ask him if he had formed any opinion as to the time and the physical character of the men who lived at that time. Dr. Stevens observed that Sir John Lubbock had said the skulls of those men were smaller than now. With the progress of civilisation the skulls had been enlarged.

The next paper was by Mr. J. A. Picton, F.S.A., on "The Ethnology of Wiltshire as illustrated by its Place-names." Mr. Picton said he proposed to consider what light the study of place-names would throw upon the nature of districts and the style of man. Hitherto most astounding guesses had been made as to the meanings of names and words hung together on account of the merest superficial resemblance. It was only lately that anything like a systematic way of going to work had been established. Names of places were often derived from their geological nature or from their geographical position. In the northern counties the names were of Norwegian derivation, and in the west Celtic. In Wilts they were nearly all Anglo-Saxon. Places were often really described in the affixes, and these qualified by their prefixes, thus—"*Winterbourne*," &c. It was often supposed that the ancient Britons were the aborigines of this country, but they were really only immigrants. No county was richer in pre-historic remains than Wiltshire. They had the primitive pit dwellings, the harrows, and later on the splendid monuments of Avebury, Silbury, and Stonehenge. Many Wiltshire names, such as "Kennett," were utterly inexplicable. Some places, as Longstreet, Stratford, &c., were so called from the Saxon "street," a Roman road. The Romans came to Wiltshire about fifty years after their landing in Kent. The name *Wansdyke* was from the Saxon god "Woden." The name Devizes was from "*Castra ad divisse*" the "camp at the division" of three manors which then existed.

At a meeting in the Town-hall, on Wednesday, the 18th, Mr. Brock read a paper on "The Discovery of a Viking's Ship in Norway." He said they were now assembled in a district remarkable for its numerous tumuli and ancient monuments. Each of the barrows on the downs was the burying-place of a family who had wished to lie near the great temples of Stonehenge or Avebury. In a county where the interments of ancient people are so diverse, he needed no apology for broaching the subject of a remarkable discovery recently made in a distant country. It related to one of the formidable sea kings who were then the terror of our Saxon forefathers, and one of a race whose bones may yet be found on our soil, having fallen before the English in battle. This discovery might be compared with the discovery of a ship at Dundalk, in 1785. There were some differences, however, in the construction of the two ships. There is every indication that the ships were used for sepulchral purposes, for ancient naval heroes were often buried in their ships, with their spears and accoutrements. King Frotho II., of Denmark, made a law that if any admiral died he should be buried in his own ship, as also should the principal commanders. The ancient Saga writers said that many heroes were buried in their own ships. In 1852 the first vessel of the kind was found. In 1863 another was discovered, and in 1867 another, which is to be seen at Christiania. The one just found enabled them to tell positively the manner in which the Norsemen were buried. Near the little village of Sandefjord there was a legend to the effect that a sea king was buried near, and that lights might sometimes be seen near the grave. On examination, a buried ship was found, supported by timber logs, at about 5,000 ft. from the sea, though probably the water was then nearer. The figure-head was beautifully carved, and represented a dragon, which was the usual figure-head on Viking ships. Three small boats were found, and some oars beautifully carved. In front of the mast was the burial-chamber. In the after part of the vessel some bones were found wrapped in silk. They heard in Sagas of burial-places being broken into by thieves, and as this one was disturbed they had a sad illustration of that truth. The length of the boat was 79 ft., and he attributed the date of it to A.D. 800. The ship was placed with prow towards the sea, so that the great chief might sail out to sea when called by Odin.

Mr. Mayer said that a similar ship had been found at Iona, in Scotland, in a manor, but it was the ship of a missionary, and not of a Viking.

The subject was also commented upon by Mr. Morgan and Mr. Picton, who said that the naval supremacy of England was due to the Viking blood in our veins. The Vikings were a race born to rule and conquer.

Earl Nelson said that his great-uncle at Copenhagen had remembered his Viking descent, for he had signalled to the Danes, "Danes, we are brothers."

Thursday, the 19th, proved a very enjoyable day. Favoured by fine weather, a large number of the members and visitors started at an early hour by special train to Chippenham, where carriages were in waiting to convey the party to Bradenstoke Priory. Passing along through lovely country, with the harvest in full swing on every hand, Langley Burrell was reached. This is a very ancient village, the church being partly of the Norman period, although the original fabric was much older. On the east end of the ridge of the nave is a stone crucifix, which attracted great attention, and on the west front of the tower (which stands on the south side of the church), is a monumental effigy comprising two figures (probably the founder and his wife), which it was suggested should be preserved with greater care. The next village reached was Draycot Cerne, the manor of which was transferred from Ralph de St. German in 1196 to Robert de Venuz, for fifty marks. It is at the present time the property and residence of the Earl Cowley. The old house at Draycot bears a date over the hall chimney of 1574. The church is supposed to have been built by Henry de Cerne about the year 1260, and is partly Early English in style. In the chancel floor is a monumental brass, with the effigies of Sir Edward Cerne, who died 1393, a monument of great beauty. The original font has been transformed into a garden-pot (so says the *Wilts and Gloucestershire Standard*, to which journal we are indebted for some of these particulars), and stands outside the church. The chancel was noticed as being on a lower level than the nave, a peculiarity found only in Saxon churches. Sutton Benger Church Mr. Brock considered to be one of great interest to all architects and archæologists. It is of the Late Decorated period (about the fourteenth century), the tower of Perpendicular date, having an embattled parapet, enriched with panelling, four pinnacles at the angles, and in the centre a very pretty open-work spirelet. The font was Norman, and the nave contained some fine specimens of Norman work. In 1330 an aisle had been added, and the work had been carried out in no niggardly spirit; the windows being beautiful and artistic to the last degree. The east-window of the aisle was enriched with hall-flowers all round, and was of very beautiful composition. A niche inserted in the lower portion of the window contained a sculpture of the Virgin; close by them being a piscina, and on the back of the niche (externally) was a miniature representation of the entire window itself. A very good piece of tapestry, supposed to be a portion of an altar-cloth, is now spread over the reading-desk. The parish register dates from 1653. Christian Malford, the next village, has still the remains of the steps and shaft of an old stone cross. The manor was given in 940 by King Edmund, to

Dunstan, Abbot of Glastonbury. The manor now belongs to the Earl of Carnarvon. The church, of very ancient date, does not present any particular features, but there are some old monuments and brasses. The next halt was at Bradenstoke, and here Mr. Brock acted as guide to the party, and gave an account of the Priory. It appears that this was founded on the 13th of April, 1142, by Walter, son of Edward of Salisbury, a valiant Norman soldier, who had accompanied the Conqueror in his invasion of England, and received the lordships of Salisbury and Amesbury in return for his services. It was dedicated to the Virgin Mary, and its inmates were canons of the order of St. Augustine. William, Earl of Salisbury, grandson of the founder, who died in 1196, is said to have been buried in the Priory Church. In one of the apartments, known as the Prior's room, is a chimney-piece of stone, richly carved and painted with five plain shields in the centre of quatrefoils, the lower part being beautifully worked in lozenged panels, containing, raised on foliage, four golden letters, "W.A.L.S." This beautiful chimney-piece, which is crowned by an elegant cornice of leaves and a central bracket, is of the age of Henry VI. The Priory now belongs to Sir Gabriel Goldney, Bart., M.P., who was represented by his son, Mr. Prior Goldney, who entertained the company with refreshment.

Having continued the journey to Malmesbury, the company were quite prepared to accept of the hospitality of Mr. W. Powell, M.P., who entertained them at luncheon in the suite of reading and recreation rooms which he has established in the town. One portion of the company was presided over by Mr. Powell; Mr. Swayne, deputy chairman of Quarter Sessions, occupying the chair in another apartment. The health of Mr. Powell was proposed by Mr. Geo. Wright (in the absence of Earl Nelson, the president).

Mr. W. Powell, in reply, said it not unfrequently happened that those who lived near a place were less well acquainted with the objects of interest in that place than those who came from a distance, and therefore it was that they were looking forward with great eagerness to the account they were to have of their ancient abbey,—that magnificent structure which the historian told them rivalled in architectural beauty the nave of Winchester, the choir of York, the spire of Salisbury, and the majestic towers of Lincoln.

The company then visited the Cross and the Abbey, the latter being commented on by Mr. G. Patrick, Mr. Brock, and Mr. Ewan Christian. In 1541, the parish church of St. Paul having become ruinous, the nave of the abbey church was given by Stumpe to the parishioners, who obtained from Archbishop Cranmer a licence to convert it into a parish church, for which purpose it continues to be used to the present day. The valuable documents which formerly belonged to the abbey have been lost, to a very great extent. The features of the architecture of the abbey church were pointed out and commented upon. When perfect it must have claimed a high place amongst the ancient ecclesiastical edifices of this country. The fabric consisted of the usual parts of a great English minster, the four limbs of the cross and a central tower. Of these portions the present parish church includes only two-thirds of the nave and aisles used by the monks. The style of its architecture is Norman, pure in its details, but with the pointed arch, erected probably about the middle of the twelfth century. Subsequent additions and alterations have been made, one of which was the erection of a western tower. The central tower fell some time in the sixteenth century, carrying some of the building with it, and was never afterwards rebuilt. The western tower also fell subsequently, and it is said that during the rejoicings for the return of King Charles II., 29th May, 1660, the noise of artillery so shook the old buildings that one of the remaining pillars of the central tower and the parts above it fell the same night. The south porch and doorway, with its elaborate series of Norman sculptures, is one of the richest specimens of its kind in England. Within the porch, in two groups on either side, are seated figures of the twelve apostles; and over the inner doorway is a figure, also seated, of the Saviour, on a throne between two cherubims. There is also a series of sculptures in medallions, illustrative of both Old and New Testament history. There is a tomb, with recumbent effigy, in royal robes, ascribed to King Athelstan, but it appears to have been erected several centuries later than his death in 941, and was probably put up by the monks. All these and many other (which our space will not allow us to enlarge upon) interesting features were described and commented upon by Mr. T. Blashill, Mr. G. Patrick, and others. The cross, which stands near the centre of the town, was built about the reign of Henry VII. It consists of eight great pillars and eight open arches, one large pillar in the centre bearing up the whole. It has flying buttresses, and an octagonal turret with a small niche on the end encloses a representation of the Crucifixion. The cross was repaired at the commencement of the present century. After all these points of interest had been duly noted, the party, having taken tea with Dr. Jennings, returned to Devizes.

In the evening a meeting was held in the Town-hall, for the reading of papers, Earl Nelson in the chair. The first was by Mr. Thomas Morgan, F.S.A., on "The Gewissens in Wiltshire." He said that, having traced (at the last Congress) the East Angles in Norfolk and Suffolk, he now wished to speak of the "Gewissens" or "Westerners." The term seemed to have been used in opposition to the "Easterlings," just as on the Continent the Eastern Goths were opposed to the Visigoths or Western Goths. It was necessary to go back to the Roman times to trace the rise of the kingdom of Wessex and its vicissitudes until swallowed up in the smaller kingdoms. Out of the 500 years during which the Romans were in supremacy in Britain, no less than 300 were without any record whatever of Britain. Records of the revolutionary Roman times were the milestones found at Bitterne, near Southampton, recording the names of Gordian the younger 238 to 244 A.D., and other celebrities. The materials for history were very sparse, neither had any satisfactory explanation been given for the absence of all literature of the period.

The paper was commented on by Mr. Karslake and Mr. Swayne, after which Mr. Morgan was heartily thanked for his learned paper.

Dr. J. S. Phené then read a paper on "Existing Analogues of Stonehenge and Avebury, from Researches in the Mediterranean," which we print on p. 257.

The paper was commented upon by Mr. Mayer, F.S.A., Mr. Picton, the Rev. Sir Talbot Baker, and others.

At nine o'clock on Friday, the 20th, about 150 members and visitors drove through the beautifully wooded and fertile country between Devizes and the foot of Salisbury Plain, passing through the prettily-situated villages of Enford and Netheravon. About twelve o'clock they arrived at Amesbury, where the church was examined and commented upon. It is one of the finest edifices in the district, cruciform in plan, with a square central tower. There are remains of Norman windows and arches. After this, luncheon was partaken of at the George Inn. At Ameshury the party was joined by the Newbury District Field Club, whose members had taken advantage of the British Association being in the vicinity to have a united excursion. The whole party then proceeded from Amesbury across the plain to Stonehenge.

The Rev. A. C. Smith, in describing the temple, said that when perfect it consisted of two circles, and two ellipses of upright stones, concentric, and environed by a bank and ditch, and outside this boundary, of a single upright stone, and a *via sacra census*. The entrance to the cluster faced the north-east, and the avenue to it is still traceable by banks of earth. One stone, called the "Friar's Heel," 16 ft. high, is supposed to have been a gnomon. The outer circle consisted of eighty stones, fixed upright at intervals at 3 ft. 6 in., but connected at the top by imposts which formed a continuous corona, or ring of stone, at a height of 16 ft. Within this was the grandest part of Stonehenge, the great ellipse, formed of five, or, as some think, seven, trilithons, the largest attaining an elevation of 25 ft. Lastly, within the trilithons was the inner ellipse, consisting of nineteen granite posts; and in the cell thus formed the altar-stone, or the stone of astronomical observation. Now the outer circle consists of sixteen uprights, and six imposts; the inner circle of seven uprights; the great ellipse of two perfect trilithons, and two single uprights; the ellipse of six blocks, and within the cell the so-called altar-stone. The origin, date, and use of Stonehenge are equally unknown to us. It has at different ages been called by different names, and even now many different opinions exist upon the subject. Some antiquaries beheld in Stonehenge a work of the antediluvians, others a sanctuary of the Danes, and others a temple of the Romans; but a numerous and learned band consider Stonehenge to be a Druidic temple.

Dr. Phené said that it was obvious that the remains were the work of two different eras.

Earl Nelson said he should like to see those stones replaced that had fallen within the memory of man.

The temple was also commented upon by Mr. T. Morgan and others.

Vespasian's Camp, an interesting Roman relic, was also visited, and the party returned to Devizes over the plain, *viâ* Redholn.

In the evening a meeting was held in the Town-hall, Earl Nelson in the chair. The first paper was by Mr. J. Tom Burgess, F.S.A., on "Ancient Fortifications, especially with reference to the Devizes Castle." Mr. Burgess said he had not come to Devizes with the intention of reading a paper on the castle, but the idea was suggested to him on learning how little really was known of it. The castle struck him as an embodiment of the successive ideas of a military defensive position. There was no county in England which possessed so many features of interest to the student of the past as Wiltshire. It is studded with so many ancient monuments as to offer almost an unrivalled field for the study of antiquity. Devizes Castle stands on a huge mound, and it presents many points in common with other castles erected about the same time by Bishop Roger, of Salisbury, who reconstructed old castles on the plans adopted by the Norman military architects. It was too much the fashion to describe the entrenchment as British, Roman, Saxon, or Danish, as the case might be; but the fact was, the commanding position would commend itself at any period to those who had to defend themselves. Such a castle was probably the stronghold of a nation and the residence of its king. Kent had four of these strongholds. Mr. Gordon Hills had a theory that these mounds were merely Roman works thrown up for general survey, but many mounds were found in very low-lying positions surrounded by a wall, which showed that they were intended for habitation. All the old Mediæval castles had not a donjon or keep like Devizes. He then alluded to many other Danish and Saxon castles in England, and compared them with Devizes Castle. Many of them were placed by the banks of rivers, and most of them on artificial mounds. Fortified mounds were found of many types, and they showed the exigencies of the people who inhabited them. The natural mound in some places was surrounded by a ditch and valla, which, in their turn, were fortified with stockades and palisades. They were also supplied with means of retreat. On the weaker side of the mound the ramparts were erected. There were many instances in which the original fastness was enlarged, as at Old Oswestry, Dorchester, &c. When Vespasian came to subdue the great western land, he found that it bristled with earthworks of the most formidable kind, and which had to be stormed before the Roman legions could pursue their march westwards. They might now fairly surmise that on this march Vespasian came across Devizes, and from the discoveries it might be assumed that that great soldier occupied it long as a commanding and strong post. Subsequently the adjacent forests sheltered the great Alfred; but those forests were now gone, and the chalk bluffs that witnessed his victories, and which still bear the ensign of his country, now fringe smiling cornfields, orchards, and fertile pastures.

A paper was also read by Mr. G. R. Wright, on "The History and Hardship of the Present Law of Treasure Trove."

On Saturday last a large party set out in carriages for Bromham. Passing through the villages of Dunkirk, Rowde, and St. Edith's Marsh, the first halt was made at Bromham. The especial point of interest there was the fine church, which was described by the rector, the Rev. E. B. Edgell. It consists of chancel, central tower, south transept, nave with south aisle, south porch with parvise, and a chantry forming a south aisle to the chancel. The nave is in the Perpendicular style of architecture, and the chancel Early English. There is a beautiful chapel on the south side of the chancel built by Richard Beauchamp, afterwards Lord St. Amand; it is Late Perpendicular in style. There are also some beautiful tombs and brasses

in the church and chapel, to the memory of Elizabeth Beauchamp, John Baynton, Sir Edward Baynton, Anne Pakyngton, and others. The party then inspected "Old Bromham House," which was formerly one of the principal halting-places for the nobility on their way to Bath. It was visited several times by James I., who hunted in the park. Close to the house are the remains of an old Roman villa, which were examined with much interest. Several hones and coins have been found there from time to time. Wans house and the Roman road were then visited, and the party next drove on to the mansion of Bowood, the princely residence of the Marquis of Lansdowne. Many of the historical pictures were viewed with very great interest. After luncheon at the Lansdowne Arms, the drive was continued by Keeper's Lodge to Spye Park, the residence of Major Spicer, and from thence past the conduit at Bowden Hill to Lacock Abbey, by Bewley Court. At the abbey the party were received by the owner, Mr. C. H. Talbot, who conducted them through the building, of which he gave the history and described the leading architectural features. It was founded by the Countess Ela in 1232. The abbey surrendered in 1539, and its site was granted to Sir William Sherington, and from his heirs came into the possession of the present family. It was strongly fortified during the Civil War for Charles I., but it surrendered to Fairfax immediately after Bristol and Devizes had fallen. The cloisters, which were greatly admired, are built in the Late Perpendicular style. On the stone groining of the roof are a series of shields of arms, including those of many old families, and several others not satisfactorily identified. In the pavement are the remains of several interesting monumental memorials, including one of the foundress, Countess Ela. The remains of the refectory, dormitory, and sacristy were also visited and commented upon, as also were the Nuns' kitchen and Chapter-house. The parish church and village cross were then visited, and the party returned to Devizes.

At half past eight p.m. a meeting was held in the Town-hall, when an inspection of the ancient deeds and charters of Devizes was made by Mr. W. de Gray Birch, F.R.S.L. (British Museum). Mr. Lambert, F.S.A., described the borough maces and regalia.

Earl Nelson, in a brief closing address, summarised what had been done during the week. Besides getting a view of the wonderful beauties of the county of Wilts, they had obtained a fair idea of the earthworks it contained, and how vast they were. He particularly noticed that what were formerly accepted as being Roman camps were now called British; and in the same way as these ground-works had been ascribed to the earlier inhabitants, so also many of the churches which had been called Norman were now called Saxon. This, he thought, was most reasonable, because the Norman style of architecture first came into use under Edward the Confessor, and surely William I. would not have pulled down every scrap of Saxon building. Something had been done by Dr. Phené's excellent paper to elucidate the mystery which had for ages hung over Stonehenge. He thought the outer entrenchment ought to be preserved from public mutilation, and he hoped something would be done to keep those stones upright which were now falling. He should also much like to see the trilithon replaced which fell in 1797.

Mr. Picton, F.S.A., proposed a vote of thanks to the noble chairman, who responded, and after several other complimentary votes of thanks had been passed the company separated.

Although the business of the Congress formally closed with this meeting, on Monday morning a number of members started for Warminster *en route* to Longleat, the famous seat of the Marquis of Bath. The picture-gallery was visited, and some of the old paintings greatly admired.

The arrangements have been most satisfactorily carried out by the honorary local secretaries, Mr. J. Reynolds, of Bristol, and Mr. W. H. Butcher, of Devizes.

The Lord Lawrence Memorial.—The committee have determined upon the erection of a standing statue of Lord Lawrence at the south-east corner of Waterloo place, just opposite the statue of Sir John Burgoyne, to which, as regards size and effect, it will bear a considerable resemblance. Mr. Boehm is executing the work.

ARCHÆOLOGICAL DISCOVERIES.

Carchemish, the Capital of the Hittite Kingdom.—The *Times* of the 19th inst. contains a long and interesting account of recent discoveries made at Carchemish during excavations conducted for the authorities of the British Museum, under the supervision of Mr. P. Henderson, the British Consul at Aleppo. At one point there was brought to light a large chamber, the walls of which were decorated with sculptures. The chamber is in the form of a corridor, such as those in the palaces at Nineveh; its length is 60 ft., with a breadth of about 18 ft. The floor of this corridor being uncovered, it was found that there was a flight of broad steps leading from the lower city in the direction of the palace mound. The west wall of this corridor only remains *in situ*, and along it have been ranged a series of Hittite sculptures in bas-relief. In concluding his account of the discoveries, the writer expresses the hope that the time is not far distant when the British Museum authorities may learn, perhaps from their German colleagues at Olympia, that digging and archæological exploration are two different things, and also that if excavations are to be any credit to those who undertake them they must be conducted by those who can bring a knowledge of the subject and an unvaried attention to bear on the works, so that all that is found may be secured. Such necessary attention cannot be expected from a consul whose seat of jurisdiction is more than ninety miles from the excavations, and who is rendered dependent on the honesty of a native overseer.

Winchester.—During the last few weeks workmen have been employed in laying down drainage pipes throughout the cathedral enclosure at Winchester, and some interesting relics of Roman handiwork have been discovered. In Canon Warburton's garden, situated on the north side of Dome-alley, was found a portion of a Roman pavement, which was slightly damaged in its removal to the Deanery; and a subsequent search revealed a further portion of the remains, which were embedded about 6 ft. below the surface, a short distance to the east from the first discovery. The pavement represented a border turning at right angles, but the centre portion was missing, its absence being accounted for by the fact that a tree had been planted over it. The spot in which this relic was discovered is situated about 120 yards south-east of the Roman pavement discovered in 1878 in Minster-street, and which now occupies a conspicuous position in the public museum in the city.

Orkney.—The *Scotsman* says that some workmen, while trenching a mound in the island of Sanday, Orkney, the other day, after disclosing two solidly-built circular walls, 4 ft. thick, and about the same distance apart, came upon an underground passage 35 ft. long, and varying in width from 2 ft. to fully 4 ft., cut out of soft rock, and covered with broad heavy stones. The bottom is covered with clay, and does not seem to have been laid with stones. A number of bones have been found.

SCHOOLS OF ART NATIONAL COMPETITION.

The Science and Art Department have issued the report of the Examiners in the National Competition, 1880, of works sent up from schools of art. It states that the number of drawings sent up from the schools of art for examination this year was 169,147, from 151 schools. Of these works, 989 were referred to the National Competition, being 406 less than in 1879, when the number was 1,395. The following are among the students rewarded in the National Competition, 1880:—

Gold Medals.—Alfred W. Bowcher, South Kensington, model of figure from life; John W. Bradburn, Coalbrookdale, design for a ceiling suitable for a synagogue; Francis Gibbons, Cirencester, design for a mosaic pavement; William Kitson, Westminster (Royal Architectural Museum), modelled design to fill a given space; Evangeline Stirling, South Kensington, model of a head from life.

Silver Medals.—Frank Brown, Westminster (Royal Architectural Museum), design for a country house (four sheets); George F. Catchpole, Westminster (Royal Architectural Museum), design for a soup tureen, candelabrum, and dinner plate; Gilbert S. Doughty, Nottingham, design for a church (four sheets); Thomas Datton, Nottingham, design for wall paper (two sheets); William S. Frith, Lambeth, model of a head from the life, model of a figure from life, seated; Alfred Hall, Cirencester, design for a cup (two sheets), design for a portion of a side of a ball-room; Cecilia Jacques, South Kensington, design for surface decoration; William Kneen, Manchester (Grammar School), design for wall paper; Fred. Marshall, Bloomsbury (Working Men's College Art Class), chalk drawing of figure from antique; Alonzo Middleton, Nottingham, design for wall paper; John Smith, Coalbrookdale, design for a loving-cup; William G. Thomas, Westminster (Royal Architectural Museum), design for iron gates (for two); Henry Tidmarsh, West London, design for a shield; Alfred Williamson, Leeds (Young Men's Christian Association Art Class), design for a church (five sheets); Austin Winterbottom, Sheffield, studies of the sycamore and chestnut in their different stages.

The Examiners were as follow,—

Figure-drawing and Painting.—Mr. P. Calderon, R.A., Mr. G. D. Leslie, R.A., Mr. W. F. Yeames, R.A.; Mr. E. J. Poynter, R.A., director for art; and Mr. H. A. Bowler, assistant director for art.

Design, with Architecture and Modelling.—Mr. J. E. Boehm, A.R.A., Mr. William Morris, Mr. J. J. Stevenson, and the director and assistant-director for art.

Design.—Mr. H. S. Marks, R.A., Mr. W. Morris, Mr. J. J. Stevenson, and the director and assistant-director for art.

Painting in Oil and Water-colours.—Mr. W. F. Yeames, R.A., Mr. H. S. Marks, R.A., Mr. Val Prinsep, A.R.A., and the director and assistant-director for art.

The Examiners in the Architectural Section say,—

"Some designs for panels were skilfully executed, though not in a sound method of ornamentation, the ornament being too cut out from the ground, and the treatment of the flowers too naturalistic and minute for proper combination with architectural forms. Some elaborate and well-executed drawings were submitted by the architectural classes, many of them by young students; their subjects were somewhat ambitious, but their treatment fairly justified the attempts to design important buildings. The examiners recognised these attempts by numerous awards, but they hope that instruction in this class will be extended in future, as it seems at present to be limited to the exclusive study of Gothic ecclesiastical architecture. Some designs for half-timbered houses were good, exhibiting sometimes, however, a straining after picturesqueness by needless irregularity of plan and complexity of roofing instead of order and symmetry, which would be the first aims of architectural design. Irregularities should not be sought for their own sake, but should arise from and give evidence of some necessity for their occurrence. A panel for a room competing for the Plasterers' Company's prize, and designed for execution in relief, showed much fine sense of the proper distribution, relative projection, and variety of surface of the elements of which it was composed, but lost some of its effect owing to a want of knowledge of the human figure on the part of the student, who otherwise exhibits great capacity for designing. A good design for a mosaic pavement, with correct classical feeling, sent from Cirencester, was awarded with a gold medal; as was a design for a ceiling suitable for a synagogue from Coalbrookdale."

UNHEALTHY DWELLINGS IN LIVERPOOL.

At the meeting of the Liverpool City Council on the 4th inst., the Health Committee called attention to a report of the medical officer of health, presented in pursuance of the Liverpool Sanitary Amendment Act, 1864, as to premises which ought to be demolished or structurally improved, and which will be submitted to the grand jury at the Quarter Sessions as the sixth presentment under the Act.

Alderman A. B. Forwood said that about eighteen months ago the Health Committee promoted the obtaining of a provisional order to amend the Sanitary Act of 1864, whereby they could take measures to improve the sanitary condition of the courts and alleys of the town in a less expensive mode than they had hitherto been able to do under the Act of 1864. Under that Act the medical officer was all-powerful; if he certified that certain premises were injurious to health, they had no control over that certification; but if it went to the grand jury, and they inspected the premises, and if they were of opinion that the medical officer was right in his statement, they authorised the taking of these premises under the conditions of the Act of Parliament. The medical officer had drawn up this presentment, and prepared his plan, which would be submitted to the grand jury at the next sessions. The general plan adopted by the medical officer was to remove the houses at the entrances of those closed-in courts that existed in the town. There were many courts in the town which were approached by passages; all chance of ventilation or air was prevented by these houses in front. In most cases the medical officer had proposed to demolish these houses in order to throw air and light into the courts. It was also proposed to remove premises to the rear of the front houses which were obstructing ventilation; and he thought from the care the medical officer had shown in going through the different districts that he would be able to make these streets and houses quite habitable without their having to

go to the great cost of taking them all nnder the Artisans' Dwellings Act. The change effected hy the provisional order had more particular reference to arbitration. Instead of the owners of each individual property having any right to ask for arhitration, the local Government Board would appoint one arhitrator, who would hear all the cases and give a decision in each case, hy which they would save a great amonnt of expense. Instead of having an average of 130*l.* or 140*l.* to pay for these miserable houses, which involved a large amount of legal expense, he hoped they would he ahle, nnder the provisional order, to do it for half the amount.

NEW BUILDINGS ON THE THAMES EMBANKMENT.

A Bill is at present hefore Parliament to enable the Corporation of London to enter into certain arrangements with the Government as to the sale of land on the Thames Embankment (on part of the site of the City Gasworks), for the erection of a new Mint. The City Lands Committee reported, at a recent meeting of the Conrt of Common Conncil, that in pursuance of a reference to them in February last, they had proceeded with the negotiations for the acqnisition hy the Government of a portion of the land helonging to the Corporation on the Victoria Embankment, consisting of ahout three acres, for the erection of a new Mint; and for the acquisition, hy the Corporation, of the premises in Basinghall-street, formerly nsed for the purposes of the Bankruptcy Conrt. Mr. George Pownall was appointed hy the Government to meet the City Architect for the purpose of determining the snm to he paid by the Government for the fee simple of the land to he purchased, as well as the snm to he paid by the Corporation for the old Bankruptcy Court premises, with the nsual power to appoint an nmpire. Mr. Pownall and the City Architect not having heen ahle to agree as to the amounts to he paid for the said properties, they referred the determination thereof to Mr. E. N. Clifton, who had since made his award, settling and determining the value of the fee simple in possession of the land in Basinghall-street at 93,500*l.*, and the value of the fee simple in possession of the land on the Victoria Embankment at 254,475*l.* These arrangements were conditional on the Act heing obtained. As onr readers know, the new buildings for the City of London School are ahont to be erected on the west side of De Keyser's Royal Hotel; and westward of the school buildings a new street running northwards to Whitefriars-street is ahont to he constructed. The proposed new huildings for Sion College, the new hall for the Grocers' Company, and the new Mint, will fill np the remainder of the large area now vacant. The works for the extension of De Keyser's Hotel eastward into New Bridge-street are now in full progress, so that we may hope that hefore very long the City-end of the Victoria Embankment will asenme a finished aspect. The site of the Bankruptcy Court in Basinghall-street will probahly he devoted to the erection of a new Conncil Chamher adjoining the existing Corporation huildings at Guildhall.

THE TREES IN KENSINGTON GARDENS.

For several years past we have from time to time called attention to the urgent necessity of removing the many decaying and decayed trees which have so long disfigured this sylvan retreat, and we are glad to note that the work is now heing energetically taken in hand. The work of tree-felling must now of necessity he much more extensive than would have been needful had timely heed heen given to advice and remonstrance. It is satisfactory to he assnred that the axe will he wielded warily as well as holdly.

AN APPRENTICESHIP SCHOOL IN ROUEN.

This institution was fonnded hy the Municipality of Rouen in May, 1878. The trades tanght are those connected with the working of wood, metal, and leather. There are, at the present time, ahont forty pnpils. They are admitted at twelve years of age, when they leave the primary schools, and the term of apprenticeship is three yeare. Our informant says the results promise to be satisfactory.

SONNET.

LILIAN ADELAIDE NEILSON.

An exit, and re-entrance death-debarred:—
Gone Lilian Neilson, with steps of fleetness!
Silent now thy voice's rhythmic neatness;
Thy careful, bright career too early marred.
Howe'er to thee the problem might be hard,
Well didst thou present in due completeness
The fine human warmth and southern sweetness
Of him, the world's dear sympathetic bard.
Much moved to mourn in verses over thee,
My trembling lute I sadly took, this plaint
To sing of Juliet we no more shall see:
In hope that tones here struck without constraint,
Might for others also tell in melody
The grief for one, who many griefs could paint.

E. C. I.

THE LATE MR. BENJAMIN FERREY, ARCHITECT.

We record with extreme regret the death of Mr. Benjamin Ferrey, F.S.A., which took place on Sunday last at his residence, 55, Inverness-terrace; the cause was weak action of the heart and general decline. Few men in the profession have heen more generally popular, and his departnre will he lamented hy many friends. We shall give some account of his life and works in our next. Mr. Ferrey wae in his seventy-first year, having heen horn April 1st, 1810.

EMPLOYERS' LIABILITY BILL, 1880.

The Master Builders of Great Britain have petitioned the House of Lords, praying that their Lordships will make such alterations in the Bill as will hring it into accord witb the following objections:—

OBJECTIONS

Of the Master Bnilders of the United Kingdom to the Employers' Liability Bill, 1880, as passed by the Hon. House of Commons.

We beg to Submit,—

1. That the Master Bnilders of the United Kingdom employ a larger number of hands than are employed in any other branch of industry proposed to he affected by the present Bill.

2. That, while many other clanses of the Bill are open to objection, Sub-clause 3 of Clause 1 is the most objectionable, as the one which entails the greatest hardship upon employers, and especially those engaged in the building trade.

3. That it appeared from the observations of H.M. Government, that the object and scope of the Bill was only to render the employer liable for the acts of a person "to whom the employer distinctly delegates his own authority," and the definition introduced into the Bill, of a "person who has superintendence entrnsted to him," is "a person whose sole or principal duty is that of superintendence, and who is not ordinarily engaged in manual labour."

4. That Sub-clanse 3 is in direct contradiction to such definition, and therehy (so far at least as builders are concerned), almost abolishes the defence of common employment, nearly every one employed being nnder the direction of some other. For the above reasons it is humbly submitted that it will be just and expedient that Sub-clause 3 should be omitted from the Bill, which would then leave every employer liable for the acts of his authorised superintendents.

5. That in regard to Sub-section 4 in Clause 2, it is submitted that it would be impossible in most cases to prove that the workman *knew* of the defect or negligence which caused his injury, and it is therefore desirable to alter the clause as follows, by inserting the words hereinafter put in italics:—

In any case where the workman knew, *or with ordinary care would have known*, of the defect or negligence which caused his injury, *or was aware of any improper conduct on the part of others in the same employ which tended to cause his injury*, and failed within a reasonable time to give, or cause to be given, information thereof to the employer or some person superior to himself in the service of the employer, unless he was aware that the employer or such superior already knew of the said defect or negligence.

Benjamin Hannen,
President of the Builders' Society.
Geo. F. Trollope,
President of the Central Association of London Builders.
Stanley G. Bird,
Vice-President of the National Association of Master Builders of Great Britain.

London, August 20th, 1880.

The Cathedral at Truro is steadily making progress. Attention is centralised on the foundations, and these are heing got in. The excavating is going on down to 5 ft. helow the line of the crypt-floor line. The concrete footings for the east-wall are finished, and up to that level. The foundations all rest npon the solid rock 10 ft. 6 in. helow the grond at the east end, and 16 ft. 6 in. helow the nave floor line. A scaffold is up aronnd the old spire, which is some 120 ft. high, and it is being removed.

THE ROYAL MANCHESTER INSTITUTION.

The proposed scheme for the transfer of the Royal Manchester Institution, Mosley-street, to the Corporation of Manchester as a public gift, has been issued, with an explanatory letter to the governors of the institution, the committee to whom the matter was referred having delayed action until the question of the Manley Hall purchase was settled.

The proposed scheme is drafted as follows:—

1. The Royal Manchester Institution, as at present constituted, shall be dissolved, and the entire landed property, and the pictures and other effects in the building helonging thereto, shall he conveyed and transferred to the corporation of the city of Manchester as a public gift from the governors of the Institution, to be held by the corporation upon trusts to be mutually settled for public purposes.

2. The corporation shall provide an endowment of 2,000*l.* annually, to be devoted to the purchase of works of art, by which in time a permanent art-gallery for the city will he formed.

3. The chief rents shall be paid by the corporation.

4. The corporation shall maintain the institution in a state of efficiency; and if any surplus arise from exhibitions or other sources, such surplus shall he expended from time to time in the development of the permanent art-gallery.

5. The governing body shall be a composite committee, consisting of members of the corporation and members selected from the governors of the Royal Institution, in such proportions as may he mutually agreed upon.

6. All existing privileges of governors and their families shall he reserved.

7. The art-gallery shall be open free to the public on such days of the week as the governing body shall determine, and they shall also have the power to decide on the terms and conditions of admission on other days.

8. The above are proposed as the general principles, subject to such modifications as may be fonnd necessary.

By order of the council.

R. F. Ainsworth, M.D., Chairman.
E. Salomons, F.R.I.B.A., Hon. Secretary.

Manchester, August 4, 1880.

The approval of the governors of the Institution has yet to be obtained.

ARCHITECTURAL ASSOCIATION.

SURVEYING CLASS.

Among the many and great advantages offered by the Association to the junior members and students of the architectnral profession is the Surveying Class. This year's course of lessons has just heen hronght to a cloee.

Arrangements were made with Mr. A. T. Walmisley (civil engineer), of 5, Westminster-chambers, Victoria-street, to give twelve lessons (six indoor lectures and six field lessons), which should embrace surveying with chain only; with chain and theodolite plotting; various methods of setting out curves with and without the theodolite; explanation of rules and tables connected therewith; the box-sextant and optical square protractor and vernier explained; levelling, adjustment for reversion and collimation explained and illustrated practically; calculations of areas by the planimeter; contours; calculation of drainage areas and capacities of reservoirs; calculation by Bidder's tables of earthwork in banks and cuttings from railway sections; the eidograph explained. In short, the instruction included every branch of land-surveying likely to fall within the experience of an architect, and Mr. Walmisley certainly spared no pains to make it thorough as well as comprehensive.

It is to be hoped when the class is more regularly established and more widely known the members of the Association will more numeronsly avail themselves of its invaluable help.

PARLIAMENTARY JOTTINGS.

Employers' Liability Bill.—This Bill was hrought up and read the first time in the House of Lords on the 19th inst., and was read a second time hy their lordships on Tuesday.

Lower Thames Valley Drainage.—In the Honee of Commons, on the 19th inst., Mr. Brodrick asked the President of the Local Government Board whether, considering that the inquiry of the inspectors into the Lower Thames Valley Drainage scheme terminated nearly three months ago, and that the scheme was condemned by a vote of the House of Commons last session, he could give a guarantee that the decision of the Local Government Board shonld he announced at a time when the attention of Parliament might he called to it. Mr. Dodson, in reply, said: I cannot guarantee that the decision of the Board shall he announced before the close of the session, as I must have time to master the volnminous evidence, and it would not he fair towards the parties interested to keep them in suspense until next year. If, however, the Board should decide to grant the provisional order applied for, the order would have no validity nntil confirmed hy an Act, so that ample opportunity will be afforded for its consideration by the House.

The British and Natural History Museums.—In the House of Commons, on the 19th inst. Mr. Gibson asked the Right Hon. the senior member for Cambridge University, one of the trustees of the British Museum, whether the

original estimate for the furniture and fittings of the new natural history museum was 177,570*l.*; whether of that sum there had only been actually granted the sum of 60,000*l.* in three successive instalments, leaving yet to be granted the sum of 117,570*l.*; whether, if the grants on account of original estimate were not in future largely increased, the removal of the Natural History collections might not be much retarded; and, whether the trustees of the British Museum would again bring the matter under the notice of the Treasury, and thus secure the speedy realisation of the advantages for which the public had already paid considerable sums.—In reply, Mr. Walpole said, the question involves four queries. In answer to the first, it is the fact that 177,570*l.* was the original estimate for the furniture and fittings of the new Natural History Museum. In answer to the second, the sum actually granted this year is only 60,000*l.* In answer to the third, it is obvious in that state of facts the removal of the national collections must necessarily be retarded if the grant of 20,000*l.* is not largely increased next year. In answer to the fourth, when the trustees meet next November to consider the estimates, I have no doubt they will bring this matter under the notice of the Treasury, in the hope that they will be able to accede to a much larger grant for the ensuing year, otherwise the exhibition of the zoological collections must necessarily be postponed.

National Portrait Gallery.—In the House of Commons on Monday last, Lord F. Cavendish, in reply to Mr. Beresford-Hope, stated that authority had been given to the Board of Works to make the alterations which were considered necessary for the protection of the National Portrait Gallery from fire. These works will be proceeded with at once.

SANITARY MATTERS.

International Conference.—A telegram from New York, dated the 19th inst., says that Mr. Evarts, Secretary of State, has sent a circular through the American Ministers abroad inviting the maritime Powers of the world to send representatives to an International Sanitary Conference to be opened at Washington on the 1st of January, 1881, with a view to securing a system of notification of the actual sanitary condition of the ports under the jurisdiction of the respective Powers, and of vessels sailing from those ports.

Sewer Ventilation at Portobello.—Serious complaints having been made of a nuisance caused by the ventilation of the sewers of Portobello by means of gratings opening into the middle of the streets, Mr. Malcolm M'Neill and Dr. H. D. Littlejohn have held an official inquiry into the matter. Their report, just published, says that there can be no doubt that in theory the system of sewer ventilation adopted in Portobello is a good one, and is advocated by eminent sanitary authorities. But, the reporters add, "In any plan of free ventilation of the sewers of a town by openings in the roadway, if a nuisance from the escape of offensive odours from the drains is to be avoided, it is absolutely necessary that the drains themselves must be properly laid, and at the same time be of the best construction. . . . . The plans of short air-shafts from the drains opening on the roadway were obtained from the neighbouring burgh of Leith, where the system had been partially introduced, and, without availing themselves of the experience of the Leith Burgh Surveyor, the Local Authority proceeded to carry out the system of open street sewer ventilation in Portobello with the assistance of an ordinary tradesman. If a practical engineer had been consulted, and if he had strongly recommended the system in question, there can be no doubt that the whole sewerage of the burgh would have been overhauled and in part reconstructed. After this had been done, at points which would be determined by careful engineering experiments, the best sites for the street openings would be selected, and the ratepayers would thus have the satisfaction of knowing that the Local Authority had availed themselves of sound engineering skill, and that the system was being tried under the best possible conditions." But Portobello, in addition to imperfect construction of drains, has special difficulties connected with its site as a town which rendered great care necessary in the adoption of this system of sewer ventilation. Its drains are tide-locked for a considerable portion of the twenty-four hours, and the sewage is thus accumulated for several hours in the drains, which, wherever imperfect, are thus subjected to the agitation of deposits along their course, and to the consequent escape of offensive odours."

THE NUDE:

ANOTHER THEORY.

In Eve's happy time there was no "society,"
For all the world knows poor Adam was none,
That when he went out he seldom came home to tea,
And so her best muslin was never undone.

You talk of the nude,—of this they'd satiety,
Where there's no Mrs. Grundy the nude is full dress;
Flounces of fig-leaf would have been impropriety,
Things that grave Adam would have had to repress.

But stay! you forget, there was then no occasion,
For jerseys, for lacing, for flounces at all,
These didn't come in till the serpent's persuasion,
These didn't come in till after the fall.

The apron, 'tis clear, came in with bad morals,
Your social arrangements all came in with sin,
Eve's daughters by dressing no longer seek laurels,
We may therefore conclude the nude has come in.

The hall-room is platform for groups of poses plastiques,
And damsels of flesh with the marble will vie,
Whilst the stage is the scene of naked gymnastic,
And Venus displays her limbs next to the sky.

Days of pure thoughts must be surely returning,
We shall see native Eves in the Park, in the Row,
Whilst a crowd of young athletes with genius burning,
Will pass with lids drooping, and seem not to know.

METER.

COMPENSATION CASES.

Value of 14 ft. in Gracechurch-street.—An action was tried last week before a special jury and Sir Thomas Chambers, Q.C., M.P., the Recorder, to assess the compensation payable to Mr. John Wilkinson, in respect of his freehold premises, No. 90, Gracechurch-street, possessing a frontage of 14 ft. to that thoroughfare, and covering a superficial area of some 640 ft., in consequence of the land being required by the Corporation of London for the improvements and approaches to the new Leadenhall Market. The evidence as to the value of the freehold on the part of the claimant exceeded by one-third that of the valuers for the Corporation. For the former, Mr. Edmond F. Fuller (Fuller & Fuller), Queen-street, City, who had prepared the claim, submitted 600*l.* a year as the annual value of the premises to an ontsider, and some 10 per cent. more to the tenant in possession. On the part of the Corporation, the highest estimate was 450*l.* a year, or 10*s.* a foot rental for the land at twenty years' purchase, and cost of the buildings added thereto. The claimant stated that he rented the premises some twenty-six years ago at 90*l.* a year, and that he purchased them about twenty-three years back for 1,800*l.* In the end a verdict was returned for 16,500*l.*, including the fixtures, agreed at 418*l.* This result was, it is said, arrived at by the jury assessing the rental value at 550*l.* a year, or 12,100*l.* for the freehold, being about 18*l.* 18*s.* a foot, or 823,284*l.* per acre, as against about 2*l.* 15*s.* per foot, the purchase-money paid in 1857, to which they added upwards of 3½ years' purchase of the profits made out of the business as compensation.

Birnbaum v. The Corporation of London.—On the 19th inst., the claim of Mr. Bernard Birnbaum, of 89, Gracechurch-street, was heard before the Recorder and a special jury.

The plaintiff, a manufacturer of waterproof and gutta-percha goods, some years ago purchased the residue of the lease of his premises, which were not only valuable for the purposes of his business, but for letting. The lease had to run for five years and a half, and Mr. Birnbaum expected a renewal. Being at a corner, the position was rendered more valuable for such purposes as advertising. The yearly rental, when the lease was acquired by the claimant in 1868, was 320*l.* It was now considerably in excess, and it was estimated that at the present time the improved net rental was at least 290*l.*, or 600*l.* altogether.

Mr. Collins was called, and deposed that he had examined the property. Part of it was let off at very low rentals. He estimated the net improved rental at 290*l.* per annum, which, calculated on the 6 per cent. table, and multiplied by five and a-half years' purchase, gave a total of 1,595*l.* Adding the 10 per cent. for compulsory purchase and the sum allowed for fixtures, he arrived at a total of 1,946*l.* 10*s.* as the value of the building, without taking into account loss of trade, &c.

Mr. Farmer stated that he considered the net improved rental to be 280*l.* per annum, and he considered that the value of the building was 1,886*l.* In cross-examination, he said that the premises were in a dirty condition, and would require the expenditure of 100*l.* to put them in repair.

Mr. Fuller and Mr. Eason gave confirmatory testimony, whilst Mr. Davids (of Messrs. Harvey & Davids) estimated the improved rental at 440*l.*

For the Corporation, Mr. Trist and Mr. Driver were examined, and these gentlemen valued the improved rental at 209*l.* and 190*l.* respectively.

The jury, after a short deliberation, awarded the compensation as follows: 1,512*l.* 10*s.* for lease, including the 10 per cent. for compulsory purchase; 192*l.* 10*s.* for fixtures; 365*l.* for goodwill; and depreciation of stock, 250*l.*: total, 2,320*l.*

THE COLLEGE FITTINGS AT YEDO, JAPAN.

SIR,—I have seen the letter of M. De Boinville, taking exception to the good opinion I have formed of the Physical College fittings at Yedo, which were suggested by Professor Ayrton, and ably carried out by the architect.

Dr. Williamson, of University College, who took the chair at my lecture (but who is not a professor of King's College), admitted the original character of the fittings to which I referred, so far as he knew, and I have said no more.

I am not aware that I have given any privileged information, or described anything not justified by the subject under discussion.

I certainly did not wander away into a description of the architectural excellences of the buildings forming the College at Japan, nor did I allude to any defects; but I simply drew the attention of the audience to a class of specially-designed fittings in one department only, the particulars of which were given to me by their originator, though not their executor, and I still think them highly creditable to both, and to the enterprising founders of a technical college the like of which is scarcely equalled out of Japan.

EDW. C. ROBINS.

SEWAGE AND THE THAMES.

SIR,—Observing in the *Builder* of the 7th inst. the trouble the London sewage is occasioning in the neighbourhood of Woolwich, let me ask,—is it impracticable to treat this large mass on the same principle as the smaller volume flowing out of the sewers at Taunton is treated? There I was recently shown by the surveyor a perfectly clear and pellucid stream of water passing from their sewage works, and causing no nuisance whatever in the river. Whereas, before the establishment of these works, fish could not live in the river, they now are to be seen, not only above the sewage works, but in all parts, even to the very outlet from the works.

Clearly, therefore, the only difficulty would be an engineering one, in applying the same system on a large scale to the London sewage. It would be difficult to conceive that engineering skill is not equal to such a task.

FELDSPAR.

PIN DOVETAILING MACHINE.

HAVING paid a visit a few days since to the Bow and Bromley Institute (above the North London Railway Station, Bow, E.), where a Workman's Exhibition is now being held, amongst the many models shown there my attention was particularly attracted to a good specimen of pin dovetailing, in the form of a square pedestal produced by a machine on an entirely new principle, invented by Mr. P. Hackworth, foreman machinist to Mr. W. Brass, contractor, Old-street, St. Luke's. Being allowed by Mr. Hackworth to inspect the machine, I consider the simplicity and ingenuity of its construction, coupled with its low cost, should recommend it to the notice of those interested, namely, builders, cabinet and pianoforte makers, box and drawer makers, shop-fitters, and many others where it might be employed to great advantage.

JOHN RENNIE.

"BUILDING LINE."

SIR,—Will some of your correspondents kindly reply to the following questions:—

1st. Is there any authority, urban or suburban, can compel me to build up to my building line? I want to go 9 ft. behind it.

2nd. What steps can I take when the local authorities refuse to pass my plans because of my setting-back?

W. H.

Lambeth Palace Library will be closed for the recess for six weeks from the 30th inst. The new collection of pamphlets on the monastic literature of England and Wales is rapidly increasing by the gifts of authors and societies.

GAS JOTTINGS.

Lancaster.—The Gas Committee of the Lancaster Corporation, who came into possession of the Lancaster Gas Company's concern in July, 1879, report that, after allowing for interest on capital, the net profit on the first year's working amounts to 2,335*l.* They have resolved to reduce the price of gas to small consumers from 4s. 2d. to 3s. 8d. per 1,000 cubic feet, and to large consumers from 3s 8d. to 3s. 6d.

Oldham.—The gross profits of the Oldham Corporation Gas Works on last year's working were 25,800*l.* The sum of 13,500*l.* was handed over to the borough fund, to he applied in aid of the rates. The price of gas is 4s. 2d. per 1,000, with discounts for ready money.

Books.

British Bee-Farming: Its Profits and Pleasures. By Jas. F. Robinson. London: Chapman & Hall. 1880.

There are many ways in which, with much pleasure to themselves, people with a head on their shoulders and a fair amount of energy may make money, who now merely moon about and *wish* they could do so. As our author quotes,—

> "The wise and active conquer difficulties
> By daring to attempt them. Folly and sloth
> Shiver and shrink at sight of toil and trouble,
> And make the impossibilities they fear."

Among these ways, at any rate with persons living out of town, should he placed bee-keeping, or, as it has come to be termed, bee-farming, concerning which Mr. Robinson has "no hesitation in saying, that in proportion to the capital expended, bee-farming will be found the most profitable business known." From 6*l.* to 9*l.* per annum may he made per hive, and twenty hives may he as easily looked after as one. Moreover, we import hundreds of tons of honey annually from Italy and elsewhere, which might he as well produced in heathery England. To get the most out of a hive some knowledge is, of course, necessary, and this Mr. Robinson's hook now before us supplies. It is clearly written and full of practical information.

Breweries and Maltings; their Arrangement, Construction, Machinery, and Plant. By Geo. Scamell, F.R.I.B.A. Second Edition, enlarged, by Fredk. Colyer, C.E. London: E. & F. N. Spon. 1880.

We need merely mention the issue of a new edition of Mr. Scamell's book. On its appearance we made its contents fully known, and assisted in obtaining for it a considerable circulation. The new edition has been partly re-written by Mr. Colyer. It contains twenty pages of plans and sections. It has been published a little too soon to include the alterations which will he required by the recent changes in the Exciso Laws.

Views of Ancient Buildings Illustrative of the Domestic Architecture of the Parish of Halifax. By John Leyland. Halifax: R. Leyland & Son. 1879.

Halifax is rich in residences of the fifteenth, sixteenth, and seventeenth centuries, and it was most desirable that some record of them should be preserved before time or further restorations should make the task more difficult. When we read in the first page of the introduction that, "Though diversities of taste may still exist, there can he no doubt that already the general opinion of this country is in favour of a return to the architecture of our forefathers of Mediæval times, both in ecclesiastical and domestic buildings," the impression is given that it must have been written much longer ago than 1879, though only just now published. And yet, on the other hand, it would seem obvious that Mr. Leyland's antiquarian studies have not been carried very far back, or he would scarcely have commenced his book with the assertion that, "It was the late Augustus Welby Pugin who first pointed out the perfection and grandeur of the cathedrals, abbeys," &c., of the great architectural agee of England. The work is of folio size, and includes twenty-five plates. There is not much art in the drawings, reproduced by the now inevitable photo-lithographer, but they serve to convey with exactness the aspect and style of the various structures, so we have reason to be obliged to Mr. Leyland, and we hope his example will he followed by dwellers in other localities.

Notes on Sketching Tours. By an Architect. B. T. Batsford, 52, High Holborn. 1880.

This is an able and a charming little book, and is likely not only to lead those who always sketched to sketch the more, but to make many sketch who ne'er did so before. The "architect" is Mr. Henry Taylor, of Manchester, who sketches very well himself, and gives numerous examples. Good lines of country are pointed out both at home and abroad, and the author gives references to a large number of books, as he goes along, in a simple and natural manner, calculated to lead the student to look them up, and make the most of them. *Nota bene.*—It is not necessary to be an architect to derive advantage from these "Notes."

Miscellanea.

Chemical Ventilation.—On the 18th inst. Dr. Richard Neale, in the presence of a number of engineers, gave a demonstration of a scheme to purify the foul air of tunnels, mines, cabins, churches, theatres, hospitals, and other buildings. The *Lancet* says:—The proposal promises to create a new era in ventilation. Nearly all attempts hitherto made to purify the air in crowded buildings have been mechanical, and have consisted of driving out the foul air by currents of fresh air. Dr. Neale's proposal, on the other hand, is a chemical one, and is designed to destroy the poisonous gases. It is not, of course, intended to supersede ordinary ventilation hy currents, hut rather to act as an auxiliary. The essence of the scheme is the adoption of some simple chemical facts. As the lungs of living beings appropriate oxygen and give off carbonic acid gas, Dr. Neale proposes to make a "chemical lung" which will appropriate carbonic acid and sulphurous gases from the air containing them, without yielding any products in exchange. The air in the tunnels of the Underground Railway was referred to as a conspicuous and well-known example of impurity irremediable by mechanical means. The principal deleterious gases in this instance are carbonic acid and sulphurous gases and carbonic oxide. All these, but especially the two former, may, Dr. Neale maintains, he easily got rid of by chemical means. By mixing a solution of sulphurous acid and water in a flask, Dr. Neale made an excellent imitation of the air at the Baker-street or Portland-road station. He then added a small quantity of solution of caustic soda, and agitated the flask briskly for a few seconds, and immediately the sulphurous smell was abolished. Into the same flask a current of carbonic acid gas was next passed, so that a lighted taper introduced into the flask was at once extinguished. After a few shakings a lighted taper was again introduced and burnt with a bright steady flame, showing that the soda had taken up the acid. Similar experiments were made with solutions of caustic lime.

Burning of the Lyceum Theatre, Sunderland. — This structure has gone the way of all theatres. It was designed by Mr. Thomas Moore, architect, Sunderland, and was opened to the public for the first time on the 29th of September, 1856, its erection having occupied just twenty weeks. The building was 106 ft. 9 in. in length, and its original breadth was 48 ft., but some time after it was finished the house adjacent to it on the northward was added on to it, and its width then became 72 ft. 6 in. The front is about 55 ft. in height, and from the floor of the pit to the ceiling the measuring line gives a record of 38 ft. The auditorium was of semicircular shape, and it measured 44 ft. in width at the proscenium, whilst from the edge of the stage to the front of the dress circle the distance was 30 ft. The stage was 55 ft. deep. The fabric of the building cost within a trifle of 7,000*l.* The carpenters' shop was situated close to the roof of the theatre, and it was here that on Thursday night in last week the fire broke out. No one was in the building at the time, and it is quite impossible even to hazard a guess at the cause of the outbreak.

Mr. Joseph Newton, C.E., who as president for twenty-four years has promoted the welfare of the London Association of Foreman Engineers and Draughtsmen, has been presented with 100 sovereigns and a timepiece.

Mr. Robert Charles Ransome, the senior partner in the firm of Ransomes, Sims, & Head, Orwell Works, Ipswich, one of the oldest agricultural engineering works in the country, returned to the works on the 9th inst., after a nine months' tour round the world, taken for the benefit of his health. His return was the occasion of a remarkably congratulatory gathering of the whole of those engaged in the works, and the presentation of an illuminated address, and a handsome album containing the signatures of the 1,150 persons employed by the firm. These, in a neat and very appropriate speech, were presented by Mr. Henry Alexander Byng, C.E., and as suitably acknowledged by Mr. Ransome. Mr. G. A. Biddell, C.E., then made a characteristic speech, in which, after re-echoing the welcome of the address, he took occasion to refer to foreign competition, which, he said, was not so much in the hands of the masters as of the men, and that the performance of thoroughly good, honest work in every respect was most necessary, and the strongest means of defying it. Mr. W. D. Sims, many years a partner in the firm, and Mr. J. E. Ransome made some remarks on the occasion.—*Engineer.*

Death by Lead Poisoning.—Last week Mr. Payne, the City Coroner, held an inquest at the Mortuary, Golden-lane, Barbican, on the body of Mary Ann Donovan, aged thirty. Evidence was adduced showing that the deceased, a single woman, earned her living hy working at a white-lead factory in Hoxton. On the 13th inst. she was seized with what appeared to be a fit, and was removed to St. Luke's Infirmary City-road. The next day being Saturday, she left the infirmary to go and take her wages. The following day she complained of being ill and of having severe pains in the head, which continued until the morning of the 17th inst., when her landlady went for a medical order for the parish doctor. That was at ten o'clock in the morning, hut owing to the doctor and his assistant being out on professional business, no doctor attended until about one o'clock, when Donovan had been dead an hour or so. Dr. Reed deposed at the inquest that there were distinct marks of lead poisoning to he seen between the teeth and gums of the deceased's mouth, the effect of the employment she had followed. The cause of death was an apoplectic or epileptic fit, produced hy the lead poisoning. A verdict in accordance with this evidence was returned hy the jury.

The Ruins of Conway Castle.—A Shrewsbury paper says,—Visitors who approach Conway hy rail from the Chester side are often surprised, and doubtless alarmed, to see, upon emerging from the tubular bridge, the vast fragment of one of the towers of the old castle suspended some 40 ft. above them, and clinging to the picturesque ruin in a way which awakens fears for its security. The peculiar position of this ruined tower, which is known as Twr Dain, is said to be due to the avarice of some of the old inhabitants of Conway, who, hy excavating the rock at its base, caused a vast fragment of the building to fall, leaving the upper portion, however, in a state of perfection which suggests comparison between the builders' workmanship of the thirteenth century, when Conway Castle was completed, and that of the present day. Although there appears to he no immediate danger of the old ruin giving way, the London and North-Western Railway Company are taking precautions for the safety of their line, which runs almost underneath it, and have determined upon giving the ruin a substantial support.

Accident.—At Cradley-heath, Staffordshire, an inquest has been held on the body of a woman named Ann Heath, who was killed by the fall of a portion of a building. It appeared that a chainmaker named Joseph Billingham let a shop to other chainmakers. On the 10th inst. a portion of the building fell down, killing the deceased, and seriously injuring other persons. Several witnesses swore that they had called Billingham's attention to the dangerous state of the building in question, but he neglected to have any repairs executed. The jury returned a verdict of "Manslaughter" against Billingham.

A Stupid Practice.—Steps are being taken to put a stop to the practice frequently indulged in, hy a certain class of visitors to the Cathedral of Canterbury, of carving their names and initials upon the walls and columns of that edifice. A prosecution has been instituted hy the Dean and Chapter against an excursionist from London, who was found guilty, and fined by the magistrates for the offence.

The New Clock, Chimes, and Bells for Dunedin Town Hall.—The new clock and bells for the Town-hall of Dunedin, which have only recently been sent out, have been entirely manufactured by Messrs. Gillett, Bland, & Co., of Croydon. The clock strikes the hours upon a bell weighing about 30 cwt. (note D), and chimes the four quarters on four other bells in due proportion of the following notes, A, F sharp, B, G; the five bells weigh altogether 3 tons 16 cwt. 2 qrs., the chimes being similar to those at the Westminster Palace. The four illuminated dials are each 7 ft. 6 in. in diameter, the figures, minutes, and circles being of cast iron, all in one piece, glazed with patent opal glass, and painted and gilt. The main frame is made, on the horizontal plan, of solid cast iron, planed top and bottom on an engine, and is so constructed that any wheel can be taken out separately without disturbing the other parts, and the clock over all is 6 ft. 6 in. long, 3 ft. 6 in. wide, and 3 ft. high. All the wheels are of the best gun-metal, turned, cut, and polished in an engine, the main wheels being 18 in., 18 in., and 16 in. in diameter. The escapement is the "double three-legged gravity," which the makers have from long practical experience found to be much superior to all ordinary kinds for perfect time-keeping. The pendulum (instead of the ordinary wooden rod) is a compensation one, made of zinc and iron tubes, and to beat two seconds of time, with a cylindrical bob at the bottom, weighing about 2¼ cwt. It also has a collar fitted on the rod for small weights for regulating, and a degree plate; it will, therefore, not be affected by any variation of temperature. There are two engraved and silvered dials on the clock, showing minutes and seconds, for the purposes of adjusting the outer hands and taking observations. All the bushes for the steel pivots to run in are made of gun-metal, screwed into cast-iron frames, so that they can be easily removed when required. The motive power is given to the clock by weights, weighing 1¼ ton, suspended from the three wrought-iron barrels by steel wire, altogether 500 ft. in length. The chime-barrel is constructed on Gillett, Bland, & Co.'s improved principle, with movable steel cams, so that the chimes can be adjusted to the greatest nicety, or changed at any time if required.

The Princes of Wales and Carnarvon Castle.—A suggestion made some time ago respecting the desirability of placing in Carnarvon Castle a tablet commemorative of the birth of the Princes of Wales has at last been carried out. Through the liberality of Mr. R. Sorton Parry, formerly High Sheriff of Carnarvonshire, a tablet, containing the names of the seventeen Princes of Wales and the dates of their birth, has been fixed in a prominent part of the noble pile. The memorial, which was executed by Mr. Hugh Jones, marble mason, Carnarvon, is surmounted by the Cambrian plume.

Manchester Industrial Exhibition.—Owing to the great demand for space at this exhibition it has been found necessary to postpone the opening until September 1st, in order to allow of the proper arrangement of goods, &c. The exhibition will be the largest of the kind that has been held in the North of England. Nearly all the space covered by the Agricultural Hall (two acres), with the exception of what has been retained for passages, will be covered by exhibits. The manager (Mr. Fred. Scott) has been assisted in the arrangement of exhibits by Mr. Joseph Corbett, engineer, Bartou-arcade.

The Patent Office.—From the annual report of the Commissioners of Patents it appears that during 1879 there were 5,388 applications for patents. This is a decrease of five upon the returns for the previous year, when the number of applications was 5,393, being the highest ever recorded. Of the first-stated number no fewer than 1,877 applications, or a little over one-third, were abandoned, so that only 3,461 proceeded to the final stage, and arrived at maturity. From the report we learn that a new edition of the index to the patents granted from 1617 to 1852, under the old law, is in progress.

Melbourne Cathedral.—A letter from Melbourne says,—"A gentleman here has just given 10,000*l.* towards the new cathedral, which I am sorry to say they are going to build in a hole, simply to be near the railway station."

Social Science Congress, Edinburgh.—The presidency of the Art Department has been accepted by Mr. W. B. Richmond, Slade Professor of Fine Art at Oxford.

The Tower of London.—We are glad to hear that in consequence of the many complaints of the delays in admission to the Tower which visitors have hitherto been subject to, it has been decided to abandon the system of visiting by batches of twenties, and to throw the rooms open as in other museums. The "beefeaters" will no longer act as guides, but as custodians and sentries at various places throughout the building. We urged the desirability of the change long ago, and the proposition was backed up in our pages by the late Mr. Planché, who had the improvement of the Tower Armoury much at heart. It was stated by Mr. Childers, Secretary of State for War, in the House of Commons on Monday last, that the new arrangements are to be made experimentally. An improved catalogue is to be issued, and the various objects of interest will be labelled. A committee has been appointed to work out the details of the new plan, which will be brought into operation as soon as possible. The possibility of showing to visitors additional places of interest will be considered by the committee, and also the question of an additional free day.

Pictures at Bristol.—The Committee of the Bristol Fine Arts Academy have decided to establish an exhibition of pictures which shall be of a permanent character, and free to the public for four or five months in the year. The spring exhibition will be held as usual, but it has been decided to discontinue the loan exhibitions that have for several years past been opened in the autumn. The encouragement given to these latter has not been sufficient to induce the committee to again undertake the great labour and responsibility involved, and in place of exhibitions of this kind an attempt will be made to form a permanent art gallery. The works already in the possession of the Academy enable them to make a start in this direction, and it is hoped that in time many more valuable works will be presented, so that a gallery worthy of the city may be formed. Should the committee meet with the encouragement they hope for, a new gallery will be added to the building for the reception of the pictures.

Messrs. Child's New Banking House, Temple Bar.—On the 23rd inst, the new buildings, partly in Fleet-street and partly in the Strand, which have just been erected as the banking premises of Messrs. Child, consequent on the demolition of Temple Bar, were opened for business. The elevation, which is in Portland stone, carved and decorated, contains three lofty floors. The ground-floor portion, which is wholly appropriated as the banking-house, is elaborately rusticated, with a massive entrance at the east, or Fleet-street, end of the frontage, surmounted by a frieze and an overhanging cornice and balcony. Above this is an ornamentally-carved shield with the arms of the Marigold Tavern, which, according to tradition, stood upon the site some 300 years ago. At the west or Strand end of the frontage there is a corresponding balcony, with Messrs. Child's arms and crest. Mr. John Gibson is the architect, and Messrs. George Smith & Co., of Pimlico, are the builders.

Art-Metal Work.—Messrs. Hart, Son, Peard & Co., have issued many trade-books in their time, quite up to the demands of the day, and very useful to those who wished to know where to obtain what they wanted without the extra cost of fresh designs and isolated workmanship; but they have not before sent out anything so complete as that which they have just now issued under the title "Examples of Art-Metal Work for Ecclesiastical, Public, and Domestic Use." It is divided into six sections. Prices are given, and the designs, which are of very varied character, are so well classified, that articles or specimens of work needed can be found at once. For designers, too, the book is suggestively valuable, and enables them to know for about what cost the firm would produce what is proposed.

Victoria Docks.—An improved form of jetty, fitted with hydraulic cranes for discharging coals from steamers, is being erected at the Victoria Docks, for Messrs. W. Cory & Son, from the designs of Mr. Henry Adams, C.E., on the site of one of the old coal-berths recently burnt down. Another of the jetties is also to be extended and fitted with a fourth crane, in order that the large steamers now being built for the coal trade may be discharged in one tide. When this extension is completed, a steamer, with suitable hatchways, will be able to discharge 2,000 tons of coal in twelve hours.

St. Paul's, London.—Some time ago, on a survey being made by the cathedral architect (Mr. Penrose) it was discovered that a portion of the stonework in the upper part of one of the lofty fluted columns of the west portico at St. Paul's had given way. It was found that nearly one-half of the upper course of the column, immediately under the capital, and upwards of 3 ft. in length, had cracked and parted from the other portion, rendering the condition of the structure dangerous. Its removal was a ticklish piece of work, and has been accomplished successfully.

Destruction of Whitechapel Church by Fire.—We regret to learn, as we go to press, that the parish church of St. Mary, Whitechapel, was totally destroyed by fire on Thursday afternoon. The fire is believed to have originated in the organ-loft. The church was only rebuilt a few years ago, at a cost of about 70,000*l.*, from designs by Mr. Ernest C. Lee, now President of the Architectural Association.

Surveyorship, London and North-Western Railway.—Mr. F. Wood, of Rugby, has resigned the post of Surveyor to the London and North-Western Railway Company, which he has held for many years, and is succeeded by Mr. Charles Hull, of Liverpool.

Roof Varnish.—A varnish for roofs has been recently patented in Germany which is composed of 35 parts of clay slate, 30 parts mica slate, and 35 parts rosin, all finely powdered and heated with 50 parts of tar.—*Bay. Ind. und Gewerbeblatt.*

TENDERS

For the erection of residence, at Hayes Common, Kent, for Mr. De Zoete. Mr. Somers Clarke, architect:—

Nightingale	£5,387	0	0
Coney	5,331	0	0
Hull	5,274	0	0
Manley	5,139	0	0
Dove, Brothers	4,295	0	0
Gammon	4,199	0	0
Funnett (accepted)	4,110	0	0

For alterations and new stables, at St. James's Tavern, Westminster, for Mr. J. Smith. Quantities not supplied. Mr. H. J. Newton, architect:—

Anley	£2,575	0	0
Goddon	2,493	0	0
Wagner	2,359	0	0
Beale	2,333	0	0
Gritten	2,327	0	0
Lamble (accepted)	2,257	0	0

For pewterer's work, at same:—

Paddon	£146	0	0
Angliss	145	17	6
Richards	140	0	0
Hellings	132	0	0
Warne	129	0	0
Heath	125	0	0
Sanders (accepted)	110	7	0

For Patrick Stead Hospital. Mr. Henry Hall, architect. Quantities supplied by Mr. S. J. Thacker:—

Watson	£5,630	0	0
Garrud	5,483	0	0
Garlick	5,377	0	0
H. B. Smith	5,182	0	0
Girling	5,175	0	0
Whiting	5,151	0	0
Harper	5,030	0	0
Hindes	4,974	0	0
Saunders & Son	4,890	0	0
Everett	4,840	0	0
Holsworth & Son	4,800	0	0
Grimwood	4,787	0	0
Mason & Son	4,780	0	0
Jones & Co.	4,779	0	0
Calver, Brothers	4,767	6	0
R. S. Smith	4,700	0	0
Ludkin & Son	4,595	0	0
Pells & Son	4,592	0	0
Gibbs & Son	4,532	0	0
Gibbons	4,530	0	0
Morris	4,480	0	0
Howard & Son	4,430	0	0

For six warehouses, Jewin-street and Edmond's-place. Messrs. Ford & Hesketh, architects:—

Adamson & Sons	£17,593	0	0
Scrivener & Co.	17,143	0	0
Brass	16,977	0	0
Hart	16,645	0	0
Peto, Brothers	16,609	0	0
Crabb	16,270	0	0
Lawrence	15,565	0	0
Mark	15,382	0	0
Conder	15,339	0	0
Ashby, Brothers (accepted)	15,256	0	0

For rebuilding the Ship, Wormwood-street, City. Messrs. Bird & Walters, architects. Quantities supplied:—

Bridgeman	£2,338	0	0
Williams & Son	2,166	0	0
Temple & Foster	2,168	0	0
Mark	2,160	0	0
Godden	2,145	0	0
Braid & Co.	2,105	0	0
Anley	1,967	0	0
P. Anley	1,940	0	0
Jackson & Todd	1,808	0	0

For the erection of an addition to the Royal Laundry, Culmore-road, Peckham. Mr. Geo. Sparrow Harrison, architect:—

Bird & Co.	£999	0	0

For alterations to the General Canrobert, for Messrs. Homfray & Co. Mr. Edward Clark, architect. Quantities supplied:—

Eary	£1,682	0	0
Smith	1,561	0	0
Rogers	1,558	0	0
Trayte	1,540	0	0

For alterations for Young Men's Christian Association, No. 168, Aldersgate-street. Mr. A. R. Pite, architect:—

Falkner	£964	0	0
Staines & Son	844	0	0
Hayward & Son	830	0	0

For alterations at the Queen Victoria, Falcon-lane, Battersea, for Mrs. Maria Richards. Mr. Edward Clark, architect. Quantities supplied:—

Wilkins	£705	0	0
Rogers	700	0	0
Mitchell & Co.	683	0	0
King	620	0	0
White	601	0	0
Trayte	599	18	9

For the erection of two detached villa residences, at Middle-lane, Crouch-end, for Mr. L. Koller. Mr. John Farrer, architect:—

Grover	£4,573	0	0
MacFarlane & Son	4,405	0	0
Smith	4,396	0	0
Lawrence	4,379	0	0
Conder	4,270	0	0
Mattock, Brothers	4,233	0	0
King	4,198	0	0
Harper	3,708	0	0

For the erection of a villa residence, to be called Ivy Dale, at Cliftonville, Northampton, for Mr. W. Coulson. Mr. S. J. Newman, architect. Quantities supplied by Messrs. R. L. Curtis & Sons:—

Edley & Wade	£2,989	0	0
Cosford	2,953	0	0
Bassford	2,851	0	0
Barlow	2,786	0	0
Smith, Brothers	2,657	0	0
Woodford	2,630	0	0
Ireson	2,629	0	0
Emery	2,600	0	0
Taylor & Grist	2,570	0	0
Green, Brothers	2,479	0	0
Heap	2,449	0	0

Tenders, with schedule of prices combined, for constructing new roads and sewers, to form "The Avenue," on the new Cliftonville Estate, Northampton, for Mr. P. Phipps. Mr. Matthew Holding, architect. Quantities supplied:—

Chapman	£1,243	15	11
Finnegan	1,089	18	6
Ireson	1,035	10	9
Martin	914	0	0
Wingrove	886	11	6
Hames	782	2	11
Barlow	761	10	9

For alterations at the London Alehouse, Exeter, for Mr. William Davie. Mr. C. Pinn, architect. Quantities not supplied:—

Westlake	£275	10	0
James & Inch	265	0	0
White (accepted)	250	0	0

For converting two houses into one, at Exeter, for Mr. W. Snow. Mr. C. Pinn, architect. Quantities not supplied:—

Westlake	£300	0	0
Brook	215	0	0
James & Inch (accepted)	147	0	0

For two hydraulic lifts, tank, pipes, and other apparatus, for the Royal Hotel, Blackfriars. Mr. E. A. Grüning, architect. Mr. F. Colyer, engineer:—

Contract No. 1.—Wells.
Baker & Sons (accepted)

Contract No. 2.—Lifts, &c.
Simpson & Co. (accepted).

Contract No. 3.—Heating apparatus.
Siehe, Gorman, & Co. (accepted).

For additions to the Palace Brewery, Anerley-road, Crystal Palace, for Messrs. Edie, Brothers. Mr. C. J. C. Pawley, architect:—

Flynn & Sons, Anerley	£350	0	0
Smith & Sons, South Norwood	260	0	0
Fox, Anerley	250	10	0
Hollidge & Stuart, South Norwood *	233	0	0

* Accepted.

For painting and decorating house at Highgate, for the governors of the Cholmley School. Mr. Herbert Winstanley, architect;—

Phillips & Son	£334	0	0
Harrison & Wood	294	0	0
Wheeler	288	0	0

For new roads, on the estate of the Right Hon. the Earl of Yarborough, at Great Grimsby. Messrs. Maughan & Curson, surveyors:—

Brown (accepted)	£836	9	2

In the list of tenders for Colchester drainage, for "Wickerson" read C. Dickinson.

TO CORRESPONDENTS.

Pitch-pine (several letters on this subject are unavoidably postponed).—F. C.—C. D.—G. C.—H. H.—T. D., jun.—J. F.—Dr. D.—J. P. B.—M. & C.—D. & Co.—H. A.—H. H.—E. C. L.—C. J. C. P.—C. D.—G. W. N.—Dr. S.—W. H. P.—E. L. B—H. B—W. H. S. S.—H. L. S.—O. M. H.—G. S. H—J. C. & Sons.—W. D. O.—H. & W.—A. W.—W. B. (cancelled).—W. Y. B. (next week).—J. D. (next week).—F. C. (next week).—W. B. F. (next week)—W. & Co. (next week. Send some particulars *of* cost).—E. P. (must apply to Mr. Hobbs).—H. M. (the Bills containing the clause in question did not pass).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

NOTICE TO SUBSCRIBERS.

THE INDEX and TITLE-PAGE for Volume xxxviii. (January to June, 1880) was given as a Supplement with our Number for July 10.

A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office.

CLOTH-CASES for binding the Numbers are now ready, price 2s. 6d. each; also

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THE THIRTY-EIGHTH VOLUME of "The Builder" (bound) is now ready, price Twelve Shillings and Sixpence.

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The Builder.

Vol. XXXIX. No. 1961. SATURDAY, SEPTEMBER 4, 1880.

ILLUSTRATIONS.

CONTENTS.

The Late Mr. Benjamin Ferrey, Architect.

BENJAMIN FERREY was born at Christchurch, Hants, on April 1st, 1810, the youngest son of Mr. Benjamin Ferrey, of that town. They were a French Huguenot family, their ancestors having come over to England at the time of the Revocation of the Edict of Nantes, some 200 years since. When quite a little lad, Benjamin Ferrey evinced a taste for drawing, and loved old buildings. Close to his own home he could see a glorious example,—the grand old Priory Church. The sketches he made at the age of thirteen of the interior are very correct in their perspective, and good in touch for one so young. It may as well be said at once that Ferrey eventually became one of the best draughtsmen of his day, being, moreover, very accurate and painstaking. In his two months' tour in 1833, through France, Italy, Switzerland, and Germany, he made many sketches (some of them lithographed subsequently for the Architectural Publication Society). All through his life he was very fond of drawing. Benjamin Ferrey received his education at the Grammar-School at Wimborne, Dorset, where his genial disposition made him a great favourite with the head master (the Rev. James Mayo) and his schoolfellows. He astonished them at times by drawing for hours in the Minster, and the boys were always glad to have a sketch by little Benjamin.

The father wisely resolved to follow the bent of his son's inclination, and placed him with Augustus Pugin—himself, it will be remembered, a French Protestant, who had fled over to England on account of religious persecution. Mr. Pugin had not practised much as an architect, but was a clever draughtsman, and possessed a good knowledge of architecture. He was in the habit of making long tours, and diligently drawing and measuring mediæval buildings, accompanied by several pupils, who assisted him.* In this manner many parts of England and Normandy were visited.

The following letter, addressed later in life to the conductor of this journal, gives some interesting information concerning Ferry's trip to Normandy. It was written with reference to the Lady Chapel at Caudbec:—

"I think I can afford you some indisputable information respecting the construction of the great pendant of this chapel, which may set doubts at rest. I, with Mr. Talbot Bury and others of Mr. Augustus Pugin's pupils, many years ago accompanied that gentleman and assisted him by sketching and measuring the various portions of buildings published by him in his work entitled 'Specimens of the Architectural Antiquities of Normandy.'

I have a most vivid recollection of the intense interest which the elder Pugin felt in the construction of the remarkable pendant of this chapel. I can answer for it that there is nothing in his illustration of it, as shown in Plate 64, but which is perfectly correct. An opening being made through the tufa of the groining at the top, some of us got in, and no little trouble was it to get out again: but with a light there was no difficulty in ascertaining the size of the voussoirs resting upon the huge keystone of the groining,

* Most of these distinguished themselves in after-life, not as architects, but otherwise. For example, the late E. W. Cooke, R.A.; the late Joseph Nash, the painter; the late Charles Mathews, the actor. Mr. F. T. Dollman was another pupil who did not forsake architecture, and whose excellent architectural works are well known and appreciated. Another pupil who still survives in the active exercise of his profession is Mr. R. B. Grantham, the eminent C.E.

a monolith of upwards of 17 ft. long. There may probably be some conjecture as to the sizes of the voussoirs built into the external angular buttresses, but in all probability they would correspond with those visible to the eye.

The striking feature, however, of the Lady-chapel, both in execution and effect, is the surprising pendant; its appearance looks quite perilous, and until Pugin with his wonted energy had a hole made and found out the exact nature of the construction, all sorts of notions were prevalent, many believing that iron suspension rods, &c., were employed.

A careful description of the construction ought to have accompanied the plan and sections. Britton, who never saw this chapel, or any of the buildings he describes, could only give meagre accounts, wholly insufficient to exhaust the constructional interest which attaches to them. This was through no fault, but an unexpected illness, which prevented his accompanying Pugin."

In Ferrey's "Recollections" of A. Welby Pugin are many interesting anecdotes of Mr. as well as of Mrs. Pugin. The latter was more severe than the former, and kept the youths in good order. Mr. Ferrey had a keen sense of humour, and in his graphic, animated manner (he was a good mimic) could recount some of the rather severe practical jokes which some of the young men at times used to play on benevolent old Mr. Pugin.

Mr. Pugin, instead of taking all credit to himself for the assistance his pupils rendered him, was in the habit of allowing each one who made the drawing for the lithographer to fix his name, as "So-and-so *delt.*," with A. Pugin *direxit.* in the other corner. In Pugin's "Ornamental Bargeboards," and in his "Gothic Ornaments," a large proportion bear the inscription, "Benj. Ferrey *delt.*" in one corner. There is no doubt that this practice in measuring and closely examining old buildings was of great service in after-years to Ferrey and his fellow-pupils. The knowledge of detail and the good eye for proportion which always distinguished him may be said to have been partly the outcome of his travels with the elder Pugin.

After studying several years in this way, Mr. Ferrey entered the office of Mr. Wilkins for a short time as assistant, and worked at the detail drawings for the new National Gallery. To this association, perhaps, may be attributed the fact that Mr. Ferrey, though originally brought up in a Gothic school, and known as one of the early workers in the Gothic Revival, was never bigoted as regards the Classic styles, with which his pencil was always quite familiar. He never took the strong line that Sir Gilbert Scott did in that respect, though he undoubtedly preferred Mediæval architecture, with which he was more at home.

In 1834 Mr. Ferrey brought out "Antiquities of the Priory Church of Christchurch, Hants," the perspective and measured drawings of which he had been engaged upon for some time. In the literary portion of this work he enlisted the services of Wm. Brayley, and fortunately secured able engravers for the plates. About this time Mr. Ferrey commenced practice in Great Russell-street, Bloomsbury (on the site now occupied by the British Museum). He was soon commissioned by the late Sir George Gervis, Bart., to lay out his estate at Bournemouth (then a place consisting of but a few houses in the midst of fine woods and heath). Though Sir George Gervis, in a prophetic spirit, said that one day Bournemouth would be a great town, few people at that period believed it would develop as it has done. The Bath Hotel and several rows of villas, among them Westover Villas, on the east side of the Bourne, were designed and built under Mr. Ferrey's superintendence. So keenly did he enter into the scheme that he took a house at Bournemouth, and resided for some time there.

In 1836 Mr. Ferrey married Ann, the daughter of Mr. William Lucas, of Stapleton Hall, Stroud-green, Hornsey. One of Mr. Ferrey's first clients was the Rev. Thomas Thurlow, nephew of the great Lord Chancellor Thurlow, of Baynard's Park, near Cranleigh, Surrey. He made extensive additions to his old Tudor mansion. In 1839 he carried out a portion of Dorset County Hospital, Dorchester. In 1841 Mr. Ferrey was appointed Hon. Diocesan Architect, Bath and Wells, a post he held up to the time of his death. His connection with this diocese was seemingly quite fortuitous, as he had no relatives or particular interest in the county, but was introduced there by his friend the late Archdeacon Brymer, Rector of Charlton Mackerel, Somerset. He also obtained work in Dorsetshire through his friend the late Mr. C. Acland Troyte,* a country gentleman and a member of the good old Devonshire family of Acland.

In 1842 the subject of our notice was employed as the architect to superintend the restoration of the nave and transepts, and of the Lady chapel, Wells Cathedral. While this work was in progress Mr. Ferrey took one of the canon's houses for several months. He subsequently carried out for Bishop Bagot extensive additions and restorations to the Palace at Wells (and in later years for Lord Auckland and succeeding bishops, including Lord Arthur Hervey, the present prelate), as well as the restoration of the beautiful chapel there. The additional story to the principal front of the palace is a feature often thought by strangers to be a part of the original design.

Mr. Ferrey was one of the original members of the Architectural Society, and in 1839 became a Fellow of the Institute of Architects (he was one of its oldest members). He afterwards served on the Council and was twice a vice-president.

In the competition for the Houses of Parliament, Mr. Ferrey acted as honorary secretary to the Committee of Architects, and was himself a competitor. In 1843 Mr. Ferrey designed the costly Church of St. James, Morpeth (as well as schools), in the Norman style, a building well thought of in the North of England as a successful adaptation of the grander features of that style.

In 1845 Mr. Ferrey, then considered one of the rising church architects of the day, was commissioned by the Baroness (then Miss) Burdett Coutts to design the Church of St. Stephen, Rochester-row, Westminster. It was a poor neighbourhood, and a church was much wanted there. Handsome schools and a vicarage were also erected about the same time; the whole of these works, carried out at great cost, were due to the munificence of Lady Burdett Coutts.

At this period (about 1847) he had many works in hand, as this note to us will show:—

"As I think you said you would be always glad to have hints of what I am doing in the country, let me say:—

1. I am building a new Governor's house to the Oxford Gaol. It has been designed to form an angular tower in keeping with the rest of the structure.

2. I have reported upon the condition of the fine abbey church at Sherborne, Dorset, in reference to removal of all the existing pewing, and, indeed, the general restoration of the interior.

The noblemen and gentlemen in the neighbourhood take great interest in the work.

3. I have just completed some extensive alterations to the Palace at Cuddesden, for the Bishop of Oxford,—suites of bedrooms, new offices, &c.

An entirely new Decorated chapel, fitted up with good oak dressings and roof; the east window presented by Prince Albert, beautiful glass by Willement; the other windows, presented by the Archbishop of York and others, are by Werrington, Wailes, and O'Connor.

4. Several additions are now going on at the Palace at Wells. In this instance, as above, the Ecclesiastical Commissioners find the money.

I have mentioned these as being *public works.*

In the course of this month [October] there will be three of my churches consecrated,—St. Mary Magdalene, Barnstaple; Melsland Church; St. James, Norfolk.

The Town-hall at Dorchester, which was noticed some time since, is my work."

From 1846 to 1853 Mr. Ferrey principally resided at the Grove, Fair Mill, about a mile from Henley-on-Thames, though still having his offices in town. He always considered this one of the happiest periods in his life, as the society in the neighbourhood was very congenial to him.

Mr. Ferrey had now got into the full swing of practice, and among other works (a list of which is given below) he carried out Penn Wood Church; St. Peter's, Elsted, Hants; Diocesan Training Schools, Saltley, near Birmingham; St. John's, Eton; Buckland St. Mary Church (this is generally considered one of the most successful of his churches, though not the largest); Esher Church; Wynnstay (Sir Watkin Wynn); Bulstrode (for the Duke of Somerset). In 1861 Mr. Ferrey published his "Recollections of A. Welby Pugin," a work which received very favourable notice from the Press, and was read by the public with great interest. He had been engaged on the task for some time, and had long entertained the idea of writing his "Recollections" of this eminent man. About 1870 Mr. Ferrey prepared designs for a proposed cathedral, Victoria, British Columbia, which will probably be carried out before long. In this year he was the recipient of the Royal gold medal, as recommended by the Institute. The last work of Mr. Ferrey was the mansion for the Duke of Connaught, at Bagshot Park, which was commenced early in the spring of 1877. In October of that year he had a slight attack of paralysis, since which he has been in delicate health, though up to the commencement of the present year he had been able to spend three or four weeks occasionally in the neighbourhood of Bagshot, so as to superintend the work, as well as to have the benefit of pure bracing air. Within the last few months, though, mercifully, there was no return of paralysis, weak action of the heart rapidly exhibited itself, with other complications, and at half-past two o'clock on Sunday afternoon, August 22nd, after having lingered several days, he expired quite peacefully and painlessly.

Mr. Ferrey took a great deal of interest in the formation of the Royal Architectural Museum. He also has contributed papers to the Institute of Architects. He was one of the consulting architects of the Incorporated Church Building Society. We have already spoken of him as an architectural draughtsman. He was equally skilful at landscape, and in water-colours could use his brush with much skill. In his holidays he was wont to delight in the latter as a relaxation after his architectural work. He was also extremely fond of music, particularly church music, and had a pleasing baritone voice. Mr. Ferrey, about twenty years or so since, invented and patented a mode of stamping plaster which was inexpensive and very effective. He adopted this process at Macclean Church, near Ampthill; All Saints', Blackheath; Streatham Parish Church (in the chancel), and at other churches.

Mr. Ferrey has had many pupils, several of whom have since become well-known architects.

In 1863 he was elected a fellow of the Society of Antiquaries, and was always proud of the title.

A letter now before us, written early in his career, and which may be usefully printed, refers to a state of things in the profession which is less commonly found now:—

"As a mere matter of fact, you can mention whenever it may suit, that large additions and the erection of a new Episcopal chapel are now going forward under me for the Bishop of Oxford, at the Palace, Cuddesden, near Wheatley, Oxford.

My object, however, in this communication is to suggest whether you may not do a great service to the public and the profession by a temperate statement in one of your *leaders* of the *inconvenience and disadvantages* arising from the union of *architect and builder* in the same person. I could give you many illustrations which I have met with in the course of my own practice; and I could, if I had time to write a long article, point out the many evils of the system. At this time I have three *country* architects who have tendered, and are executing contracts as builders under me. Their position is most anomalous, viz., they proclaim themselves architects and builders, and I have had opportunities of detecting their malpractices in cases where they have acted in the twofold capacity. Indeed, it stands to reason that one of the principal functions of the architect must be sunk when he becomes the tradesman. As to checking expenditure, &c., it is absurd. I believe that the intelligent public are beginning to see this, but I know the influence of the *Builder* is very great; I see it upon every gentleman's table in the country, and they would at once see the force of the arguments which might be advanced, if you think it would be consistent to say something upon the subject. In the case of a respectable builder, I have no hesitation in permitting him to trace any drawings he pleases, because they are essential to him in the performance of his duty; but it is too bad that the architect and builder should take his copies for carrying work into execution, and then, as *architect* only, at some subsequent day, make use of others' designs.

I do not make these remarks in disparagement of the builder. I respect him in his position as much as anybody, but upon principle I feel annoyed when I see him *acting two parts.* A man should be either a builder or an architect, but the joint pursuits is highly objectionable. The practical part and the occupation of building is an ample pursuit for one man, without his meddling with the artistical and theoretical branch. It is however, unnecessary that I should say more upon this point. I am led to advert to it now because I have found it necessary to refuse the *tender* of a man who calls himself an *architect.* I feel that I cannot exercise proper control, and am fettered when dealing with such a person.

I am confident that the *Builder* may advocate right principles without any fear of losing support from a class, and indeed all the respectable builders with whom I am acquainted deprecate strongly the course I have adverted to. They rightly believe that it is for the benefit of the employers themselves that they are under the superintendence of an architect, as relieving them from *much responsibility*, independent of the many other objections that could be named.

P.S.—I should be glad on some opportunity to give you a few facts bearing on the above topic; I am sure that a great saving is effected by the employment of an architect; some employers fancy they save five per cent. by dispensing with a professional man,—this is a great delusion."

Benjamin Ferrey, with his pleasant countenance and winning manners, gained many clients, and in most cases his clients became afterwards his personal friends. With young architects he was always very popular, and many could bear testimony to his good nature and willingness to help them in any difficulty by the aid of his experience. In domestic life his evenness of temper was characteristic. In December, 1872, Mr. Ferrey married Emily, daughter of the late Mr. William Hopkinson, who survives him. By his first wife he leaves three children, a son and two daughters. The son, Edmund Benjamin, who has been in practice for about ten years, jointly with his father, and on his own account, has taken the prin-

* Whose name is well known as author of several of the "Hymns, Ancient and Modern."

cipal part in the business since Mr. Ferrey's illness in 1877, and promises to be an efficient successor. Mr. Ferrey was buried in the same grave as his first wife at Highgate Cemetery, on August 27th, the funeral, in accordance with the wish of the family, being kept private.

List of the principal works carried out by Mr. Benjamin Ferrey since the year 1834 (in the later ones his son was associated with him) :—

Mansions.—Bagshot Park (Duke of Connaught), Wynnstay (Sir W. W. Wynn, bart.), Bulstrode (Duke of Somerset), Huntsham Court, Devon (Mr. C. A. W. Troyte), Datchet House (Mr. W. Good); Bude Haven House (Mr. Arthur Mills); Streatham (Mrs. Hamilton); Park Side, Wimbledon (Mr. W. Williams).

Mansions (Alterations and Additions). — Luton Hoo (Marquis of Bute); Baynard's Park, Horsham (Rev. Thomas Thurlow); Brogyntyn, Salop (Lord Harlech); Bridehead, Dorchester (Mr. Robert Williams); Bishop's Palace, Wells (successively for Bishop Bagot, Lord Auckland, and the present bishop, Lord Arthur Hervey); Brandon Lodge (Lady Beresford); Cefn Park, North Wales (Sir Roger Palmer, bart.); Putney Heath (Mr. R. Williams); Fitzroy Farm, Highgate (Earl of Dufferin); Killadeagh Castle, Ireland (Earl of Dufferin); Frampton Court, Dorchester (Mr. R. B. Sheridan); North Aston, Oxon (Mr. W. H. Foster-Melliar); Hatch Park (Mr. W. H. P. Gore-Langton, M.P.); Knowle, Surrey (Sir William Hanham); Herbert, Hon. Sidney; Penlarth House, North Wales (Mr. W. W. E. Wynn); Poltimore Park (Lord Poltimore); Park Hill, Henley-on-Thames (Mr. Rhodes); Riby Grove, Lincolnshire (Colonel Tomline).

Public Buildings, &c.—Saltley Training Schools, near Birmingham; Ascot Grand Stand (dining-room, booking offices, &c.); Cambridge Mausoleum, Kew-green; Royal Cambridge Asylum, Kingston-on-Thames (commenced by the late Mr. Allom); Dorset County Hospital and Chapel, Dorchester; Schools, Vicarages, Railway Stations, on Lord Dufferin's Estate, Ireland; Almshouses, Kirtling, Oxon; Diocesan Schools Oxford; St. John's Foundation School, Leatherhead, and Chapel (jointly with Mr. J. H. Good, architect); Luton Town-hall; Grammar School, Henley-on-Thames; Shepton Mallet Almshouses, Somerset; Almshouses, Dorking; Town-hall, Dorchester.

Schools.—Beaulam; St. Mary's, Battersea (Wandsworth-common); Buckland Newton, Dorset; Bala, North Wales; Ceddington; Linslade; Chetwynd, Salop; Cuckfield, Sussex; Llanuwchyn, North Wales; Darshill, Somerset; Dowlish Wake, Somerset; Geddington; Henley-on-Thames; Lower Slaughter, Gloucestershire; Llanfachreth, Merioneth; St. Mark's, St. John's-wood (jointly with Mr. J. H. Good, architect); Netherton, Northumberland; Overton, Oxon; Otterton, Devon; Romsey, Hants; Sidlesham, Sussex; St. Stephen's, Rochester-row, Westminster; Oakhill, Somerset; Taunton (St. Mary Magdalene); Upper Tooting, Surrey; Esher, Surrey; Westbourne, Sussex; Wargrave, Berks; St. John's, Angell Town, Brixton; Morpeth, Northumberland; Great Bedwyn, Wilts.

Parsonages.—St. John's, Angell Town, Brixton; Compton Vallence (jointly with Mr. Crickmay, architect), Grasley; Cuttislock, Dorset; Charlton Mackerel; St. Paul's, Dorking; St. John's, Eton; Elsfield, Somerset; Hounsdown, Hants; Henley-on-Thames; Kirtling, Oxon; Keresley and Coundon Vicarages; Little Milton, Oxon; Mentmore, Bucks; Maiden Newton, Dorset; Melrose, Scotland; New Shoreham; Nuthurst, Sussex; Overton; Pishill, Oxon; Penn-street, Bucks; Romsey, Hants; Stanton, Wilts; St. Stephen's, Rochester-row, Westminster; Stanford; Lower Tooting; Tarrant Hinton, Dorset; Wheatley, Oxon; Warkton, Northants.

New Churches.—Shepherdswell, Kent; Brighton, St. Ann's; Coldharbour; Ascot-heath; All Saints, Blackheath; Ashurst, Sussex; Burton, Hants; Brightwell; Barcombe, Sussex; St. John's, Brixton; Brockhamgreen, Sussex; Bengeo, Herts; Birlingham, Worcestershire; Bala, North Wales; Buckland St. Mary, Somerset; Christ Church, South Banbury; Cefn, North Wales; Christ Church, Clapham; Christ Church, St. Giles's; Christ Church, Kensington; Christchurch Cemetery Chapels, Hants; Chetwynd, Salop; Dogmersfield, Hants; St. Mark's, Old-street, London; St. Paul's, Dorking; St. John's, Eton; Esher, Surrey; Christ Church, Eastbourne; Cemetery Chapels, Eastbourne; Faulk-green, Salop; Guernsey; Hillingdon Cemetery Chapels, Middlesex; Hale, near Farnham; Hounsdowe, Hants; Holdenhurst, Hants; Harpsden, Oxon; Kilgerran, Pembrokeshire; Lower Slaughter, Gloucestershire; Linslade, Herts; Llanfachreth, Merioneth; Llangedwyn, North Wales; Little Briddy, Dorset; West Lydford, East Lydford, Somerset; Lufton, Somerset; Episcopal Church, Moscow; Melplash, Dorset; St. John's, Morpeth; Otterton Devon; Pett, Sussex; Penn-street, Bucks; Holy Trinity, Roehampton; Slinfold, Sussex; Sandbeck Private Chapel Yorkshire (Earl of Scarborough); Sambrook, Salop; Immanuel Ch., Streatham-common; St. Stephen's, Rochester-row, Westminster; Volster, Somerset; Whitchurch, Hants; West Hatch, Somerset.

Church Restorations and Additions.—Wells Cathedral: nave and transepts and lady-chapel, 1842; west front and towers, 1870-74; St. Mary Magdalene, Taunton (tower rebuilt—G. G. Scott and B. Ferrey, joint architects); Christchurch Priory Church, Hants; Ackworth, Yorkshire; Abbotsbury, Dorset; Binfield, Berks; Brislington, Somerset; Babcary, Somerset; Barkway, Herts; Braisgrove, Hants; East Coker, Somerset; St. Lawrence, New Brentford; Chipstable, Somerset; Chobham, Surrey; Romsey Abbey (north transept, &c.); Cookham, Berks; Castle Cary, Somerset; Craich, Derbyshire; Corwen, North Wales; Corston, Somerset; Chiselhurst, Kent; Charlton Mackerel, Somerset; Down Ampney, Gloucestershire; Dowlish Wake, Somerset; Eling, Hants; Enlish Episcop, Somerset; Enmore, Somerset; Trinity Church, Eastbourne; Frampton, Dorset; St. George's, Hanover-square; Highclife, Hants; Henley-on-Thames (parish church); Huxham, Devon; Isle Abbot (rebuilding of tower), Somerset; Keresley, Staffordshire; Kelston, Kingswood, Hants; Limington, Somerset; Llanfair, North Wales; Langford Budville, Somerset; Long Ashton, Somerset; Martock, Somerset; Meifodd, Merioneth; Merriot, Somerset; Merton, Surrey; Maulden, Beds; Ruabon, Denbighshire; Sotherton, Suffolk; Scropton, Derbyshire; Southbourne; Stamfordham, Northumberland; Streatham (parish church), Sopley, Hants; Sandymount, Ireland; Crom Church, Ireland; Tyneham, Dorset; Thames Ditton, Surrey; Upton, Bucks; Up-Ottery, Devon; Wichnor, Staffordshire; Westbourne, Sussex; Warmington, Northants (chancel), Wingham, Kent; Wrexham, North Wales; Wanstrow, Somerset; Ystrydgynlais, South Wales.*

HEALTHY DWELLINGS.

THE book published under this title† by Captain Galton seems calculated to fill a special place in the literature of the subject. It is not a book giving details and diagrams of methods of drainage, trapping, &c.; it is one in which the principles to be considered, and the best methods to be employed in regard to the whole subject of the sanitary conditions of dwellings, are generally treated of in one volume and in relation to one another, giving a kind of *coup d'œil* of the subject of sanitation. While in other practical treatises we have the subjects of drainage, of water supply, of ventilation, &c., separately gone into and illustrated in detail, we have here the outlines of all these various branches of the subject considered in relation to each other, and within the compass of a comparatively small volume.

Practical sanitary science, says the author in his preface, is embodied in the words "pure air, pure water," and these include a pure subsoil. This latter is, therefore, to be regarded as the basis of the whole, and receives the first consideration in a chapter on the conditions which regulate the healthiness of a site. There is a great deal of information collected in this chapter; some of it of course is familiar to everyone who has paid any attention to the subject, some of it may be new to a good many readers, even among those who are not unacqnainted with sanitary matters. This is followed by a chapter on the effect of soils and local conditions on the healthiness of site. The author commences by quoting Dr. Parkes's scale of relative healthiness of various classes of site; "primitive rocks, clay slate, and millstone grit," standing highest, and marshy land lowest. But he is careful to point out that the advantage of a naturally healthy site may be all thrown away and become practically non-existent. "During the first visitation of cholera, one of the places which suffered most severely, owing to its filthy local conditions, was Megavissey, on the granite formation of Cornwall." This fact as to the influence of the habits of a population on the prevalence of an epidemic, is, of course, almost proverbial now. Another example given is, however, more out of the way of ordinary experience. This is the case of the erection of a military sanitorium on the granite peninsula of Kowloon, in China, which seemed to possess every requisite for health in its geological formation and its free exposure to winds; yet the troops on being moved into the huts there suffered severely from fever. "This arose from the disturbance in a tropical climate of the surface soil impregnated with decaying organic matter. Until soil of that nature has been opened and oxygenised it is in the highest degree deleterious." For similar reasons the removal of brushwood in the vicinity of a camp, though highly desirable in the long-run, has been found to cause fever in the first instance, owing to the disturbance of decaying organic matter. In this and some other points in the book, Captain Galton's experience as a military engineer comes in usefully, and leads to the suggestion of conclusions from facts which are less within the range of the civil sanitary reformer's usual experience. An instance from the experience in the camp at Balaclava as to the relative healthiness of two methods of placing dwellings on a slope (illustrated by sections) is one of the most direct and practical examples that could have been brought forward of the influence of site and drainage on health, and one that can be understood and appreciated by every reader. Another point brought forward in this chapter, and which is certainly sometimes overlooked, is that a hilly site, even with good subsoil and exposed to breezes, is not necessarily healthy if the wind comes to it over a stretch of plain deficiently drained or otherwise unhealthy in its conditions. The elevation of the site does not raise it above the risk of contamination from the lower ground.

In the chapter on the healthy arrangement of buildings on a given area some interesting comparisons are drawn between the conditions of eastern and western towns, and the conditions of camp life as compared with life in built towns. The density of population in a camp area on active service is very greatly in excess of even the highest densities of population in London and other large towns, and this without either drainage or paving. The difficulty of preserving sanitary conditions under such a state of things when the camp is anything more than a merely temporary one, is, of course, obvious, and the conclusion that no one site should be occupied for more than a limited period is inevitable. The author considers that the continued occupation of Aldershott as a camp, on a porous soil, without paving or adequate drainage round the tents, is leading to a gradual deterioration of the health of the camp. He does not give the density of population of Aldershott Camp, but we presume it is considerably below that which is frequent in camping on active service. A good deal more attention, however, is now paid to the sanitary arrangement of camps than used to be the custom; and those who read General (then Colonel) Pearson's letter from his camp at Ekowe, detailing its arrangements to the Commander-in-chief, must have been struck by the practical care which was given by this prudent as well as spirited officer to the arrangement of his camp so as to get the best sanitary conditions attainable under unavoidably unfavourable circumstances, where a number of men were put in a comparatively small area without the possibility of change of place or change of air.*

The remarks on the purity of air in an occupied dwelling, and the various influences which may interfere with it, should be read with attention, and suggest a great deal. In London it is observed there are special conditions arising from the large amount of suspended organic matter in the air; an important factor in which is the ammonia given out by the manure from the enormous quantity of horses kept in London, and continually traversing the streets during the day. The author tells us that the mud from a paved street in London was found on analysis to contain nearly 90 per cent. of horses' dung, and that the mud on the new wood pavements consists of it almost entirely: but in a macadamised street there surely must be a very large amount of mere detritus arising from the grinding down of the material by the wheels. A fact in regard to wood pavement is brought up again which is of some interest now that this pavement has come again so much into use. It is that the wood pavement laid down in Regent-street about thirty years ago was taken up because it had become so saturated with ammonia that the emanations tarnished the plate in the silversmiths' shops. Captain Galton does not give the time which the paving had been down before arriving at this state. The same evil has been pointed out in America.

The chief difficulty of ventilation is summed up in the course of a chapter on cubic space and floor space, as consisting in the necessity of avoiding draughts. "Everyone approves of ventilation in theory; practically no one likes to perceive any movement of air." Thus a great deal of our ventilation in ordinary houses is really done accidentally, through crevices around doors and windows which theoretically in many cases should not exist, and which are not taken account of, but without which a sleeping room, under the usual conditions of closed windows and drawn curtains, would be unbearable, and positively injurious before morning. This is a point to be considered, we may observe, in reference to the employment of concrete houses with a finished and close outer skin, as described in a recent article in our columns. The experience there mentioned of one who had resided in such a house on an exposed situation, that a gale of wind might be blowing outside, and the inmates hardly be

* Of the above-mentioned works, the following have been illustrated in the volumes of the *Builder* for the years indicated, viz.:—Christ Church, Endell-street, Long-acre (1845, p. 114); St. Stephen's Church and Schools, Rochester-row, Westminster, built at the cost of the Baroness Burdett Coutts (1847, p. 359); interior of St. Stephen's Church, Westminster (1850. p. 516); St. John's Church, Angell-town, Brixton (1853, pp. 296-7); St. John's Schools, Canterbury-road, Brixton (1853, p. 303); St. Paul's Church and Parsonage, Dorking (1857, p. 755); Bulstrode, Buckinghamshire, one of the seats of the Duke of Somerset (1861, pp. 860 61); Pulpit, Church of St. Mary Magdalene, Taunton (1867. p. 688); mansion, Bagshot Park, Surrey, for H.R.H. the Duke of Connaught (1877, pp. 1198-1200).

† Observations on the Construction of Healthy Dwellings, namely, houses, hospitals, barracks, asylums, &c. By Douglas Galton, late Royal Engineers, C.B., &c., &c. London: Henry Froude; Oxford: Clarendon Press. 1880.

* Since these words were written, a letter has appeared in the *Times* giving an extract from the correspondence of a young officer serving in the present Afghanistan campaign, from which it appears that a camp was pitched on one occasion among the carcasses of dead and putrefying camels. We imagine, however, that this is quite an exceptional instance of carelessness or stupidity.

conscious of it, shows that there was very little of what we may term natural ventilation in such a building, and that with impervious wall-material and tight fitting of windows and doors comes the increased necessity for sufficient systematically-arranged ventilation.

Captain Galton's remarks on the details of ventilation are preceded, very logically, by the consideration of the movement of air, a subject which people who are speculating in ventilating processes would do well to consider more fully than they usually do. The author is not in favour of mechanical means of propulsion or expulsion of air, except in special cases, and points out that not unfrequently propulsion of air into an apartment in this way results in a strong current towards the nearest outlet, leaving stagnant portions of unchanged air in the sides and angles of the apartment. It is just as well that some one should draw attention to the fact that inlets for ventilation should be so arranged as to disperse the introduced current throughout the room as much as possible; for this self-evident fact (as one would think it) seems to be beside the comprehension even of some people who professedly deal in ventilation; and not long since we saw an arrangement for ventilating recommended on the ground (partly) that it sent the current as direct as possible from the inlet to the outlet. Captain Galton has no special panacea in ventilation to recommend; he examines and states briefly the principles on which ventilation should be based, and has various suggestions to make in regard to what may be called the common sense of the subject. The channels that admit air should, he observes, be short, direct, and accessible; "long channels collect dirt, and form a refuge for insects; but if it is necessary to make them long, they should be easily accessible for cleaning;" a very simple and obvious consideration, often entirely forgotten. This, we may observe, is one drawback to the upright tubes for ventilation which were re-invented a little while ago, and the idea of which was suddenly seized upon with such avidity and unanimity by a press and a public who seemed never to have heard of ventilation before, and imagined that this expedient was the be-all and the end-all of the science. The author is in favour of the Sherringham ventilator as a simple but effective form, capable of being used both as inlet and outlet. Another point on which he is particular is in regard to drawing the air for inlet ventilation from a quarter where it will be found as pure as possible: another simple consideration, often absurdly overlooked, people seeming to think that air is air, wherever it is drawn from, and that they may let impure air in as ventilation (because they cannot see its impurity), though they would not think of putting dirty water in their washhand basins or baths. One point which the author alludes to especially is that, as a general rule, air drawn from a high level is better than that drawn from near the ground; he instances the Houses of Parliament as a case in which the opportunity afforded for doing this by the lofty tower has been neglected. The House would be supplied with better air if it were drawn down from the top of the Victoria Tower, and the tower would be useful as well as beautiful. We may note that the French Chamber is so ventilated, the air being drawn down from a height of nearly 100 ft.

In the course of observations on warming we have the mention of the system experimented on at Lockport, U.S, by which 200 houses were heated by steam from a central boiler, the steam being arranged so as to be turned on or out off in each house and (if we understand right) in each apartment, as wanted, in the same manner as gas laid on to the houses. The idea of laying on heat in a town, just as gas and water are laid on, has not infrequently tempted the imagination of scientific socialists, but we fear that, however convenient in certain circumstances and over a limited area, the idea of a general application of heat in this way on a large scale is chimerical. It is beset by a difficulty of the same kind, in the first place, as that which at present affects the general use of electric light, viz., the diminution of power in proportion to the distance from the point of origination. Gas and water are gas and water still, and unchanged in their composition and utility, at any distance at which pipes can deliver them; but steam and hot water are parting with their heat all the time of their passage from the boiler to the point where it is to be utilised. But besides this, there is the difference in the way in which their heat can affect the apartment to which it is introduced, which must put such methods at a disadvantage in comparison with ordinary fuel and fire. Captain Galton puts this very plainly at the conclusion of his general observations on warming: "Where a room is heated by warmed air passed through flues into the room" (and this practically includes the case of pipes placed in hot-air chambers and sending warm air from them), "the air imparts its heat to the walls. The air is thus warmer than the walls. When a room is warmed by an open fire, on the other hand, the warming is effected by the radiant heat from the fire; the rays from the fire pass through the air without sensibly warming it, the radiant heat warms the walls and furniture, and these impart their heat to the air. Therefore the walls in this case are warmer than the air." The consequence is that the walls and furniture cannot, by conducted heat, be kept in cold weather as warm as is desirable without raising the air to a temperature both unpleasant and unhealthy. The author thinks, however, that in a room warmed by steam-pipes heated to a high temperature, the effect on the walls would tend to approximate in some degree to that produced by the open fire, in proportion as the temperature of the pipes is raised. We may suggest that the same result might be attained by the systematising of a plan which has once or twice been tried, namely by fire-clay lumps heated by a gas-flame. If the supply of every house in a town with heat from a common source, in the same way in which gas and water are supplied, be ever accomplished on a large scale, it would be more likely to be done through the medium of inflammable gas than by any other medium now known to us, but a supply from such a source would not be healthy unless the fumes of the gas could be kept out of the room. To make gas the means of heating some slow-conducting substance, through which heat would be imparted to the room while the gas-flame itself would be kept from all contact with the air of the room, seems an idea that offers more chance for the working of a system of heat supply than any other; and if the electric light be destined, as we believe, ultimately to supersede gas as a means of lighting, it may perhaps come to pass that coal-gas, superseded for this purpose, may turn out a valuable means of heating, and be thus utilised to even better purpose than it has been hitherto, and in such a way that its more disagreeable qualities may be kept out of sight. The bearing which such a system would have on the prevention of smoke is obvious.

But the method of warming a room affects also the working of its ventilating system, if it has any; or may even be said to produce a ventilating system where there is none. There is therefore the more advantage for general readers in a treatise in which the two subjects of warming and ventilation are considered almost simultaneously and in connection with each other. The difficulty with the open fire is that while it assists ventilation when in operation, the fire-place may, when not in use, entirely change its function, become an inlet instead of an outlet, and throw all the arrangements for ventilation out of gear. It is in respect of such a condition of things, again, that gas in connection with the heating apparatus might become so useful, being so easily regulated, in securing a sufficient heat at any required moment to create an up-draught for ventilation without producing more heat than is wanted. But this is by the way. In dealing with the open fire-grate while in operation the question is how best to produce and to radiate heat economically, to prevent smoke, and assist ventilation. The idea of feeding the ventilation of the room by air warmed in its passage into the room by contact with the fire-place is of course quite a common-place now, but the whole object is not accomplished so well or in so compact a manner in any invention that we know of as in Captain Galton's fireplace, figured in the plan, section, and elevation on page 126. The excellence of this fireplace is well known to those conversant with the subject, yet we believe it has come comparatively little into use, perhaps for the reason mentioned by its inventor—it has never been patented, and therefore manufacturers do not care to suggest its use. There is another reason, however, and a strong one, the impression (too much founded on fact) that it is scarcely possible so to cleanse the entering air in towns as to prevent it from soiling and spoiling the apartment. The principle (to mention it once again) is that of introducing air to a chamber at the back of the fire, where it is warmed by blocks of fire-clay, which form the sides of the chamber and the back and sides of the fireplace, and thus warmed, ascends a shaft, which delivers it into the room, as air-supply, near the ceiling, from whence it circulates through the room, and eventually comes to the grate to feed the fire, and go off up the smoke flue, or what may, for the most part of the time that the fire is burning, be called the hot-air or extraction flue, for the prevention of smoke is facilitated by the introduction of air through a slit in the back lining of the fireplace, so as to give an extra supply of air at the point of combustion, on much the same principle as the "split-bridge" in larger furnaces, which in one or another modification has proved the most effectual means of preventing smoke in such furnaces. This fireplace we take to be, for the combined purposes of heating, smoke prevention, and ventilation the best that has been invented. We looked with some curiosity to see what the author had to say about the functions of his fireplace when not in use, in regard to ventilation. From the passing suggestion that "the inlets for warmed air may be provided with valves, to be closed when the fireplace is wanted rather for ventilation than for warming," it is evidently calculated that when windows are open in warm weather the fire-place flue is to act as an outlet, as before. We should imagine the provision for a gas-jet at or in the chimney opening would be necessary to insure it thus acting. We will sum up, however, in the author's own words, the advantages which he claims for his grate, and all which we believe to be justly claimed:—

"1. That it ventilates the room.

2. That it maintains an equable temperature in all parts of the room, and prevents draught.

3. That the heat from radiation is thrown into the room better than from other grates.

4. That the fire-brick lining prevents the fire from going out, even when left untouched for a long time, and prevents the rapid changes of temperature which occur in rooms in cold weather from that cause.

5. That it economises fuel partly by making use of the spare heat, which otherwise would all pass up the chimney, and partly by ensuring by its construction a more complete combustion, and thereby diminishing smoke.

6. That it prevents smoky chimneys by the ample supply of warmed air to the room, and by the draught created in the neck of the chimney."

Clause 2 seems, by the way, to be sufficiently included in the terms of clause 4. In considering the ventilation of rooms without open fire-places, and in combination with a warm-air system, the author gives a great many useful and suggestive hints. In regard to theatres he draws attention (for which unfortunate actors will thank him) to the facilities which the necessarily large employment of light in connexion with the stage affords both for warming and ventilation, light being at present necessarily connected with heat, which on the stages of most theatres is probably not utilised at all either for warmth or ventilation; adequate ventilation of a theatre will, however, he thinks, be more satisfactory if some mechanical appliance be used to force in the fresh air as well as to remove the vitiated air. A good while since we published a translation of a complete plan proposed by a French architect for the treatment of theatre ventilation, in which the air was to be kept slightly in a state of compression in the house, so that all draughts (if any) on the opening of doors would be outward rather than inward, and the dangerous effect of draughts on people clad in evening dress, or even with better protection in the way of clothing, would be obviated. This was suggested as an extra and accompanying advantage in the employment of propulsion in theatres: another advantage, as recent experiments in the States seem to have decisively shown, is in the better acoustic properties of the house, or rather the marked assistance to its acoustic properties realised when the incoming current for ventilation is propelled from the stage towards the spectators. In the most costly and elaborate of theatres, the Paris Opera House, however, mechanical propulsion is not made use of; hot-water apparatus is used behind the stage, "on the assumption that this method does not dry the air so much" (a very gratuitous assumption, we should say, when the water has no connexion whatever with the air to be warmed, unless it was thought that aqueous vapour percolated through the substance of the heating pipes), "and the part of the house occu-

pied by the public is warmed by stoves, as being quicker in operation." In saying that it is warmed by stoves, Captain Galton of course means that the air is thus warmed in chambers before admission to the house. The description of the ventilation and warming in the Herbert Hospital is worth attention, as it seems to be very efficient, complete, and simple in working; but we can merely refer to it. One observation at the conclusion of the ventilation chapters should be noted:—"No system of ventilation or warming in a large building or establisbment can be satisfactorily conducted unless some person is charged with the duty of seeing that it is maintained at all times in effective action."

To say that "the laws regulating the movement of air should govern the form of buildings," is perhaps rather too round a statement, though the chapter on "the internal arrangement of buildings" recapitulates some points in which this is more of a logical sequence than many readers would suppose. To say that a building must be so planned that air may have free access to every part of it is of course a truism, though one which is not unfrequently forgotten. We have been frequently struck, for example, with the want of ventilation in the central staircase even of recently built and costly houses, especially among some of those numerous houses in flats which have come into use in the Pimlico district and elsewhere. Many of these are built with the stairs, from which all the various tenements open, closed by a fixed skylight at the top, so that in hot weather especially there seems not only an absolute stagnation of air in the upper stories of the staircase, but even an accumulation of fouled air which has risen to the top of the staircase shaft and has no exit; and it must be remembered that change and circulation of the strata of air are much less liable to go on spontaneously in a high narrow funnel like a staircase shaft than in a space of the proportions of an ordinary room. A point to which our author alludes, and which is not so familiar, is that fires frequently spread with greater rapidity than they otherwise would do in English houses through the facility afforded for currents of air to pass from one floor to another behind the boxing of windows, the battening on walls, &c. He urges that "the free passage of air should be stopped as far as possible between every room and the room under and over it, by means of some substance difficult of combustion." Among other means of checking the spread of combustion he recommends especially a course of fire-clay slabs below each floor level projecting 6 in. into the rooms and receiving the ends of the beams carrying the floor above; the under side of the fireclay (or terra-cotta) being moulded and occupying the place of the sham plaster cornice which now forms the usual connexion between the wall and the ceiling of a room. Captain Galton apparently contemplates only double-framed floors, with beams carrying joists above and ceiling joists below, with an air space between. This is all very good, no doubt, but it must be remembered that this means a great deal of expense, and it could hardly be carried out in buildings where economy in both money and space must necessarily be consulted. In the course of the remarks on the internal arrangement of buildings, in which we concur in the main, some special attention is given to the sanitary construction of stables, and the entire want of attention, often, to the provision of adequate ventilation and fresh air for the horses, both in sufficient quantity and in the places where it is wanted. The entirely accidental way in which some new stables are constructed, or old ones left unaltered and unimproved in this respect, would lead one to conclude that horses were not supposed to live by respiration in the same way as human beings. Captain Galton gives small-scale plans (by the way, there is no scale to them) showing where he considers air should be especially introduced to provide for every horse having pure air to breathe both when he is standing and lying down, which we recommend to the reader's attention. Perhaps some of the diseases to which horses are subject, and which are the dread of the horse-owner and the puzzle of the "vet.," may be traceable, if the truth were known, to nothing more far-fetched or mysterious than the want of proper air to breathe.

There are one or two points we rather question in the remarks on "conditions affecting materials and construction." Damp courses of slate (recommended among other means for preventing damp rising) are liable to breakage with the slightest unequal settlement of the wall, and are therefore not to be trusted. Further on, "a floor of wooden blocks laid on and bedded in asphalte combines dryness with warmth for the feet." It may do so, but it almost certainly ensures the rapid decay of the wood so imbedded. These, however, are minor points. Some statistics as to the amount of water which is held in new walls will startle some readers, and explain pretty forcibly to those who are going into new houses why it is not wise to be in too great a hurry to commence occupancy. According to Captain Galton's calculation, a house in which 100,000 bricks have been used, contains in the bricks and in the mortar combined about 10,000 gallons of water, which must be removed from the walls of the house by evaporation before it becomes habitable. Some of this will be escaping, no doubt, from the lower part of the wall while the upper is in process of building, but not much; the greater part will still have to be accounted for when the roof is put on. Another fact mentioned about plaster is suggestive: it was stated in a discussion at the French Academy of Medicine in 1862 that in a case in which an analysis had been made of the plaster from the wall of a hospital, this was found to contain 46 per cent. of organic matter. It ought to be stated, however, to what depth the plaster was cut for the analysis. We can well imagine the plaster being loaded with organic matter in this proportion to a depth of $\frac{1}{8}$ in. or even more, but not throughout its thickness; the question is, how far did the organic substances actually permeate? This is the more important, because some leading sanitary authorities have suggested that the best internal wall-finish for a hospital ward is not a hard and washable material, but an ordinary plaster coating, which should be scraped and resurfaced from time to time; but the efficacy and suitability of this treatment depend, of course, on the degree to which the impurities penetrate into the plaster: if they are merely superficial, the process is easy and satisfactory; if they penetrate deep, the renewal of the plaster throughout would be necessary,—a by no means convenient necessity. We should have more faith ourselves in a smooth wall-facing which would hold far less of organic matter at all times than plaster, and which could be thoroughly cleansed by washing, while the ward was empty, as every hospital ward should be, by rotation, for about a month in each year. The great thing to remember in regard to impervious materials is, that the more completely impervious they are, the more complete must be the provision for cleanliness and ventilation. Captain Galton comments on this again in regard to impervious roofs or ceilings. Experience, he says, shows that it is unhealthy to live under a ceiling impervious to air. "Air heated by contact with the human body carries up emanations which when they rest on a pervious ceiling are retained there, while the moisture passes off through the ceiling; on the contrary, if these emanations come in contact with an impervious ceiling, they are not absorbed, and may be again brought into circulation in the air of the room. Consequently, if circumstances render it necessary to have a ceiling impervious to air and moisture, this must be discounted by providing under such impervious covering additional facilities for change of air in the upper part of the room." For ourselves, we should decidedly prefer and recommend the impervious ceiling with the thorough ventilation; but we admit that it is more difficult to carry this out satisfactorily. But to trust to the pervious ceiling for retaining what we do not want to have returned upon us, seems rather like shirking a difficulty than fairly meeting it.

The author commences his remarks on "Removal of Refuse," by saying that "a theoretically perfect system of refuse removal would be one where a large volume of rapidly-flowing water received the whole refuse, and carried it away, before it had time to decompose, to a large river not used for drinking purposes, and thence to the sea; but this is generally unattainable, and it would leave the waste matter unutilised." As this latter objection is made in the same sentence, it seems rather odd to call this a theoretically perfect system; and it is so desirable to emphasise in this country the danger and folly of sending sewage into rivers, that it is a pity that the author should have seemed to countenance it even under the restriction which he makes. In fact, the restriction is not sufficient, for it is a great evil to the dwellers on the banks of a river to pollute it with sewage, even if they are not going to drink the water; and the whole sentence, so prominently placed, surprises us. We should say a theoretically perfect system was that which conveyed away refuse matter as quickly as possible to where it would be useful, and we have to find out where or in what conditions that is. Chemistry will tell us in the long run, no doubt, but we have not mastered the subject yet. Captain Galton's military experience enables him to give some useful suggestions for the management of extempore latrines, &c., in circumstances where rough-and-ready methods alone can be used; for the rest, the principal systems of removal of house-refuse, by water-closets and sinks, by the dry-earth midden system, and the pail system, are briefly explained, and some of their respective advantages and drawbacks mentioned, but the author does not positively recommend any one system or apparatus, except that he decidedly prefers the pail system (two or three modifications of which are described) to any more wholesale system of removal without water-carriage. The Liernur system is described, and some probable drawbacks to its working suggested; but one obvious objection might be added, that of compelling the employment of yet another elaborate system of underground piping in large towns. Most towns have already three systems of pipes,—gas-supply, water-supply, and drains; and these are enough, in all conscience, to keep in order and provide for, and rather too much in some cases.

This portion of the book, considering the great difficulty, elaboration, and importance of the subject, must be considered but very brief and rudimentary, but it will serve to give general readers an outline of the main difficulties and the principles on which they are to be met. The value of Captain Galton's book is most apparent as a whole, in giving a general and trustworthy view of the subject of sanitation, such as ordinary unscientific readers can understand and take interest in; and in this way it may conduce much towards the enlightenment of the unscientific public, while it contains every here and there hints and experiences which may prove very suggestive to the scientific specialist in sanitary reform.

THE EXHIBITION OF METAL-WORK IN PARIS.

FROM the slight glimpse that we have had within the last few days of the retrospective museum which was announced to be opened three weeks since, we certainly have no reason to regret the delay that has been occasioned by the arrangement of a collection of a series of works of art the like of which has not before been brought together through the long annals of great exhibitions. With the knowledge of the treasures that have been reposing in their cases in the rooms on the first floor of the Palais de l'Industrie, it has been so far sorry work, however instructive, to have to inspect the modern productions down below. Not but what they supply ample matter for inquiry and study,—they indeed should form the chief interest of the exhibition,—but without the means of comparison with older works, such as the museum is purposely intended to facilitate, it is difficult to form a correct estimate of the merit of the modern French metal-workers, whose art is very completely represented here; in this respect every credit is due to the management of the exhibition, which has gathered together such a characteristic show, and one so essentially connected with the industrial application of art. The marvels of modern ingenuity, such as iron has enabled the manufacturer, the engineer, and the architect to carry out, are here unrepresented, a feature, the absence of which is not to be regretted in an exhibition organised by a society avowedly devoted to the application of the arts to the needs of industry. Last year was held in Paris an exhibition in which the applications of science to industry were admirably shown; this year it is the industrial value of the arts which is more prominently put forward. The directors cannot be too warmly complimented on the success of their efforts; it is rarely that an exhibition is marked so plainly with the stamp of unity, and though "the free exhibition," as the class to which have been admitted a variety of the various attractive objects which seem in Paris the necessary complement to every public show, may to some extent be over large, the

general effect of the Palais de l'Industrie exhibition is very "metallic."

Paris can certainly boast of an unusually large number of men who must be termed, for want of a better word, artistic iron and metal workers; and their emulative efforts, though they may strikingly seem to lead in the same direction, show plainly the effect of the endeavour to revive within the last few years the spirit that animated the sturdy work of the past. It is true this effort is strongly influenced by the taste of the eighteenth century, which in France has prevailed for some years, as it promises yet to continue to do.

In the artistic products of the Paris metal-workers,—we are speaking more particularly of the wrought-iron-workers,—the seventeenth and eighteenth centuries chiefly supply the models, and certainly very attractive are the results of this adaptation of the work of the past to the needs of the present. Each exhibition seems to show us that it is hopeless to ask for so-called original design. The discoveries of the scientific man of one age render useless those of his predecessors, but the creations of the artist never make us forget the creations of those who have gone before. The cry, then, that we do but repeat the work of the past finds some excuse in this theory, apparently comfortably accepted by a large number of artistic workers in the present day, and whose productions are satisfactorily represented, in, as regards France, the present Exhibition in the Champs Elysées.

Purists will doubtless shudder at the finely-wrought scrolls and foliage which decorate the iron railings, the tripods, and the chandeliers exhibited, as the sad emblems of a period when art was in its decadence; it is unfortunately true that the Middle Ages, that period when unquestionably the noblest creations of the metal-workers' art were produced, can scarcely be traced as the suggestive source of study taken by the manufacturers. Though relegated to a dark corner, may be seen in one of the most attractive stalls a humble member of the gorgeous railings that surround the tomb of the Scaligers at Verona; it is from the so-believed more graceful creations of later centuries that the designers have drawn their inspirations, and this being a French Exhibition it is the taste of the eighteenth century,—that typically French age,—which is most conspicuous. Had we been in Germany we should doubtless have seen more than one specimen inspired by the work of the Renaissance and the Middle Ages, when in the hands of the humble artist the plastic iron was forged and welded into work that rivals the delicacy of the goldsmith's productions.

The whole metal industry is well represented in this exhibition, from the rough ore to the finished production of the united labour of designer and workman, whose models, drawings, and working-studies are also to be seen here; a large share is naturally devoted to the bronze trade, so important a branch of the metal-worker's art in Paris, which has long been the head-quarters of the manufacture of all the wretched "ironmongery," as it has not too charitably been termed by a French critic, and so long abhorred by all people of taste, that has bedecked for three generations and more the mantel-pieces of households in every part of the civilised world. While this deplorable branch of industry seems still to be in a vigorous state of health, it is satisfactory to feel that its products find the market growing smaller and smaller every day in those countries where art education has been extended, but it still remains to the thoughtful observer a mystery, what outlet the manufacturers find for all this glittering rubbish; and yet only its more respectable productions are here exhibited. The cast gilt-zinc clocks that crowd the showy watchmakers' shops in the more popular neighbourhoods of Paris and the numerous provincial towns, show sufficiently how large a sale there is for a cheaper object than the expensive "*objet de luxe*," as it is pomposuly termed by the polite shopman or the elegantly-printed card of the firms whose products figure under the glass roof of the Palais de l'Industrie.

The gold and silver smith are largely represented, and all the well-known names are to be found; the jewellers are also well represented; the diamond-polishing forms, as it did in 1878, a never-failing source of attraction.

The usefully decorative services of metal are well shown by numerous exhibits of ornaments, cast or *repoussée*, for architectural decorative purposes, and certainly it must be tempting to the professional eye to see a whole Jarret or Mansard window, with its mouldings, its pediment and its details, well studied, an architectural model, in fact, all ready-made for use; weathercocks, finials, and many other decorative objects, are to be found here, and when their use is known, great aid do they afford to the architect. But perhaps the most characteristic feature of the whole show, and one remarkable when we consider that it is devoted to the display of metal-work, is the absence of all noisy machinery, a feature admirably calculated to induce long hours being spent in the exhibition. What the pecuniary success of the show has already been, may be judged from the fact that on the Sunday following its opening, when all was still in disorder, no fewer than 8,000 visitors poured into the Palais de l'Industrie. The management may fairly expect an even larger crowd when the retrospective museum is thrown open, this additional feature promising to be very complete. Among numerous contributions from famous collections, the South Kensington Museum has, we learn, liberally lent a considerable number of their marvels of the metal-worker's art.

THE ROYAL SANITARY COMMISSION AND THE *BUILDER* ON DUBLIN.

IN our notice recently of the Royal Sanitary Commission we almost allowed the report to speak for itself, and we summed up by giving the more important conclusions of the Commissioners. The "Sanitary Condition of Dublin" is a heading of old standing in the *Builder*, as a reference to our volumes for the last twenty years will show. Some journals have been of late taking credit for having pointed out such and such wants and such and such blots in respect to Dublin, whilst quietly ignoring or altogether ignorant of the fact that all the ins-and-outs of the unsanitary condition of the Irish capital were fully treated of long years ago in these pages. Indeed, we might say, without fear of contradiction, upwards of a decade since we anticipated almost every one of the conclusions of the Commissioners, in substance, if not exactly in the same words. Coming down to more recent dates we would particularly direct the attention of our old readers to the series of articles which appeared in the *Builder*, running through nearly every year between 1869 and the present year. The condition of the Liffey and its tributaries, the Poddle, the Dodder, the Jolka, and the other reeking though minor streams, was described. The homes of the people in the tenement houses, and the circumstances of these houses when private mansions and when they had degenerated into rookeries for several separate families, were depicted over and over again. The state of the old markets, meat and vegetable, the old sewers and their construction, the bad house-drainage and its complete absence in several districts, the scavenging under the old contract system, and when taken over by the Corporation, the back streets and the back yards rarely cleaned, unpaved streets, and bad road metalling, the drinking habits of the lower orders, the want of building bye-laws and improved dwellings for the working classes,—these and kindred other matters were fully pointed out by us and the ground again and again travelled over. Respecting that often-debated subject, the purification of the Liffey, and the need of an efficient system of main drainage, a scheme suited to the financial circumstances of the City, we long since advocated the amended scheme which is now about being adopted after a wanton expenditure of money and an utter failure to force an ill-advised and enormously expensive scheme upon the citizens.

In 1870, but not for the first time, we wrote: "Putting aside other plans, we boldly say there is no salvation for Dublin but in a thorough system of parallel main drainage and intercepting sewers on both sides of the Liffey. Until the river is saved from city sewage pollution on its north and south banks, there can be no proper purification of the Liffey. The treatment of the sewage in its final distribution is another question for which more than one method can be adopted, as it pleases those whose chief business it will be to carry it out with profit and advantage to the city and country at large. The Poddle river, rushing over and emptying hourly its avalanches of solid slime into the Liffey, in the most central part of the city, is a frightful picture to contemplate. What it was a quarter of a century since, a mother of dead dogs, night soil, and butcher-shamble's offal, it is still, but multiplied in beastly enormity. Is it possible that the corporate authorities of Dublin can pretend to be ignorant of this frightful stream of rolling filth that passes but a few yards off, under their very noses, while sitting in their town councils? The effluvium of the Poddle wriggles itself through the street sewers, and the malaria of the Liffey is daily wafted into Parliament-street to the City-hall, acting as a due monitor and avenger of corporate negligence and imbecility!"

The Corporation have done a little service in the way of public improvements, but the state of the Liffey is still the same foul blot, the tenement houses are growing worse, the majority of the back streets are brimful of dirt, back yards are an abomination, and proper privy accommodation in the same quarters is absent. We pointed out in 1870, as previously and since, that there were districts north and south of the city that never witnessed a scavenger's cart in their neighbourhood, and that the watering-cart was only reserved for fashionable localities. The picture is still true. Long before the rebuilding of Essex and Carlisle Bridges, we suggested their remodelling to meet the greatly increasing passenger and vehicular traffic between the north and south of the Liffey, and the provision of a new bridge further down the river was advocated at the same time to meet the necessities of the growing northern district. Well, the two former bridges have been rebuilt, and a new swivel bridge was opened last year, built on the site we indicated. Ever since the water supply of Dublin was taken from the Vartry, we admitted that it was fairly good, but we repeatedly said that the poor often suffered from the want of a continuous supply in the poorer districts, and that the receptacles for holding the water in most of the tenement houses were out of repair or in a foul state. In our articles on the sanitary state of Dublin during the last twelve or fifteen years it will be found that we have discussed most of the points bearing upon the question of public or of personal health. Baths and washhouses, ship nuisances in the river, ambulance, and hospital accommodation, the floating hospital in the river or harbour, swimming-baths in the city, and along the sea-shore in the northern and southern marine townships, the state of the old city graveyards still unimproved, the free opening of the public squares, the inspection and disinfection of houses and cabs in times of epidemic, these were some in addition to the other matters already alluded to that we have discussed in our several articles on the sanitary state of Dublin from time to time, and, as we said, extending over several years. The very picture we drew in 1870 and 1871 of the haunts of wretchedness in certain districts north and south of the Liffey, of vice brought on by dirt, and disease and crime by drink, with punishment or death as the outcome, have been on two occasions lately reproduced in other words by the Recorder of Dublin, who directly traces the evils to their true source, the unsanitary condition of the homes and surroundings of the poor and working classes. The Borough Engineer of Dublin traces more evils to the defective condition of the house-drains and the state of the tenement houses than to any other causes, and he is not inclined to admit (indeed he never was) that the main sewers of the city are in a bad condition. Certainly for the last quarter of a century a good amount of new main sewer work has been executed to meet the growing extension of the city; but in the older portions of the city, and between the older and the newer portions, the sewers are as we have several years ago described them, "a patch work system," thus anticipating, as in other matters, the conclusions of the Commissioners.

We witnessed the execution of not a little of this patchwork north and south of Dublin, and the work as a patch was good enough in its way, but the work as a whole, old and new, could never be expected to hang together. The sewers are, to a large extent, irregular in line and gradient, and defective in sundry other ways, and a patch-work they must always remain, until the old work drops away from the new, or new work replaces the old all along the line. Several years ago we wrote,—"The drains connected with the old houses of Dublin lead nowhere, or are choked up; and the house drainage of some of the modern cheap buildings on the skirts of the city is a mere make-believe."

During the fifteen years between 1865 and

1880 we have had occasion at times to say some cheering words about many matters in Dublin and elsewhere throughout the provinces, because it has been our duty to chronicle progress and improvement as well as to point out the obstacles to it and to aid in their removal. The unsanitary state of Dublin has, however, supplied us much material for pleasant thought, notwithstanding the somewhat saddening nature of the subject. To have paved the way to a reform by persistently and consistently advocating the one line of policy in the interest of the few and the many alike,—health and home, and health at home and without, was to preach saving principles which must be recognised on the banks of the Liffey as well as on the Thames, and, indeed, everywhere amongst civilised people. There is a sad want of healthful dwellings for the working classes in Dublin, and a number of these erected by a public company, and which were visited for us some months ago, are deficient in accommodation, lack proper space and appliances, and in most instances we think the rents are too high for the class of persons they were intended for, but which in many cases inhabits them not.

In conclusion, we may say in respect to the main drainage of Dublin the Corporation some days ago resolved to refer the matter to the Main Drainage Committee, with a view to agreeing upon some plan of action for carrying out the recommendations contained in the report of the Commissioners. Procrastination, however, in municipal circles in Dublin is proverbial, and the exercise of a respected public criticism is still necessary to force action and ensure anything approaching towards expedition, even in a life and death question.

The *Builder* collected its own evidence, and its many articles were the result of visits and personal inspection. Yet the outcome of a Royal Commission sitting for many days scarcely carries the subject of the sanitary condition of Dublin further, and in all its essential features it is identical with the conclusion and recommendations long since expressed in this journal.

METROPOLITAN RAILWAY TRAFFIC.

MUCH as is the position of the heart to the body is that of the metropolis to Great Britain; and of nothing is this truer than in regard to railway traffic. If a map of the railways of the country be taken it will be seen that the lines that represent the railways grow blacker and thicker and more numerous as London is neared, and that there is a convergence of lines thereto. But these do not all enter the heart of the city, and hence the idea of a railway which would traverse the most populous part, and also join the great stations where railways ceased, was one which could not be otherwise than acceptable. The passenger who was put down at Paddington, for instance, and wished to travel from King's-cross, had the mild horrors of a middle passage,—long, comparatively costly, and inconvenient often,—to endure. But when the underground railway was commenced it not only gave a quick and cheap means of transport between parts of the great city, but it became also a means of junction between some of its great railways. The public need it met is known to have been great, but not many know the extent of that need, or the manner in which it has been met. Nor is the vastness either of the amount that has been spent in providing the great lines that traverse the metropolis, nor the largeness of the passenger traffic thereon known. It may, therefore, be of interest at this juncture, when another extension of the Metropolitan line has been so recently opened, to give from official sources statistics which show the cost of what has been done, and the extent to which the public avail themselves of the facilities for travel on the chief of the lines that now specially and almost solely serve the metropolis.

In round numbers, nine millions sterling have been spent in forming the Metropolitan Railway, in fitting up with appliances for travel, and in subsidiary works in connexion with the great line that traverses London. With the exception of about a quarter of a million,—expended in providing the working stock of the line, and of one or two smaller sums subscribed to other related London railway companies,—the whole of this vast sum has been spent in purchasing land and buildings, in adapting these for the purposes needed, in forming the line, the works, and the stations, and in the needful expenditure in other methods to create the line. That working stock to which reference has been made is small beside that of the great companies; but it is probable that few of the latter find their passenger accommodation so much used. There are not 300 engines, wagons, and carriages on the Metropolitan; but we shall soon see how large is the volume of passenger traffic that travels over the line. Before leaving the question of cost, however, it is needful to state that the Metropolitan Railway holds a quantity of surplus lands and buildings,—so large that it has a net revenue therefrom of over 1,000*l.* a week, and that the amount of this revenue is increasing, though sales of land from time to time keep that increased rental in check. Coming to the most interesting part of the official statement from which some of these facts are drawn, we have a summary of the gross receipts of the Metropolitan Railway for traffic, and of the numbers of passengers it has carried for over eighteen years. From the financial statement it appears that in the year 1863 the gross traffic receipts of the Metropolitan were 101,707*l.*; whilst in the last complete year they were 506,204*l.*—or, in other words, the receipts are now full five times what they were at the opening of the line. It will be interesting to give fully a statement of the number of passengers over the railway in every one of those years. That statement shows that the numbers were as under for each year:—

Year.	Passengers.
In 1863 there were carried	9,455,175
,, 1864 ,, ,,	11,721,889
,, 1865 ,, ,,	15,763,907
,, 1866 ,, ,,	21,273,104
,, 1867 ,, ,,	23,445,282
,, 1868 ,, ,,	27,778,011
,, 1869 ,, ,,	36,893,791
,, 1870 ,, ,,	39,160,849
,, 1871 ,, ,,	42,765,427
,, 1872 ,, ,,	41,392,449
,, 1873 ,, ,,	43,533,973
,, 1874 ,, ,,	44,118,425
,, 1875 ,, ,,	48,302,324
,, 1876 ,, ,,	52,586,395
,, 1877 ,, ,,	56,175,753
,, 1878 ,, ,,	58,807,038
,, 1879 ,, ,,	60,747,553
,, 1880 (first half) ,,	31,592,429

This growth of passenger traffic on one small line of some dozen miles is wonderful in its rapidity. It will be seen that at the opening the number of passengers was large,—nearly one million per month; but since then there has been such steady progress that at the present time over five millions of passengers are carried monthly over the little Metropolitan line. During the first half of the present year not less than 174,543 persons were carried daily, on the average, over that line, so that every hour of the twenty-four not less than 7,000 persons were carried; or, to put the figures in another way, the stream of traffic was so great that the number carried on the Metropolitan Railway during the first six months of this year was equal to the estimated population of Great Britain and Ireland! And it is evident that the maximum traffic is not yet reached, for at the date to which we have referred there had been expended on lines not opened at the end of June last fully 624,000*l.* One of the lines,—that from Finchley-road to Harrow, has since been opened, and a new source of traffic has consequently been tapped. Other extensions are in progress, and will, in time to come, add to the traffic of the Metropolitan; and though it may be postponed, yet the Inner Circle Railway must some day be completed, and a large volume of traffic now blocked off will flow over the underground line. It has already been stated that the numbers given are those of passengers on the Metropolitan Railway, and that over a series of years the allied line (but not yet connected by that inner circle), the Metropolitan District, has carried half as many. It is clear, then, that the possibilities of passenger traffic in the metropolis are almost illimitable; and it is evident that there is a great future before the railways which practically monopolise that vast traffic. The oldest of these,—the Metropolitan,—has already become a very profitable company to its shareholders; and it is fair to add that its service to the public has been immense. It is clear from the history of the past that its passenger traffic will grow; and it is evident that it can, from the experience of "busy days," almost double the number it carries, without largely adding either to its staff or its working stock, so that it is evident that as branches long in completion are opened out, the volume of passenger traffic on the great Metropolitan Railway will continue to grow.

V.C.—HONOUR FOR SAVING LIFE.

THE decoration of the Iron Cross, the possession of which is indicated by the addition of the letters V.C. to the name, is rightly prized by the English soldier as the highest distinction that he can hope to attain. That decoration, indeed, vouches for the display of the two sister, though sometimes separated, virtues of courage and mercy. It is conferred for the saving of life under the fire of the enemy.

Somewhat allied in its character to the Victoria Cross, though bestowed by less exalted judges, is the medal of the Royal Humane Society. It is a distinction of which it would be desirable to enhance the value, by exalting the dignity of the awarder of the decoration. The idea that underlies the two badges of honour is the same; and it is one that is eminently germane to the English character.

We want a third step in this noble brotherhood. We want an honour for those who save life, or perhaps many lives, at the risk of their own—by promptitude and energy, though neither under the fire of the enemy, nor in the dangers of sea or river. Not a few instances may be recalled of heroic and devoted courage in the mine, or the railway, even in the crowded street. It is possible that the guard who, on the 19th of August, ran along the line of rails in the Bleamoor Tunnel to attach fog-signals to the way, and thus to give the only possible warning of danger to the engineer of the Pullman express rushing to his own destruction and that of a whole trainful of passengers, did not consciously risk his life in so doing. But when we remember the fate, within a few days of the same event, of an experienced railway official killed in crossing the line at a station, we must admit that the action referred to was not unattended with danger. And beyond all doubt it showed promptitude, presence of mind, perception of the best thing to do in a sudden and grave emergency, and its result was the avoidance of a catastrophe more terrible than any that has occurred in the United Kingdom, save the fall of the Tay Bridge. Demands of this nature, in prompt courage and ready thought, are of daily occurrence on our railways. Why should not a due token of commendation be added to our social encouragements for noble conduct? If a man has the virtue to become rich, testimonials are there to greet him. How if he only save the lives of fifty or a hundred people?

HAY AND CORN DRYING MACHINE.

THE weather has varied so much in the different parts of the island that it is difficult to form a reliable estimate of the prospects of the harvest. Abundance is promised by many of the fields that we have seen, while bad accounts come from other districts. The same may be said as to the hay. Everywhere late, in some districts there has been a fair, if not a heavy crop; while in some there has been little but a contribution to the dunghill.

In no respect is man a greater debtor to Science than when she presents him with the means of increasing or preserving the yield of the precious fruits of the earth. Nor has Science been behindhand, of late years, with the demand made on the genius of her votaries. The very misfortune of labour-contests has not been without some countervailing advantage, in the way in which it has turned the attention of mechanists to the production of labour-saving machines. In our actual state it may be said that these implements are characterised by utility rather than by elegance. By that we do not mean artistic elegance, but that true beauty of scientific construction in which the aim sought is attained with the greatest economy of material consistent with durability. As it is, advancing without heat of drum, the hay-cutting and hay-making machines seem to have arrested, at all events in many parts of England, the once usual annual invasion of Irish labourers.

Hay-making, however, proverbially requires sunshine. The same is true to a much more limited extent, of hay-cutting. But in the present year we have very often witnessed the mowing, by machine or by hand, of a fine grass crop, under the encouragement of a bright day or two, succeeded by a steady downpour on the prostrate grass. It is in cases like this that the farmer will listen, with all his ears, to the promises of Mr. W. A. Gibbs, of Gilswell-park, Chingford, Essex. Nor are these simply

promises—or ideas set in cursory order on paper alone. Mr. Gibbs has not only invented, but also constructed, a hay-making apparatus, of which actual experience has been made by Mr. G. P. Fuller, of Neston Park, near Corsham, Wiltshire, quite recently. The apparatus is in two parts. It comprises a frame upon wheels, supporting a sheet-iron reciprocating trough, along which the hay is slowly passed, subjected to a powerful current of heated air, and turned about by rows of revolving forks. A second apparatus, also on wheels, contains a furnace for heating the blast, and a fan for producing it. A portable steam-engine forms a third portion of the contrivance; but this is already to be found on many farms.

The effect of this machine is thoroughly to dry grass that would otherwise have been entirely spoiled. It does this at the rate of four one-horse cart-loads per hour, in other words, it saves the hay of an acre in an hour. At Neston-park 117 acres were cut. The crop was light. By the use of the Gibbs machine the whole 117 acres were cleared in three weeks, two of which were continuously wet. Details are given of the cost of the cutting and clearing of 43 acres in one week. The crop was very light, only 30 tons being made from the 43 acres. The cost amounted to 9s. 6d. per acre, or 13s. 6d. per ton. The machine was actually at work for only twenty-four hours during this time, so that it made about 1½ ton of hay per hour. The hay is said to be as fragrant as that made by the ordinary process.

Our readers will remember the interest with which we have always regarded every fresh appliance which engineering has offered to agriculture, and that we urged the possibility of saving the hay crop by artificial means long before Mr. Gibbs's invention was made. The saving of labour, or value of the cost of labour, by the substitution of mechanical for human or for animal power, is as legitimate an object for the farmer as it is for the cotton-spinner, nor do we see any reason why the economy should not be as great in the one case as in the other. But it is not only cost that is saved. The great advantage of mechanical power, as compared with animal power, is the rapidity with which it can be developed and applied in such cases as cotton-spinning; this rapidity only means saving of time, and thus saving on the interest of money invested in the business. But in agriculture it means much more. It means such a command of time as renders the farmer to some extent independent of the caprices of the season. Now another step is proposed. It is one which, sooner or later, we hold to be certain of accomplishment. It is to make the agriculturist, to a great extent, independent of the weather. The possession of a hay-drying machine, if it be one that actually does all that it is said to do, will be to the farmer equivalent to the earnings of the hay crop. As we have usually one day wet to one fine, and as July is one of the wettest months of the year, this ought to be equal to a saving of at least 25 per cent. of the annual hay crop, or to the reduction, whoever pockets the benefit, of a fourth in the cost of hay.

But this is but little in comparison to what may be effected as to corn. We do not suppose that any corn-drying machine would be of use in those cases where the corn damps in growing and mildews instead of ripening. But we are under the apprehension that the great loss that the farmer experiences in his cereals is not of this nature, but is due to the deterioration or partial germination of the grain after it has ripened in the ear, and while the solstitial rains, perhaps rather later than usual, keep the reaper from the field. We can see no reason why artificial harvesting should not, in these cases, be successfully adopted. And we invite those who have saved their hay by hot blast to have the courage of their experience, and to try a corn-saving machine.

Electric Lighting at Liverpool-street Terminus. — So satisfied are the Great Eastern Railway Company with the electric light at their Liverpool-street Terminus, that they have increased the number of lamps from 16 to 31. Three of the new lamps are outside the station. The system is also extended into the booking-offices, and instead of being confined, as heretofore, to the main platform, has been carried to the suburban platform also. The variety of light in use here is that known as the "Brush" system.

THE MERCERS' COMPANY'S NEW BUILDING IN CHEAPSIDE.

THE new building for the Mercers' Company consists of a lofty pile, 200 ft. long, with returns in Ironmonger-lane and Old Jewry. It is faced with Portland stone and polished granite, with statuary and carving, and has a lofty tower over the entrance to the hall. It was designed by Mr. Barnes Williams, the Company's architect, so as to harmonise with the old entrance to the hall,* which has been literally reproduced.

The parts of the building east and west of the entrance are devoted to commercial purposes, and are principally let to former tenants of the company. The remainder forms the entrance, vestibule, staircase, and suite of rooms for the use of the Company.

This building completes the line of frontage which has been formed by setting back the houses on the north side of the Poultry.

Messrs. Ashby & Horner are the contractors. Mr. Fenning supplied the granite. Messrs. Ronnson & Drew supplied the constructional ironwork; Mr. Shrivell the ornamental ironwork. Messrs. Holden & Co. furnished the ornamental zincwork. Mr. S. Trickett supplied the stone. The carving was executed by Mr. Sansom. Messrs. Benham & Co. are fitting up the kitchens, the hot-water apparatus, and the gas-work. Mr. Julius Sax fits up the electric bells; Mr. Crace has the contract for the decoration. Mr. James Wilkinson has acted as clerk of the works. Mr. Hyatt has supplied all the pavement and stallboard lights.

A KINDLY WORKMAN.

IN one of the antiquated towns of Emilia, only a few miles from Bologna, on the romantic road to Ravenna, so long the capital of Italy, was celebrated not long since a simple yet characteristic ceremony, which roused from the dead slumber of bygone magnificence the quiet, town of Castel San Pietro, sleeping under the now useless protection of its Middle Age castle, and almost in the shadow of the towering Apennines. An honest carrier of the Castel San Pietro has bequeathed to the Working Man's Society of his town the small savings of a life-time, to give a little marriage-portion to a poor girl every two years. The Senator Pepoli, president of the working man's society of Castel San Pietro, has wisely addressed to all the similar societies throughout Italy a circular stating the circumstances of the generous gift of the worthy Francisco Fabbri, whose example and memory merit even wider notice than such a step will assure his philanthropic action. From his boyhood a carrier, Fabbri toiling honestly and laboriously, commenced to set aside his savings that were to assure him in his old age a happy existence in the bosom of his family. But even in his youth—we quote from the Senator Pepoli's circular—in his leisure hours, or when the fogs and wind prevented him exercising his business, he betook himself to the well-peopled slopes of the Apennines, gladdening with the sound of fiddle the joyous meetings of the country-folk, and never ashamed to gather from his work its ill-paid gains. The sums thus amassed and jealously set aside were never expended on himself. He used to tell his friends and relations that he had in view a secret object, which he would in due time make known. The day has at last come, and the honest old fellow has kept his word. During last Easter he came, accompanied by a notary, to the rooms of the working man's society of his town and declared, —so states the Senator Pepoli,—that he presented to the Association seven hundred *lire* (about 30*l.*), scraped together by him little by little, with the intention that two hundred *lire* should go to augment the loan fund, and five hundred *lire* to serve to form a capital which, at five per cent., would enable the sum of fifty *lire* to be given every two years to the daughter —chosen by lots—of one of the members of the Association. Astonished at such a bequest, I asked, continues Senator Pepoli, whether such was in reality his fixed desire. Fabbri's reply, in its curt simplicity, is a model of eloquence:— "This has been the dream of my life. To have the pleasure of being useful to my fellows I have worked incessantly, and now I have attained my object, and I am happier than a Cæsar."

When a wealthy person, either during his lifetime or on his death-bed, presents to the poor of his native town a sum of money to alleviate their suffering there rises throughout the country a cry of gratitude, and the example is in everybody's mouth. It seems to me, remarks Senator Pepoli, that the fact I have related contains the sublimest expression of human charity, and that this honest and aged benefactor deserves the gratitude of the nation and of the Government. It is a noble example which it is to be hoped will find emulative imitators, as it visibly raises the moral level of the workman in the face of the incredulity and selfishness of his eternal detractors, and this example merits to be inserted in the transactions of all the working men's associations throughout the country.

As a further and even more lasting token of Fabbri's generous donation an inscription has been placed on the house in which he was born, "Here Francesco Fabbri, a workman, gave on the 29th of March, 1880, the economies of a long and honest life to the working man's society of Castel San Pietro to afford a marriage-portion to a poor young girl,—the public sentiment hopes that from the marriages thus made may spring citizens, laborious, upright, and provident like their pious benefactor."

* The old entrance to the hall it is asserted was designed by an Italian architect in the seventeenth century. If there be any old pupil left of the Company's late architect, Mr. George Smith, we should like to hear what he has to say on this subject.

BUILDING NOTES FROM SOUTH AFRICA.

As South Africa is a quarter of the empire that was seldom spoken of before the era of the Zulu war, and is even yet a *terra incognita* to the trade, the readers of the *Builder* will doubtless appreciate a few miscellaneous notes from these colonies. During the past eight or ten years times have been generally prosperous throughout the South African colonies, notwithstanding the native wars that have occurred. Comparatively vast strides have naturally followed this prosperity in the nature and character of the building operations throughout the country. The oldest and most venerable buildings to be found in South Africa are of Dutch architecture, and their style has left a certain impress on the buildings of even the present day in most of the larger towns of the Cape colony. Dutch buildings are, however, more exclusively the peculiarity of Cape Town. The tiny-paned, wide-sashed windows, almost flush with the walls, the handsome and curious fanlights, the gracefully-outlined gable, and the high walled-in "stoep," occupying the whole of the space where the side-walk would be in an English street, are features which strike the eye of every stranger on landing from Table Bay. Solid board shutters folding inside the window, and walls a couple of feet thick in solid masonry, give evidence of good judgment as to the requirements of the climate; for the days are warm (seldom above 100°, however, at Cape Town) and the summer dusty in the town. Here and there may be seen a building partaking of the East Indian style, and showing evidence of the settlement here of more than one Indian officer. Nearly all of the public buildings here were built by the Dutch. The new central railway station, a handsome and well-planned structure, finished in 1879, marks the new era of English-designed buildings, and throughout the town the old "stoeps" are giving way gradually to side-walks and English shop-fronts. The new Parliament Houses of Cape Town, designed, no doubt, to hold the members of the confederate Parliament of the future, have again been commenced, a number of workmen being now engaged on the foundations. This building, which in external appearance more resembles the Capitol at Washington than the British Houses of Parliament, will prove to be a great ornament to the town. It is situated just below the present Government House (the private and official residence of the Cape Governors), and just at the entrance to the Avenue and Botanic Gardens, where its prominence may add to its attraction as a "feature" of the town. Its cost is estimated at 120,000*l.*

In Cape Town and the principal towns of the western province of the Cape the bulk of builders' work is carried on by the Malays, who have constituted the mechanical class of the population for the past hundred years in those districts. Although quiet, sober, intelligent, and industrious, compared with the native classes, and even compared with Europeans, the

Malay lacks that faculty of steady application, the spirit of genius, which can be displayed by the Englishman or the American, and consequently the European mechanic steps in as foreman or overseer, and takes the place of preference, particularly in all jobs or work requiring more than the average skill. In the eastern parts of the Cape, in Natal, the Free States, and Diamond Fields, and the Transvaal, the Malay and native (negro) mechanic may be found, but they are not so numerous or so skilful as the low average of the English mechanic.

We may as well here speak of the prospects of mechanics who may desire to emigrate to these parts. They are in great demand in nearly all parts of South Africa, and for the past several years no class has thriven better, all things considered, than they, compared with the same classes in other colonies. But in a population of about a million whites it must be distinctly understood that this demand has somewhat narrow limits, and will not apply to all classes of mechanics. For instance, a carpenter, a mason, or bricklayer, who had only worked in one branch of his trade, might find it most difficult to get a living unless he could in some way "pick up" the other branches and perform general work. The population being sparse in most parts, and the towns and villages small, the mechanic is called upon to do, in small jobs, the variety of work represented by a large shop in England. It is not expected, however, that the general work of such will be equal in quality to that turned out by the English establishment. What is known as the "handy man" will succeed the best in South Africa; a man who can make a box or chest, solder a kettle, or repair an umbrella. In this, as more or less in other colonies, the trade of mason is generally found united to that of bricklayer and plasterer, and a man who can combine a knowledge of these three trades is almost certain to do well. Wages vary from 1*l.* 10*s.* to 3*l.* per week, but as many differing circumstances of climate, land, situation, and price of living, have to be taken into account, that we must refrain from attempting any specific information on that subject. Such information can be best obtained through the Cape Emigration Office in London.

As to the style of building, it is only recently that the era of three and four story buildings has dawned. The Dutch built nearly all their houses of a single story, and it was only in 1878, we believe, that the first four-story structure was erected in Cape Town. Here the houses, both stories and dwellings, are built in brick and stucco, and the roofs are flat and plastered, a depression on one side carrying off the water. In most of the inland towns, such as Grahamstown, King Williamstown, and Maritzburg, Natal, brick buildings prevail. Within a few years past several experiments have been made in the importation of wooden buildings from England and America, ready-made, and only requiring to be fitted up. A church at Kimberley and one at East London have been erected in this way, and it is believed that cottages may be imported very cheaply in the same way. These experiments are, of course, partially a result of the scarcity of mechanical labour. In some districts stone is largely used, though none of the quality of the sandstone of England will be found. A kind of hardy, slaty rock is to be found, but granite abounds in most parts of the country. This is a very hard, light-grey granite, very durable, and capable of taking an excellent polish, but it is difficult of working on account of its extreme hardness In Table Valley (at Cape Town) and at the Paarl, extensive quarries are now in operation. At the latter place there is a large mountain of solid granite, sufficient to supply the world as far as quantity is concerned. The quarries here are chiefly used to supply the dock-works of Table Bay. Although possessed of some remarkably fine forests, South Africa is a treeless country, and, of course, native woods do not enter largely into the builder's materials except for shop purposes, such as cabinet and wagon making. Considerable quantities of pine and deal are, therefore, imported from Norway, Sweden, and latterly from Canada; but the English mechanic will have to get accustomed there to the use of the native woods. Although the larger forests of the Cape, Natal, and the Transvaal have not been thoroughly worked, owing to the difficulties of transport, yet several varieties of South African woods are obtaining celebrity. A common wood there is the yellow wood,—a light-coloured wood, heavier than deal, and of finer, closer grain, and considerably harder to work. This wood comes in for much of the cabinet and furniture work of the colony, and is very durable. The "sneezewood" is another beautiful and fine-grained wood, very hard, and likewise used much in furniture and wagon making. For this purpose it is invaluable, as it will withstand the heat of the driest inland districts, where an article made from imported wood will warp and shrink up, and often literally fall to pieces. This excellent quality pertains to most of the other woods of the Cape. But perhaps the most valuable of all the native woods here is the "stinkwood," so called from a peculiar but not disagreeable odour emitted by it when freshly cut. This wood is generally as dark as mahogany (it is, in fact, called the Cape mahogany), but is more variegated in shade; it is of the most compact texture and finest grain. One of its eminent qualities,—which has never yet been properly taken into account by woodworkers,—is its susceptibility of polish. When properly polished, it can be made to assume more the appearance of some kind of metal than wood, and figures to excellent advantage in carving. Specimens of carving in this wood may be seen in the Dutch Reformed Church, Adderley-street, and in the Lutheran Church, Strand-street, Cape Town, and are well worth a visit by the traveller in South Africa. They not only show the excellence of the wood, but the taste of the Dutch sculptors, which is not to be despised. A wood which is no doubt destined to figure prominently in marine architecture in the future is the mangrove. This wood, as is known, possesses the rare property of resisting the effects of seawater, but though found on the American coasts and in some other parts, has never been got in pieces of sufficient length and straightness to be utilised as piles and dock timbers. The discoveries recently made by Mr. St. Vincent Erskine along the Zanzibar coast and at the mouth of the Congo have revealed forests of magnificent timber fitted in all respects for dock works. These trees, especially at the mouth of the Congo, grow 2 ft. in thickness, and many of them 100 ft. high. Standing in the water, where they grow naturally, their appearance is very striking to the traveller. The mangrove from these places has been tested with the most satisfactory results, and, once they are brought to the attention of marine engineers and harbour builders, will, without doubt, play an important part in future harbour construction.

THE BRITISH ASSOCIATION AT SWANSEA.

THIS year's meeting of the British Association for the Advancement of Science commenced in Swansea on the 25th ult. Thirty-two years ago the Association met in Swansea. The present year's meeting has not been very largely attended, but has been signalised by the very able and interesting address by the president, Professor Ramsay, F.R.S., Director-general of the Geological Survey, which dealt with the subject of the recurrence of certain phenomena in geological time.

On Thursday, the 26th inst., in Section B, Chemical Science, Mr. H. B. Dixon, M.A., read the paper by Dr. J. Pattinson, containing the report of the committee on the heat means for the development of light from coal-gas of different qualities. The paper gave information regarding the burning of what is known as common gas, or gas made from the common bituminous coal of the Newcastle and other coalfields, or from this class of coal mixed with a small quantity of cannel coal, and having an illuminating power equal to sixteen standard sperm candles when consumed at the rate of 5 cubic feet per hour in Sugg's No. 1 London argand burner, —the standard burner adopted in London by the London gas referees, and prescribed in nearly all Acts of Parliament of gas companies. After observing that the principal condition to be observed in order to develop the maximum amount of light from coal-gas was to supply the flame in a suitable manner with just a sufficient amount of air to effect the complete combustion of gas, Mr. Pattinson gave the results of experiment with union jet burners. In the case of each burner there was a certain consumption and a certain pressure, and at all other consumptions or pressures above or below this the results were worse. There was, therefore, a limit to the reduction of pressure causing an increase of the illuminating power of the gas consumed, and this limit was reached when the flame ceased to have a somewhat definite form, and burned in a languid waving manner, showing very low intensity of combustion, and having a tendency to smoke.

In Section D, Biology, Dr. Gunther, in his address as President of the Section, spoke on the subject of museums and their management. With regard to the British or National Museum, he said he believed that some of the members of the British Association would feel somewhat disappointed that the zoological and botanical collections on the one hand, and the palæontological on the other, continue to be kept distinct.

In the Anthropological Department of Section D, Professor Rudler read a paper on "The Ethnical Relations of the Typical Man of South Wales." In the same department, several papers of interest were afterwards read, including one by Mr. B. Jones, of Llanelly, on "The Antiquities of Lancarum, or Loughor Castle." Mr. Jones pointed out that Loughor was originally a Roman station called Lancarum, and was situate on the "Via Julia," which ran from Gloucestershire into Pembrokeshire. The Romans had a castle on the east bank of this river, and a Hospicium on the west bank. The "Via Julia" passed from Neath through Penller-gaer, which was at one time a Roman camp. To the north of the Penller-gaer was a place called Tre-di-ar-y-gaer, or Tredegar. A Roman bridge crossed the river at Llanidlo Talybont, and there was a watercourse extending from the castle to Lliw Bridge, which could still be traced. The castle was supposed to be of British origin, and to have been utilised by the Romans.

In Section F, Economic Science and Statistics, Mr. James Heywood, F.R.S., presided, and Dr. J. H. Gladstone introduced a report of a committee on the "Importance of her Majesty's Inspectors of Schools being appointed with reference to their scientific attainments." In the discussion which followed, Mr. Wilkinson said a system prevailed in France which we as a nation would do well to adopt. There a boy got technical instruction and a knowledge of ordinary literature, and a general education, in fact, which was all that was required to make him when he left school competent to earn his own livelihood. Dr. Silvanus Thompson suggested that workshops should be attached to schools—that in all schools boys should be trained to acquire a knowledge of the principles that underlie the work they would probably have to do—that they should learn something of the laws of general science, chemistry, and physics, and physiology. Mr. Botly read a paper on "Agricultural Statistics and Land Tenure," in which he gave in a tabular form the acreage under various crops, with the annual increase or decrease on the year, the quantities and value of imports of cereals, cattle, sheep, and swine, and the number of horses used in agriculture. He showed the importance and necessity of some alteration in the land laws, so as to develop a greater outcome from the land by giving larger security to the occupier for increased investment of capital in the cultivation of the soil. The paper was supplemented by a table showing the number of agricultural holdings in the United Kingdom, with the number of cattle, sheep, and swine to the acre, and the rental in England, Scotland, and Ireland.

In the evening a *soirée* was given by the Mayor in a large building erected for the Eisteddfod, when about 3,000 persons were present.

Of the excursions, that on Thursday, to Dowlais Works, on the invitation of Mr. G. T. Clark, was one of the most important and interesting. Mr. and Mrs. Clark, and Mr. Menelaus, received the visitors, who, under the guidance of Mr. W. Menelaus, were conducted over the various departments of these famous iron and steel-making works. Subsequently the visitors were entertained by Mr. Clark at luncheon in the Guest Memorial Building.

On Friday, in Section A, Mathematics, Professor Everett read the report of a committee upon "Underground Temperature." Observations, it was stated, had been taken in the Tolergoch Lead Mine, Flintshire, between Rhyl and Presteign. The top of the shaft was 190 ft. above the level of the sea, and was at the foot of a hill 500 ft. above the sea. The lowest workings were 900 ft. below sea level. The veins ran across an angle of carboniferous lime-

stone, bounded on both sides by faults which threw down coal-measure shale for a considerable distance. The limestone dipped at angles varying from 45 deg. to 55 deg., and was of two kinds, one white and massive, the other thin, bedded, black, with thin shale partings. There were levels at intervals of about twenty yards vertically in the vein, most of which had been driven for some years. The observations had been taken by boring a hole 24 in. deep, at a distance of from 1½ to five yards from the fore-breast, and, either on the same day or on the next day, inserting one of the committee's slow action thermometers, with a foot of plugging, consisting of dry rag and clay behind it. After an interval, generally of four days, the thermometer was taken out and read, then re-inserted and read again about a week later, the difference between the two readings never amounting to so much as half a degree.

In the Chemical Science Section, Dr. Gilbert, the President of the Section, delivered his opening address, which took for its subject "The Application of Chemistry to Agriculture."

In Section C, Geology, Mr. Edward Wethered read a paper "On the Sandstones and Grits of the Lower and Middle Series of the Bristol Coalfield." In the course of his remarks he said:—The Bristol coalfield is noted for its series of grits and sandstones, and these probably have their equivalents in the South Wales and Forest of Dean coalfields, as well as in that of Somersetshire. The first point raised was the application of the term grit and sandstone. The author confirmed the statement of Mr. Sorby in his presidential address to the Geological Society in 1880, to the effect that the carboniferous sandstones were composed of angular grains. Of those examined by the author, the grains of the millstone grit were the least angular. It was also pointed out that, as rocks show such variation of coarseness in the same deposit, this could not be taken into consideration as a test for grit. It was therefore suggested that the term grit should be confined to those rocks which show regularity of grains, irrespective of coarseness; and the term sandstone to those which are composed of rounded grains (*i.e.*, from which the angularity has been removed). In any case, the term grit must be more generally applied to carboniferous rocks than has been the case hitherto. After a careful examination of the rocks of the coalfield, the author had come to the conclusion that, owing to the great similarity of carboniferous arenaceous rocks, occurring at different horizons, it was at the risk of serious error to rely upon them for correlation or stratigraphical landmarks. The proportion of silica could be sometimes used as a guide in determining one from another, but little reliance could be placed on it over a large area, as so many contained nearly about the same amount.

In the Section of Economic Science and Statistics, Mr. Stephen Bourne read a paper on the "Revival of Trade." In the course of his remarks, comparing 1878-9 with 1879-80, he said:—The increased export trade has been principally in iron and cotton goods, the one being 8 44*l.*, one-third of the whole increase of 27·00*l.*, and the other 7 30*l.*, or one-fourth. Iron has greatly risen in price, but cottons have slightly, woollens considerably, fallen. An analysis of the figures shows, in the first place, that great as has been the increase in our exportations, that of our import trade has been far greater, the excesses of one over the other being 27,000,000*l.* Secondly, that the revival has been much more to the advantage of those who have sold to us than to those who have sold our produce and manufactures. Thirdly, that the whole excess in the value of the exports is scarcely equivalent to the entire cost of the food we have imported or consumed. Bad harvests have forced us to buy from others, especially the United States of America, who thus, having profits to expend, and looking to permanent extension, have purchased our manufactures at depressed prices. Good harvests at home, especially, abroad as well, may reverse this.

Mr. James Abernethy, V.P. Inst. C.E., delivered his address as President of the Mechanical Science Section, his theme being the past and present condition of the Port of Swansea as typical of the rise and progress of the various ports in the Bristol Channel within the last half century, and the vast improvements which have been effected in the nature and extent of the accommodation provided to meet the requirements of the shipping of the present day as regards dock facilities and appliances for the rapid and economical loading and discharging of their cargoes. Having described the existing dock works, he said that in consequence of the great increase in the size and number of the steam-shipping frequenting the port, particularly steam-vessels, it has been found indispensable to provide an entrance-lock of greater size and depth of water over the cill, with an additional extensive dock and spacious quays so as to furnish ample siding accommodation for the shipment of coal, and increased facilities generally for the loading and discharging of cargoes. In consequence, the trustees have entered into a contract for the construction of a dock in Fabian's Bay of 23¾ acres area of water space, together with an entrance-lock 450 ft. in length, and 60 ft. in width, with 32 ft. of water over the outer cill at H. W. O. S. T.; the dock to be kept (as in the case of the South Dock) above the tide of the day by the surplus water from Port Tennant Canal and other sources discharging into it. As regards the shipment of coal, it is proposed to be conducted on the same system as that at the Alexandra Dock at Newport, viz., by gravitation from the sidings to the hoists both for the loaded and empty wagons, the whole machinery of the dock appliances to be worked by hydraulic power, it having been found possible by this system at a very moderate cost to ship from 150 to 200 tons of coal per hour at each hoist. In addition to providing this extensive dock accommodation, the embanking of the indent termed "Fabian's Bay," within the eastern pier, will it is anticipated, as in other well-known cases, tend to accelerate the tidal flow into the upper reaches of the river, and give a better direction and greater force to the ebbing tidal current for the future maintenance of the entrance channel at present in progress of being further deepened by dredging. These various works are now in course of construction, under Mr. Abernethy's superintendence.

A paper by Mr. J. M'Connochie, on the Bute Docks, Cardiff, was next read.

Saturday was chiefly devoted to excursions, St. David's Cathedral, Dynevor Castle and Park, Gower, and other places being visited. A great many of the members visited the new docks at Swansea, under the guidance of Mr. Abernethy.

On Monday, in the Mechanical Science Section, Mr. Baldwin Latham, C.E., read a paper on "The Temperature of Town Water Supplies," to which we shall return.

M. Ernest Benedict made a new suggestion as to a Channel tunnel to France. He gave an elaborate account of the engineering operations requisite for its construction, which would require an outlay of 6,000,000*l.*, probably increased to 8,000,000*l.* by the cost of apparatus, &c. That capital would require 500,000*l.* a year to pay 5 per cent., or 27 trains in each direction, at an average profit of 1*l.* per train mile; and that would be less than a third of the total number of trains that could be worked through the tube daily. The increased traffic on the connected railways on each side of the Channel would be great, and it would pay those railways to subscribe the capital required. That being the commercial aspect of the enterprise, it was desirable to remember that the undertaking would be of great national importance. There was not a country in the world except England which could turn out the materials within any reasonable period. It would stimulate trade during construction, and after its completion would result in a permanently increased development of traffic in many articles of commerce. The peculiarity of this scheme was that, instead of tunnelling through doubtful geological strata, which might have faults like those met with at the tunnel under the Severn near Bristol, it was proposed to carry across the Channel a tube 16 ft. in diameter, at 35 ft. below the lowest water level.—M. Bergeran, C.E., of France, said the plan was not worthy of serious examination. The plan now being carried out was simple in idea and easy of execution. It was simply a tunnel through a bed of chalk 160 ft. thick.

In the Section of Economic Science and Statistics, the report of the Anthropometric Committee was read by Mr. F. P. Fellowes. It stated that since their first appointment at the Bristol meeting in 1875, they had had the advantage of being presided over by Dr. Farr, who had always taken deep interest in their labours, and had placed at their service his unrivalled experience in the collection and arrangement of statistics. Dr. Farr, they regretted to say, had intimated his desire to retire on the ground of ill-health, and Mr. Francis Galton, F.R.S., had been nominated chairman in his place. The committee considered that they were carrying on a work of no mean value to social statistics, supplementary to the national census. The classification of the returns is based on the principle of collecting into a standard class as large a number of cases as possible, which imply the most favourable conditions of existence in respect to fresh air, exercise, and wholesome and sufficient food, and specialising into classes, which may be compared with this standard, those which depart more or less from the standard class. This system was recommended for adoption by Mr. C. Roberts. The influence of mental and manual work, the influence of food and clothing on development, and of climate and sanitary conditions, and the influence of town and country life, may, as materials accumulate, be determined. The statistics already received have been formed into twenty-eight tables.

The President of the Section (Mr. G. W. Hastings, M.P.), in the course of his address, subsequently delivered, said that what Dr. Farr had done for the Registration Office, to which he had been so long attached, it was needless to say. To him it was mainly due that the carefully compiled tables, the admirable reports, the impulse given to the sanitary and social improvement, had been carried out as they had been. Many had earnestly desired that Dr. Farr should become the head of the department which he had done so much to create and amplify. That was not to be, but none the less—rather more—was a great debt owing by the people to a man who had laboured for them so continuously. A committee had been formed to raise a testimonial adequate, in some degree, to Dr. Farr's eminent services.

In the evening an address was delivered in the Music Hall by Mr. Francis Galton, F.R.S., on "Mental Imagery."

We may mention other papers next week.

GLASGOW MUNICIPAL BUILDINGS COMPETITION.

The architect called in to advise in this competition (Mr. C. Barry) sent in his report on Tuesday last, and it will probably be dealt with by the Corporation this week. On Monday next the whole of the drawings will be open for two or three days to the view of the Corporation and the competitors; and then for two or three days more for the general public, in the Corporation galleries, Sauchiehall-street.

We have already received a letter from an architect complaining as to the result, but as nothing certain can yet be known, this is, at any rate, premature.

SEMINARY AT CLAPHAM, FOR THE ROMAN CATHOLIC DIOCESE OF SOUTHWARK.

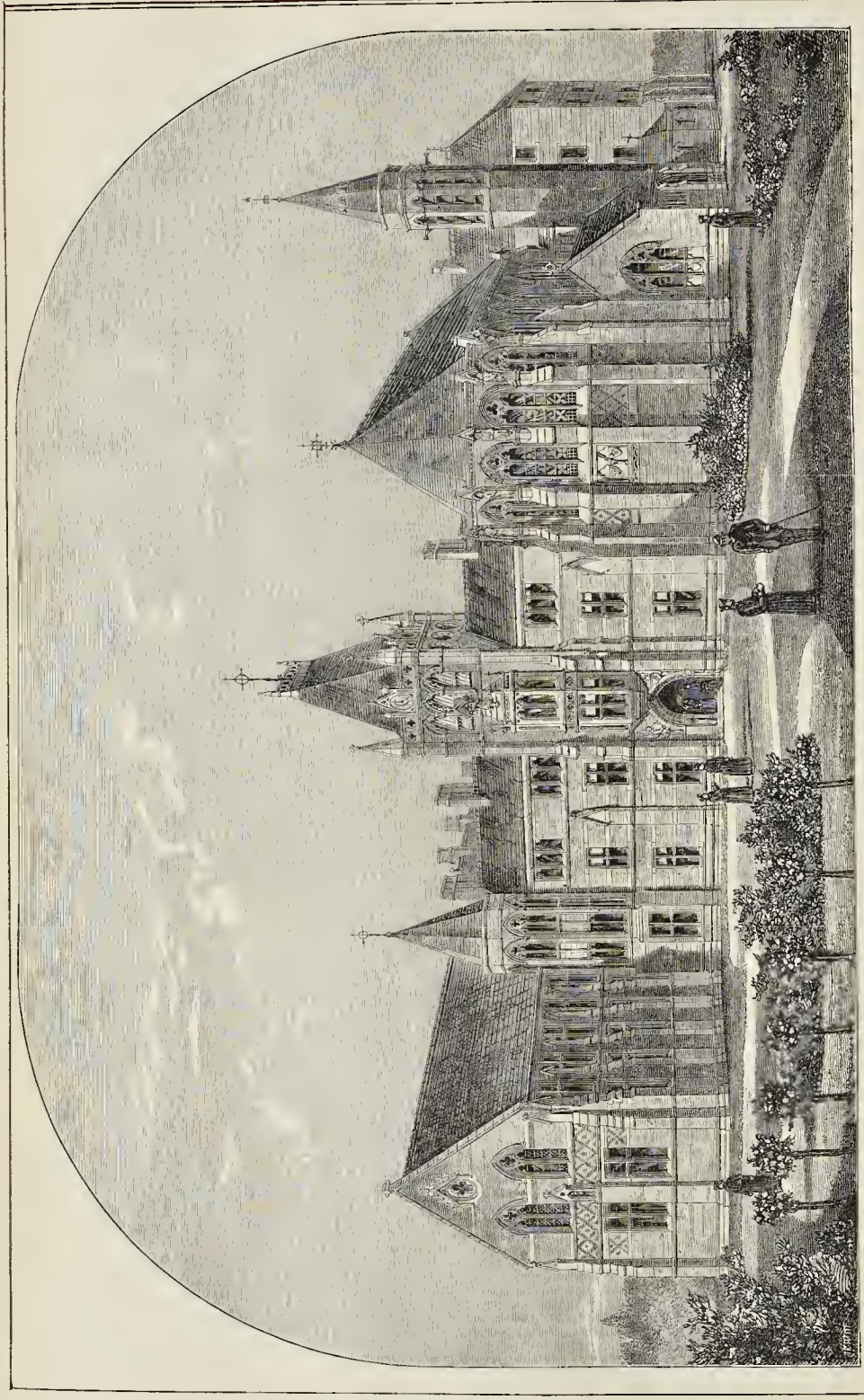
The design is planned to suit the somewhat restricted site in the Clapham-road; care, however, has been taken to secure ventilation, and at the same time to obtain a certain portion of the sun's rays to every part of the building at some part of the day. The style is a free adaptation of the Decorated. The walls will be faced with red brick and freestone dressings; the roofs will be covered with green slates.

The building will afford accommodation for sixty-nine students (each having a separate bedroom), and with suitable lecture-hall, museum, and recreation-rooms. There will be apartments for the bishop, the president, the vice-president, and three professors; large refectory, library, chapel, and the usual kitchen offices.

It is proposed to carry out the work in sections, the first of which will provide accommodation for sixteen students, the professors being lodged for the present in the existing house.

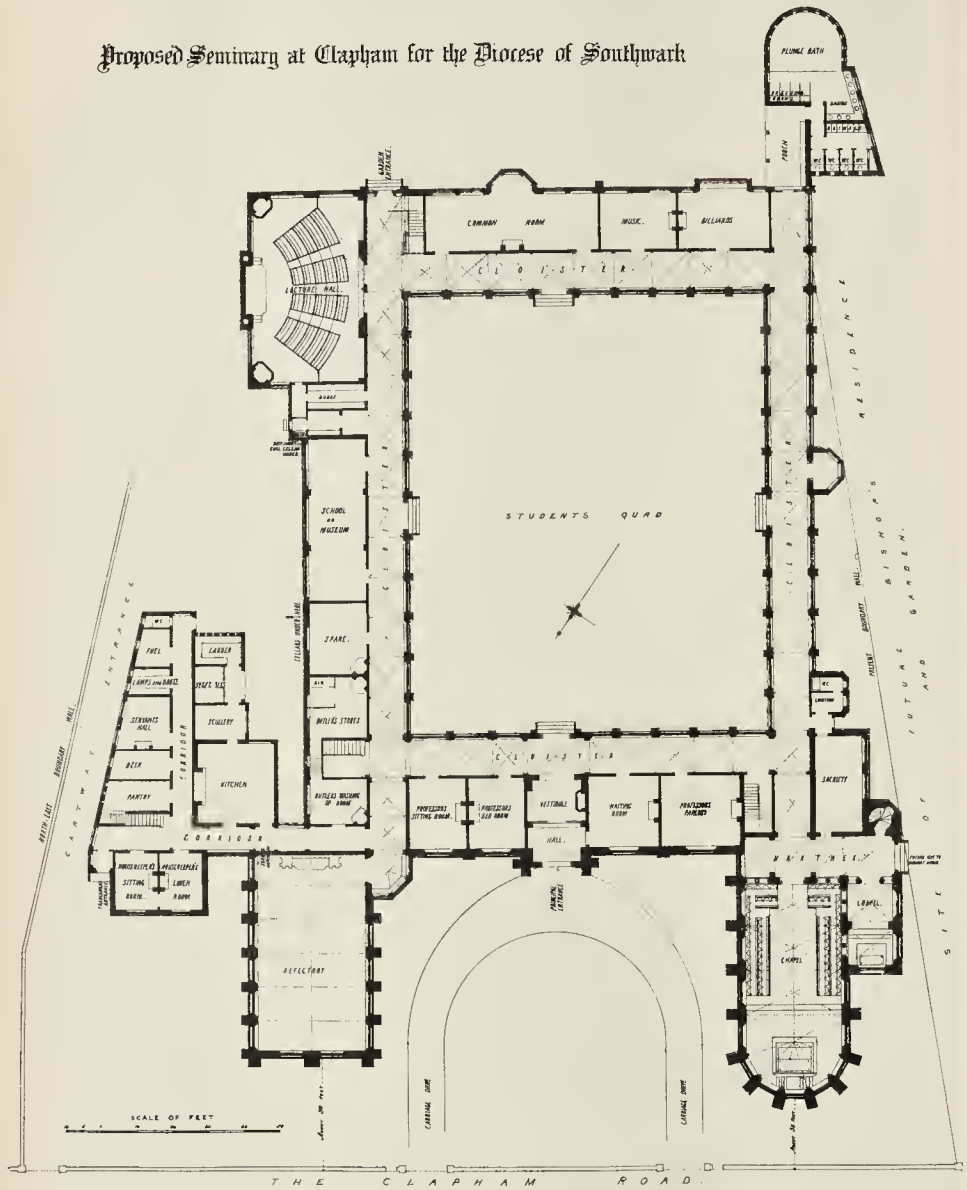
The total cost of the buildings will be about 37,000*l.* The architect is Mr. John Crawley, of Bloomsbury-square.

A Testimonial.—On Monday, the 30th of August, the *employés* of Mr. George Jennings, sanitary engineer, Palace Wharf, Seamgate, met at the Mitre Hotel, Palace-road, to make a presentation of a handsome timepiece to Mr. John Gordon, foreman of plumbers, on his retiring from the firm, after nine years' service. The chair was taken by Mr. R. Lucas, cashier of the firm, and a pleasant evening was spent.



SEMINARY AT CLAPHAM FOR THE R.C. DIOCESE OF SOUTHWARK.

Proposed Seminary at Clapham for the Diocese of Southwark



GROUND FLOOR PLAN.

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COURTYARD of EASTBURY HOUSE BARKING ESSEX

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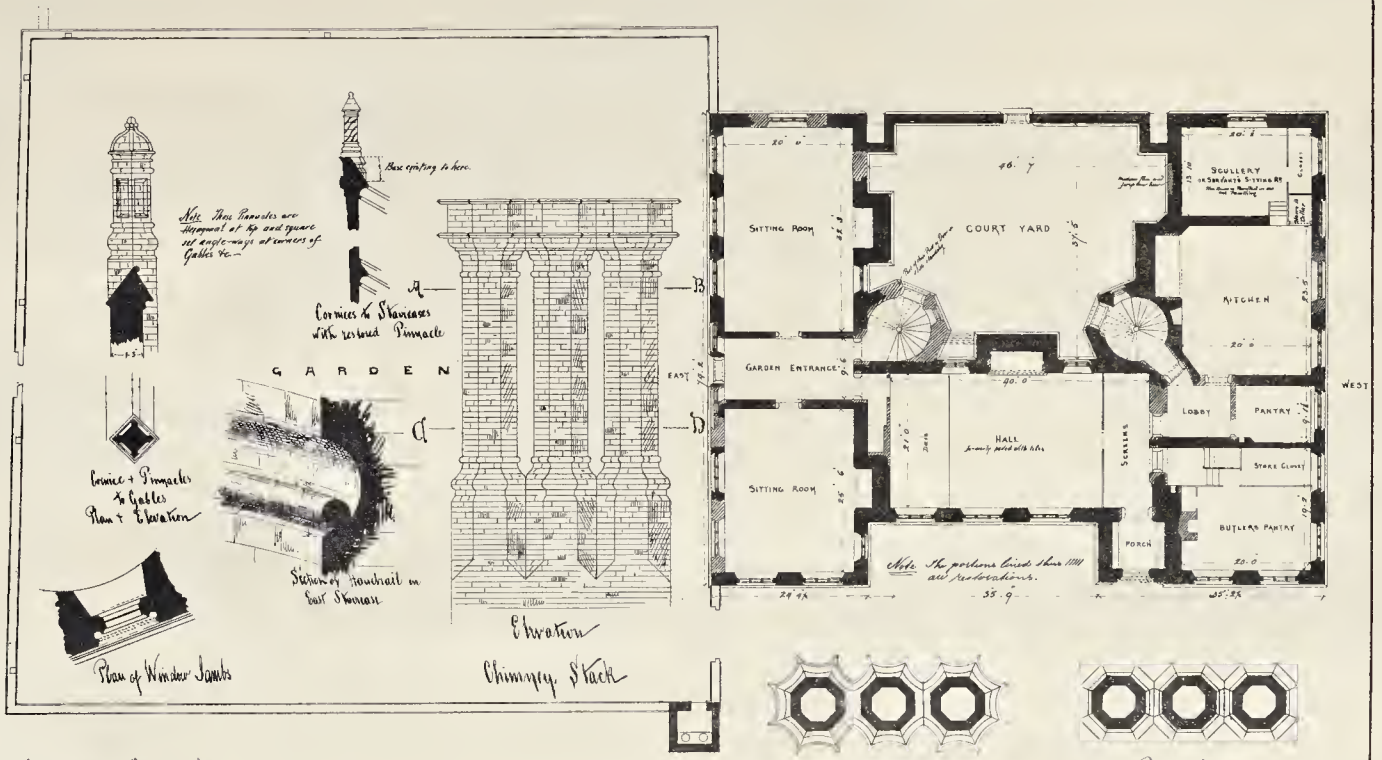
EASTBURY HOUSE, BARKING, ESSEX



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MILTON-NEXT-SITTINGBOURNE COFFEE-TAVERN.

At the beginning of this year a public meeting was held to discuss the desirability of establishing a coffee-tavern in Milton, and there being a strong feeling that such an institution would prove a means of doing good, it was decided to form a Coffee-Tavern Company, and invite applications for shares; a considerable number of which were at once taken. The offers of several sites were obtained, and eventually one in close proximity to the quay was secured at a cost of 360*l*. Mr. W. Leonard Grant, of Sittingbourne, was appointed architect to the Company, and instructed to prepare a design for a house to cost about 900*l*. Tenders were invited for the work, and that of Mr. J. Sosger, of Borden (823*l*. 10s., exclusive of fittings), was accepted. The accommodation provided is as follows: On ground-floor, a bar 26 ft. by 13 ft. 6 in. (approached by angle-entrance), coffee, smoking, and store-rooms, kitchen, scullery, and usual offices; a separate entrance and staircase leading to a hall 39 ft. by 26 ft. on first-floor; on second-floor is provided a manager's bedroom, four cubicles for lodgers, linen-stores, and w.c. The building is faced with warm-coloured stocks, with red brick dressings, chimneys, piers, &c., and is covered with red plain tiles. The ceilings of hall and bar are to be panelled with V-jointed boarding, varnished, the panels being formed by the iron-girders (which are exposed, and painted a light blue colour), with moulded wood cross-girders. The memorial-stone was laid by Miss Hinde (one of the oldest inhabitants of the town) in the presence of the secretaries of the Church of England Temperance Society (the Rev. J. H. Potter, and Mr. A. Sargant), the chairman and directors of the company, and a large concourse of spectators.

EASTBURY MANOR HOUSE, ESSEX.

The manor of Eastbury was part of the possessions of the Abbey of Barking, which latter was dissolved in 1539. In 1545 the manor was granted to Sir W. Denham, kt., sheriff of London, who, dying three years after, bequeathed it to his heir, William Abbott, who, after holding it eight years, conveyed it to John Keele, the latter selling it in the same year (1557) to Clement Sisby.

Tradition relates that the date 1572 was at no remote period conspicuous on several parts of the existing edifice, notably in the hall and on the water-spouts, and there is reason for assuming that the present structure was erected by Clement Sisby. The manor continued in the possession of this family for fifty years. In or before 1608 it was sold by Thomas Sisby to Augustine Steward. The property again changed hands in 1646, 1714, 1740, 1773, and 1802. After which date it was occupied by a Mr. Scott, who made considerable alterations—tearing up the floors and taking down the chimney-pieces, some of which were sold to the Rev. T. Fanshaw, by whom they were placed in his house at Parsloes, where, we believe, they still exist. The manor was sold by Mr. Bushfield in 1845 to Mr. Sterry, in whose possession it still remains. At the time these drawings were made the occupier (Mr. F. Whitbread) had expended a considerable sum in restorations. The house, which was built in the reign of Queen Elizabeth, is entirely of brick. At this period a marked change is observable in the general arrangement of country houses. Prior to this time houses were built round a central courtyard, with all the windows looking upon it,—a few loops and such openings as were required for defensive purposes only being made in the outer walls. Owing to the less turbulent state of the country, and the greater security against outrage, buildings were now erected more in accordance with the requirements of a domestic dwelling than with those of a feudal stronghold. One of the most radical changes being connected with the windows, which were made of larger size and boldly placed in the outer walls, instead of looking upon an inner court.

The present plan of the house consists of a south front and two wings, the fourth side of the court being closed by a blank wall (see plan and perspective sketch).

The principal entrance is on the north front, being an arched opening with traceried spandrels in cut brickwork. The ground-plan is self-explanatory; the portions shown with cross lines are restorations. On the first-floor there was a room over the hall of similar size, having the walls decorated with paintings. On one side a number of men and women, in the costume of the period, under niches; and on the other side a painting representing the "Miraculous Draught of Fishes." The western wing appears to have been devoted to sleeping apartments, whilst the eastern wing comprised one large chamber. On the second floor were three galleries extending the entire length of each block. The roofs which are now open to the tiles, were ceiled, so that each gallery formed a long low chamber, with a cradle roof and a large window at each end; the side windows formed small recesses or pseudo bays. There are to be found such galleries in most old houses of this period, *e.g.*, Knole, Hever, and Haddon Hall. In the eastern gallery the remains of decorative embellishments in distemper are clearly discernible.

The house at present is, in many parts, in a ruined and dilapidated condition. That portion which is inhabited has been considerably altered and modernised.

Our perspective view shows the courtyard in its original condition, not as it at present exists.

The tower staircase in the south-east angle had a well-cut handrail in brick (a detail of it is given), which denotes this as the principal staircase, there being no such handrail in the tower now standing.

The general character of the building and details are well worthy of study, and notwithstanding the ravages of time and the destructive proclivities of some modern restorers, there still remains sufficient of the original work whereby we can form some idea as to the beauty and stateliness of the edifice originally.

Our illustrations are prepared from measured drawings by Mr. Edward Clarke, architect, 6, Adam-street, Adelphi, made some years ago.

THE LATE MR. CHAS. LEE.

We regret to have to announce the death of Charles Lee (formerly of Golden-square, and more recently of Adelphi Terrace), whose name has long been familiar as one of the leading London surveyors. The event occurred at his residence, Ravenswood, West-hill, Putney-heath, on Saturday last, at the age of seventy-six, after an illness of four years' duration, brought on by overwork in his profession. Losing his parents in early life, Mr. Lee was brought up with his relative, Mr. Williams, a surveyor of the old school, practising at Islington, and he was placed to learn the practical part of the profession with Mr. Thomas Cubitt, the well-known builder of Belgravia. After thus spending two or three years he entered as articled pupil the office of Mr. John Nash, the Government architect of the day, and while there took an active part in carrying out the great improvements at the West End, in the construction of Regent-street, the demolition of the King's-mews at Charing-cross, and the formation of Trafalgar-square, as also the Regent's Park and the buildings adjacent, having for his fellow clerks the late Mr. James Pennethorne, Mr. Mathieson (afterwards the Government architect for Scotland), and other well-known members of the profession who have now passed away. On Mr. Nash's retirement Mr. Lee became associated with Mr. Jas. Morgan, who succeeded to a part of Mr. Nash's practice, and was by profession chiefly an engineer, having constructed the Regent's Canal, in which Mr. Lee was largely engaged. While with Mr. Morgan, Mr. Lee prepared the designs and superintended the erection of the Haymarket Theatre as it stood prior to the recent alterations. He afterwards entered into partnership with the late Mr. Henry Duesbury, and with him carried out, among other works, the Town-hall, Derby; the Derby Lunatic Asylum; two or three churches and schools, in the first days of the Gothic revival; as also several houses in Westbourne-terrace and the neighbourhood. On Mr. Duesbury's retirement, Mr. Lee took into partnership in architectural matters the late Mr. Thomas Talbot Bury, who, as a pupil of the elder Pugin, had formerly been brought much in contact with Mr. Nash. Messrs. Lee & Bury carried out churches at Bovingdon, Aldenham, Battersea, and Weymouth, and some other architectural works. After the dissolution of this partnership, Mr. Lee practised alone for some time; but for the last sixteen years the names of Mr. Lee's sons with that of Mr. William Pain (for many years in the office) were associated with his own, the firm being Messrs. Lee, Sons, & Pain. Industrial Schools at Anerley, Sutton, and Wandsworth-common; alteration of St. James's Church, Piccadilly; St. Luke's Church, Holloway; St. John's Church, Putney; many private residences, and notably, of late years, the rebuilding of Her Majesty's Theatre after the fire, may be mentioned as further illustrations of Mr. Lee's practice.*

It is, however, in connexion with his lengthened experience and extensive practice as a surveyor and valuer that Mr. Lee's name is best known. Commencing in the early days of the Tithe Commutation and Poor-rate Assessment Acts and of the valuations for the Metropolitan Improvements, he was contemporary with the late Mr. Higgins, Messrs. G. Allen & Porter, Mr. John Shaw, Mr. Wiltshire, and others, then the leading surveyors, but many of whose names are scarcely recognised by the present generation. From that time till within the last four or five years Mr. Lee may be said to have been concerned in most of the important rating or compensation cases which have occurred in the metropolis and neighbourhood. He valued for rating and for other purposes, on several occasions, the parishes of St. James, Westminster; St. George, Hanover-square; Lambeth, Wandsworth, Battersea, Putney, Wimbledon, and Fulham, and was employed for or against nearly all the water and gas companies. In the year 1853 he valued for re-assessment the whole of the property supplied by the New River Company. He was engaged in the compensation cases for Battersea Park, the South-Western Extension to Waterloo, the Blackwall Railway, and later in the London, Chatham and Dover, and Charing-cross Railways, and other railway Extensions and Improvements; the Hull, the Sunderland, and the Birkenhead Docks, the Cambridge Gas and Water Companies, Carlisle Water Company, and the Dundee Gas Company. He also acted on the part of the Government in the important cases arising out of the Defence Works at Portsmouth, Plymouth, Sheerness, &c. He had also considerable practice in the management and development of building estates; he arranged the sale and letting of the Old Grand Junction Waterworks' Reservoir (now the site of the Great Western Railway Terminus and Norfolk-square), the Copenhagen Estate at Islington (in connection with which he sold to the City the land for the New Cattle Market), and those of many private owners.

Mr. Lee was a man of good general ability and wonderful power of memory, possessed of great tenacity of purpose and of a genial and kindly disposition to those with whom he was intimate. His death will be the most regretted by those who knew him best.

Upon the frame of an engraving which hung over the fireplace in Mr. Lee's room in Golden-square he had pasted a cutting from some book, containing the following lines:—

"RULES FOR SUCCESS.

Be firm; one constant element in luck,
Is genuine, solid, old Teutonic pluck;
Stick to your aim; the mongrel's hold may slip,
But only crowbars loose the bull-dog's grip;
Small as he looks, the jaw that never yields,
Drags down the bellowing monarch of the fields."

The power of sticking to his aim, combined with excellent natural ability, was the secret of Mr. Lee's success in his profession; and in these days of divided aims in life the lines are possibly worthy of reproduction.

Cost of Cologne Cathedral.—The *Wochenblatt für Architekten und Ingenieure*, discussing the question of the cost of Cologne Cathedral, says:—"The sums which between 1821 and the present time have been contributed to the cathedral building fund, both from public and private sources, amount to 18,000,000 marks (900,000*l*.). This amount has been pretty evenly expended on the erection of the towers and the additions to the church. If to this we add the moneys contributed during past centuries, and notably what has been sunk in the colossal foundations and spent in purchasing various necessary parcels of ground, it will appear that the cathedral as it now stands represents about 40,000,000 marks (2,000,000*l*.)."

* Illustrations will be found in our pages of St. Luke's, Holloway (1859, p. 499), Her Majesty's Theatre (1869 p. 507), &c.

WIND-PRESSURE.

Among the many points which were brought into notice during the Tay Bridge inquiry there was no one of greater interest than the question of wind-pressure. To builders the effect of atmospheric disturbances had long been familiar, and the records of destruction, both among finished structures, but more especially in the case of gables during the course of erection, are neither few nor far between. It is somewhat astounding, therefore, to find that a danger to which every structure that is acted upon by the force of the wind is more or less exposed should not only have almost entirely escaped the notice of engineers, but should also have failed to elicit that amount of attention on the part of scientific investigators which in other branches of the profession generally afforded some reliable data as a foundation for the every-day use of practical men. Nevertheless, there is some apology to be found for the indifference with which it has been hitherto regarded by engineers in practice. Until lately the allowances that have been made for resisting what may be spoken of as the ordinary statical strains to which such structures as high bridges are more especially subjected, have been considered more than sufficient to withstand the force of the wind when added to the lateral strains thus provided for. In this way wind-pressure in the every-day practice of civil engineers in this country came to be very much overlooked, and although a large allowance has always been made for atmospheric disturbances, both in France and in America, the subject has never attracted much attention in England. The failure on the part of science to supply reliable information seems to have confirmed the indifference which arose from the matter having been considered of little practical importance.

The exceptional circumstances under which it was proposed to throw a bridge over the estuary of the Forth brought the question into notice, and in the light of the terrible disaster of the night of the 28th of December last it would have been well if the inquiry had been made earlier, with special reference to the Tay Bridge as well.

In looking into the history of the subject it appears that the source of information to which engineers generally applied was a table presented by Smeaton to the Royal Society in 1759. Omitting atmospheric phenomena, which experience had shown to be confined to the tropics, he estimated the pressure of the wind in this country at six pounds per square foot of surface for high winds, eight or nine pounds for very high winds, and twelve pounds for a storm or tempest. These figures no doubt obtained considerable sanction on account of the distinguished character of the authority with which they were associated, and from the fact that the structures, more especially lighthouses, which had been presumably constructed on the basis of these estimates, had been constantly exposed to the utmost fury of the winds, and remained as monuments of their ability to resist them. But even in the face of such assurances there was at least one good reason why engineers in this country should have reconsidered the subject, from the fact, that in France and America the practice has been to allow 55 lb. and 50 lb. for wind-pressures respectively. Besides the very much greater margin which prevailed abroad, there were isolated instances in this country which proved conclusively that the wind reached a maximum intensity far beyond that which had been laid down by Smeaton. There are several authentic cases of railway carriages having been upset by the wind, both in France and America, and India as well, but of still greater importance as affecting the rules for providing against wind-pressure in the British Isles, is the record of a carriage having been thrown over by a hurricane, on the Chester and Holyhead line, in 1868. Quoting from the report of the Commissioners appointed to inquire into the circumstances attending the fall of the Tay Bridge, it appears that "the pressure required to overturn railway carriages may be taken to vary between 28 lb. and 40 lb. per square foot," so that it became necessary in the light of this exceptional instance to inquire how far such a pressure was likely to act upon the more extended surface of a wide and lofty bridge. It is here that we find a great discrepancy of opinion among practical men and an absence of reliable information to assist us in forming a judgment. It appears that there is no record of any pressure approaching to that which upset the railway carriage on the Chester line ever having acted upon an extended area, but on the other hand, there is no record of how great the extent of surface may be over which such an exceptional pressure may exert its force. It appears that a hurricane at Walmer, of an intensity that perhaps exceeded the pressure which upset the railway carriage, acted over a width varying from 450 ft. to 700 ft., and that a somewhat similar cyclone passed over the Isle of Wight during the winter of 1877. In the face of such facts it is difficult to escape from the conclusion that the wind may in a similar manner act upon a lofty structure of similar width, and that, therefore, it is imperative to provide against the possibility of its doing so.

Nevertheless, when the proposal to build a bridge across the Forth, with spans of 1,600 ft., came to be discussed, a very different conclusion was arrived at. It appears, as our readers have heard more than once, that Mr. Barlow and Dr. Pole, to whom the subject was remitted for detailed investigation, not being satisfied with their own judgment, consulted the Astronomer-Royal, and afterwards spoke of his opinion as "highly authoritative and valuable." The conclusion at which he arrived was "that the greatest wind-pressure to which a plain surface like that of the bridge will be subjected in its whole extent is 10 lb. per square foot." Although the plans for the Tay Bridge had been completed a long time before this opinion was made known, Sir Thomas Bouch seemed to have considered that it was applicable to that undertaking, and no doubt felt his mind much relieved in consequence. When the Astronomer-Royal, however, was examined before the Commissioners he drew a distinction between the two bridges, which, in the light of the opinion already referred to, is somewhat difficult to understand. In his letter to Dr. Pole and Mr. Barlow he said that although "upon very limited surfaces, and for very limited times, the pressure of the wind does amount sometimes to 40 lb. per square foot, or in Scotland probably to more," yet that, looking at the character of that bridge, which was a suspension-bridge with two spans of 1,600 ft. each, the greatest amount of pressure to which it would probably be subjected on its whole extent, would, in his opinion, not be more than 10 lb. per square foot. If an engineer, without further explanation, had drawn the conclusion that this opinion meant that the wind-pressure would not be more than 10 lb. upon a span of 1,600 ft., but that it might be 40 lb. or 50 lb. over an area of 450 ft., he would have found it consistent with what the Astronomer Royal afterwards stated; but, at the same time, we do not think that one engineer in a hundred would have made such an interpretation of the original opinion.

As matters stand at present, we have first the authority of Smeaton, and afterwards the opinion of the present Astronomer-Royal confirming it, for undefined areas between 450 ft. and 1,600 ft. On the other hand, the conclusion arrived at by one of the Commissioners on the Tay Bridge is that the estimate of French and American engineers is much nearer the mark, and "that there can be no reason to doubt that there may be wind-pressure of 45 lb. and even 50 lb. in this country." In saying this, however, they do not commit themselves to any opinion as to the width of the structure, which would be sufficiently great to admit of a lower estimate being taken. To make matters still more complicated, Mr. Baker, who "is a civil engineer of eminence," and "who seems to have devoted much time and attention to the subject of wind-pressures," said that for the last fifteen years he had looked very carefully for evidence of any structure capable of standing a uniform pressure of 20 lb. which had been blown down, and that he had never found a single instance,—that there were hundreds of buildings in this country that would be blown down with a pressure of 20 lb. on the square foot, and miles of wall on the edges of cliffs and on open downs which would be blown down with a pressure of even 13 lb. In the face of all this apparently conflicting evidence, there will be a natural anxiety on the part both of the travelling public and the engineering profession to have the subject thoroughly investigated, and meanwhile there is every prospect that the promoters of such undertakings as the Tay Bridge will find it a very difficult task to raise money unless they are able to convince subscribers that the question of wind-pressure has not only been successfully investigated, but that measures have been taken to render such lofty structures thoroughly secure.

LEAD-MINING AND SMELTING IN DERBYSHIRE.

The annual excursion of the Chesterfield and Derbyshire Institute of Mining, Mechanical, and Civil Engineers took place a few days since under the presidency of Lord Edward Cavendish, M.P. The principal visits made were to several of the best-known lead-mines in the county, especially to the Millclose Stoop, from which (says the *Mining Journal*) is drawn as much lead as from all the other mines now being worked in Derbyshire. To the extraordinary customs or rights as regards lead-mining which prevail in the Peak and other districts must be attributed the small quantity of ore raised for the number of mines opened out, for men without capital are able to sink and carry on operations in the most primitive manner, without any machinery whatever.

On the last day of the gathering Mr. Stokes, of Derby, Assistant Government Inspector of Mines for the district, read an interesting paper on "Lead and Lead-Mining in Derbyshire." The lead-mines, it appears, became the property of the Crown at a very early period; and in the old Roman town of Wirksworth there was lead ore raised in 714, the dues going to support a nunnery at Repton, the abbess of which, it is said, sent a sarcophagus of lead to Croyland, in Lincolnshire, for the interment of St. Cuthlac, a monk, the lead having been obtained from the Wirksworth Mines. Mr. Stokes showed from well-founded data that lead was raised in Derbyshire during the reigns of Tiberius Cæsar, Domitian Cæsar, and Hadrian in the early part of the Christian era. In 1469 the mineral duties north of the Trent were leased to Richard Earl of Warwick, and others, for a term of forty years. At the death of Charles II. the Dowager Queen Catherine had the mines of Derbyshire. About seventy years ago Mr. Richard Arkwright purchased the lease of mines from the Rolls family, and it is still held by the descendant of the former. In the High Peak district since 1690 they have been held by the Dukes of Devonshire, having been leased from the Duchy of Lancaster. Some of the customs prevailing 200 or 300 years ago in connexion with the mines were most peculiar, and we are told that whisky was not allowed to be taken into a mine lest it should frighten away the ore. In relation to the Acts on mining passed in the reigns of Edward I. and VI., Philip and Mary, there is an old poem or rhyme, by Manlove, a local writer, who in allusion to them says:—

> "For stealing ore twice from the minery
> The thief that 's taken fined twice shall be.
> But the third time that he commits such theft
> Shall have a knife stuck through his hand to the heft
> Into the stone, and there till death shall stand,
> Or loose himself by cutting loose his hand";
> And shall forswear the franchise of the mine,
> And always lose his freedom from that time."

As to the mode of smelting lead there are still standing records in what are known as the Bole Hills, the ancient smelting hearths being termed "boles," and consisting of loose stones built upon the brows of hills. Upon these rudely-constructed hearths wood was laid, and over that again the ore was placed. Fire was then applied to the wood, and then the air at first was the only means of kindling the fire to the necessary heat to smelt the ore. After a time bellows were introduced, in some cases being so large they had to be worked by horses. For smelting, it was a custom at one time to cut down timber anywhere within reach for the purpose, and one of the articles made at Great Barmote Court, held in 1665, was,—"We say that for the payment of the said lot miners within the wapentake of Wirksworth ought to have liberty to work the ground within the wapentake, and to have timber also in the king's wastes to work their ground withal, and egress and regress from the highway to their grooves and mines." The timber was not only used for smelting the ore, but it was also burnt for breaking down the sides of veins and getting the mineral before blasting by gunpowder was employed in Derbyshire, as shown by another Court article,—"We say that any miner in an open rake may kindle and light his fire after four o'clock in the afternoon, giving his neighbour lawful warning thereof." This free use of timber in all probability was abandoned when the value and use of coal and gunpowder became known. Bole hills, however, are the most clearly defined geographical position of the ancient smelting hearth; but the word "tor," of which there are many in Derbyshire, may also indicate a smelting-place. The

mining customs first received the Royal sanction from Edward I., after a petition from the miners had been presented to him and an inquiry held at Ashbourne, in 1287, by the king's direction, by the Sheriff of Derbyshire. Those customs have been modified, and reduced to legal rights by Acts passed in 1851 and 1852. The right of all persons to search for, dig, and sink mines on any person's land seems anything but right to the owner, who sees his land cut up, roads made across his fields, and water ingress and egress allowed to the miner. But, at the same time, it should be remembered that the miner had the same rights when the whole of the Peak was a "vast howling wilderness" without cultivation, and belonged to the Crown; also that the present owners bought the land subject to those privileges. There is little doubt that the mining rights at one time, as well as the income from the lead, were of more importance than the surface value,—so that it was of advantage to the Crown that every encouragement should be given to the miners to pursue their calling. These customs once established, have been clung to by the miners with the greatest tenacity, and have been fought for in the law courts, and, as they have been confirmed by the Acts of 1851 and 1852, both miners and landowners know the limit of their privileges as well as their inconveniences.

As to lead itself, Mr. Stokes remarks that some writers consider the veins to be a sedimentary deposit, slowly accumulating or growing similar to stalagmites; whilst others consider that the mineral has been thrown up from below, similar to all igneous rocks, filling fissures or cracks in the strata. Engineering skill and science have done little to improve the mode of working in the lead mines of Derbyshire, which in most instances is somewhat similar to what it was 100 years ago or more, or, indeed, little better than it was in the old Saxon period. In the whole of the lead-mining districts there are only two shafts where the ascent and descent are performed by mechanical means. In all the others ladders are used, or else a still more antiquated system, called "stemples" and "footholds." Stemples are hand and foot rests of wood, driven in horizontally in the shaft, up which the miner climbs by alternately stepping from one to the other, with the risk of being killed by failing to the bottom of the shaft should he miss his hold. In the large mines there are three classes of men employed underground,—tutmen, tributers, and daymen. Tutmen work the levels, tributers work the ore after it has been proved by the levels; and where work is let by the fathom it is called tutwork. As showing the value formerly of some of the mines, it is stated that in 1769 the viewers' tithes for the Wirksworth mines alone were 1,000*l.* per annum.

THE CONDITION OF CISTERNS.

THE official water examiner, Lieut.-Col. Frank Bolton, makes some observations on this subject in his last report, to which attention should be paid. We willingly give them the additional circulation of our columns:—"In the absence of a duly authorised and official 'standard of filtration' regulating the quantity of water to be passed through a given area in a given time, it has been found during the past eight years that when the rate of filtration does not exceed 540 gallons per square yard of filter bed each twenty-four hours, the filtration is effectual, and this has been generally recognised as a tentative standard rate of filtration. The water companies now nearly all keep within this limit, but it is disheartening to reflect that, notwithstanding the efforts that have been made and the large expenditure that has been incurred in works for properly treating and improving the quality of the water, these efforts are rendered nearly abortive and but of little value by the apathy and carelessness of a great number of the householders. The water delivered for domestic purposes is frequently deteriorated after leaving the companies' mains by the dirty state of the cisterns on the premises of the consumers. Many of the cisterns, tanks, and butts for containing water in small tenement houses in the metropolis are in a disgusting and filthy state. An opportunity for inspecting these presents itself when travelling on some of the metropolitan and suburban lines. Cisterns may be seen without lids and with portions of rotten lids floating in the water, full of rank and decaying vegetation, and other most objectionable substances, such as old rags and paper; and on closer examination the contents would show more or less organic deposit, and under the microscope would be found to abound in infusorial life. All cisterns should, therefore, be properly covered and be frequently cleaned out, and every care should be taken to prevent the contamination of the domestic supply after delivery. Now, as heretofore, it appears to be the rule in building a certain class of houses to place the cistern over the water-closet with an untrapped waste-pipe communicating with the drains. These cisterns are often open and regularly receive the drippings from the roofs and gutters; they are, moreover, in close proximity to the dust-bins and other deposits of filth and garbage, while children amuse themselves by throwing all sorts of dirty rubbish into the water, including dead puppies and kittens, with an occasional cat. These are facts known by personal observation. The purest and best filtered water in England would be poisoned by such a system of storage.

The Public Health Act of 1875, section 70, gives power to any local authority, in case of complaint, to inspect and remedy such evils, but, probably, the only remedy for this state of affairs will be found in the establishment of the constant supply system and the consequent total abolition of these unfit receptacles; meanwhile, and until the system of constant supply is completed, the owners and occupiers of houses are surely very wrong in permitting such a condition of things to exist."

NATIONAL INSURANCE.

AT the annual conference of local government administrators of the four northern counties of England, held recently, at Gilsland, under the presidency of Earl Percy, Mr. Cropper read a paper on "National Insurance." At last year's conference Mr. Cropper read a paper on the same subject, but too late for discussion, so he read another this year amended so as to include knowledge acquired during the year. Lord Carnarvon said, that as we compelled the solvent to provide for the destitute, it could not be wrong to make a man provide for himself. It would be well if such provision could be made voluntarily, but it had better be enforced by law than be left wanting. In Germany payment to sick societies was compulsory, masters of artisans being bound to deduct the fortnightly payment due to the clubs, and no difficulty ever arose in the practice of this rule. In the third place his lordship said the majority of existing British Benefit Societies were insolvent. British working men earned higher wages than the same class in any other country, yet they expected to be supported in their old age. The sick-club or friendly society was a man's natural resource. Lord Carnarvon said that, in 1879, 150 registered friendly societies became insolvent. A million and a half of people now belonged to societies which professed to provide for sickness and infirmities, and probably most of them would find their payments thrown away, and of no use when the time of their need came. Lord Carnarvon proposed to reduce the cost of insurance by making every man join in payment. Many contributors would not seek the benefit. Yet it was not unfair as a national scheme, because it would not be asserted beforehand that anybody would not claim, and the ease to the poor-rate would overcome any objection to it. The London and North-Western Railway Company insisted upon a deposit of 2½ per cent. of the salary, and added a similar amount. A servant on leaving with a good character could claim half, and if rendered incapable he received an income of one-third his pay. He did not believe a compulsory system of insurance would ever take the place of the Poor-Law. There would still be women and children of stray workmen who had been missed. It would not do the work of all the existing sick societies, because it would lack the aid of the self-interest of the members of those societies which at present helped to check pretence. Employers also might object to make the deduction, and might think that in the end they would have to pay the insurance, and add it to their workmen's wages. But the employers would soon learn their own interest, and they rarely objected to rules, however arbitrary, if only applied alike to all their competitors in trade.

In the discussion which followed, Sir Charles Trevelyan said he gave an unqualified opposition to the principle advocated in the paper. He admitted the excellence of Mr. Blackley's notion amid all his failures. Compulsory providence was a pure fallacy. Providence was a moral quality. Man must be able to stand, yet free to fall. Action such as that proposed might turn a man into a machine. Out-door relief was provided for a man if he saved nothing at all, and all the powers in the world would not promote thrift and providence while those diverse influences prevailed. Some friendly societies were now extremely well-managed associations.

GLAZED TERRA COTTA FOR ARCHITECTURAL PURPOSES.

OUR recent articles on terra cotta have brought us communications from two or three manufacturers, amongst others, which seem to show a praiseworthy desire to take any steps that may promise to improve their wares and promote the application of them. We may have occasion hereafter to refer to these.

From Messrs. Wilcock & Co., of Burmantofts, we have received a number of specimens of their glazed faïence, which they, no doubt correctly, consider the most recent development of terra cotta for architectural purposes. The material of which this faïence is made is a very fine fire-clay; it being essential that the clay should be almost chemically pure, otherwise it will not stand the great heat to which the articles are subjected, in order to secure hardness and durability. The clay is prepared in the usual way, and in a thoroughly plastic condition is pressed into plaster moulds, and, indeed, up to the point of being ready for the kiln, is treated precisely as if it were terra cotta, only it is handled with additional care.

When carefully placed in the kiln it is subjected to an intense fire for from forty to fifty hours; after being allowed to cool it is ready for going through some preparatory processes prior to being glazed. These processes have been arrived at after repeated trials and failures, but these have resulted in it being now possible to produce a very great variety of effects and colours. If, as they claim, the glaze is imperishable and unaffected by either atmosphere or temperature, the ware is certainly eminently suitable for either interior or exterior decoration.

We are not bound to admire the taste displayed in all the specimens sent, but the plastic quality of the material obviously fits it for fine work, and it admits of a great variety of colouring.

THE RUSSIAN YACHT *LIVADIA*.

THE construction, interior decoration, and furnishing of the Imperial state saloon of this yacht have been entrusted to Mr. Robert Christie, and some of the most important pieces of furniture made for the purpose have been on view for a few days in the rooms of the Royal School of Art Needlework, Exhibition-road, South Kensington. The principal pieces are in what is called white and gold, including sideboard, settee, chairs, &c., and are solid and handsome; the metal-work seems good, and the same may be said of the gilding, but we are bound to say that they please us less than some of the simpler and cheaper furniture to be found near them in the rooms. The forms are clumsy, and the embroidered satin with which the chairs and settee are covered is hard and staring. Some red plush curtains, with an almost metallic lustre, are very rich in appearance.

This School of Art Needlework, by the way, is scarcely so well known as it ought to be.

Bricks.—A correspondent writes:—"What is the average annual consumption of bricks for building purposes in London? I think I saw in a paper that at a meeting of brickmakers, held last autumn at the Cannon-street Hotel, the chairman stated the average metropolitan consumption to be 750,000,000." A precise answer to this could not be given without special inquiries. Mr. W. T. Wiseman, who is agent for many of the manufacturers, supposes in reply to our question, "that probably 800 millions of bricks annually (taking the average of the past five years) are sent to London within a radius of four or five miles from London Bridge."

OBITUARY.

Mr. W. Penstone.—The death of this young architect, from consumption, took place last week. He was a member of the Committee of the Architectural Association last session, but would not allow himself to be nominated again in consequence of his failing health. The noteworthy paper on "Late Wrought Ironwork," read during the session 1878-79, and which we printed, gave a few of the results of considerable study of the work of the seventeenth and eighteenth centuries in various arts. No. 1096 in this year's Exhibition of the Royal Academy showed in clever drawing two buildings erected from his designs. A good draughtsman and hard-worker will be missed in the Association, and another right-minded and pleasant companion remembered with regret.

Mr. Hakewill. — We mention with great personal regret that Mr. John Henry Hakewill, Fellow of the Institute of Architects, died at his residence, 77, Inverness-terrace, on the 30th ult., in his seventieth year. We will take another opportunity to speak of his works. Death has been sadly busy in the ranks of the architectural profession of late.

ROYAL HOTEL, BLACKFRIARS.

We mentioned briefly in our last that the second section, which completes the building of the "Royal Hotel," at Blackfriars, is now commenced. The work is in the hands of Messrs. Lucas Brothers, who are pushing on rapidly with the contract, in order at as early a date as possible to meet the demand for accommodation at the present hotel, which, large as it is, is not able now to do so. In the new building there will be many arrangements for the comfort of the visitors and the easy working of the business of the hotel. Two high class hydraulic lifts will be erected for conveying visitors and their luggage to the different floors of the hotel. Special arrangements have been made for the safety of the visitors using the apparatus. Mr. E. A. Gruning is the architect, and Mr. F. Colyer is the engineer, who has designed the lifts and other engineering appliances, and will superintend the same in conjunction with the architect. Messrs. Simpson & Co. have the contract for the lifts; Messrs. Siebe, Gorman, & Co., for the heating apparatus; and Messrs. S. J. Baker & Sons, for the wells.

SOCIAL NOTES.

An Extraordinary Delusion.—At the last meeting of the Orrell (near Wigan) Local Board, the medical officer of health in his monthly report stated that one case of scarlatina had occurred at Gathurst, which seemed to have been due to infection imported into the district. The clerk mentioned that there was an extraordinary superstition in the minds of some of the parents in the Board's district. Believing that it was better children should have the whooping-cough while they were young, parents were in the habit of taking their children where whooping-cough was prevalent, in order that they might catch the infection. In one case he knew a woman—the mother of eight children—take her children to a house where there were persons residing suffering from scarlet-fever, so that they might have the fever while they were young. The medical officer said that was a recognised notion amongst the poorer classes. There is evidently wide scope for the use of health primers in our Board schools, and for the missionary zeal of ladies' sanitary associations.

The Coffee-Tavern Movement.—At Kidderminster, a new coffee-tavern, erected for the County and City of Worcester Coffee-Tavern Company in Vicar-street, Kidderminster, was opened on the 14th ult., by Lord Lyttelton, the chairman of the company. The tavern has been built specially for its intended purpose by Mr. Julian, and taken on a twenty-one years' lease by the company.——A coffee-tavern has been opened at Kingston, which, by permission of Prince Leopold, is called the Leopold Tavern. The Prince is a shareholder.

Working Men's Clubs.—On the 17th ult., the building which is to be the head-quarters in future of the Twerton-on-Avon Club Institute and Reading-room (formerly known as the Working Men's Club), together with a new hall in the rear, was opened. Messrs. Carr a short time since purchased the building known as the George Inn, and a plot of ground adjoining, on which the new hall has been erected. The old building has been thoroughly renovated, and fitted for the use of the club. The Club-house has on the ground-floor a library of 700 volumes, a reading-room, and a smoking-room. The first-floor has also three rooms, which will be used for committee, writing, and billiard-rooms, respectively. The new hall, which is built of stone, is capable of holding 400 persons. The builder was Mr. Thomas Harrison, of Twerton, and Mr. J. L. Asher supplied the gas-fittings.

YE ANTIENT HOUSE.*

Hollow home oft will come
Rattling to the ground;
Birds will flee, o'er the sea
Other homes will found;
When returned, old one's spurned,
New's more cheap and sound.

Men of old, as we're told,
Their own time could take;
Strikes unknown, each one shown
What he was to make;
Now-a-days—railway age—
Man must keep awake!

Holy men, living then,
Built both well and strong.
Why? Because each "had pause";
Labour for a song.
Money, too, then, they knew,
Need not "hum along."

Sages say, in his day,
No one gains his crown,—
Be it praise, glory, bays,—
Envy hunts him down;
When he dies *then* fame cries,
"Great is his renown"!

So we praise other days—
Ever sing the past;
Giants, then, were the men
Ne'er to be surpass'd!
Passing by, mockingly,
Pearls before us cast.

Let me stay 'ero I stray
Farther from my theme;
Long and low,—plan so, so,—
Built without a scheme;
Here a stair, leading—where?
Ancient houses seem.

Ceilings low, as you go,—
Mind, you'll hump your head!
Dusty, too,—gracious!—phew!
Roofs, part stripp'd of lead;
Draughts as well—who can tell
Where rats are *not* bred!

Walls so bulged, bricks divulged;
Filled with ghostly sounds;
Rooms so large—turn a barge;
Lumbago abounds.
It is but a draughty hut,
Grown beyond its bounds.

Herbert.

The Employers' Liability Bill was read a third time in the House of Lords on Tuesday last, having previously passed through Committee, in the course of which passage sub-section 3 of Clause 1 was omitted, on the motion of Lord Brabourne. On the motion, after the third reading, "That this Bill do pass," the Lord Chancellor moved the insertion of the word "any" in the second sub-section of Clause 1, making the clause read as follows:—"By reason of the negligence of any person in the service of the employer who has 'any' superintendence entrusted to him." This amendment was agreed to. Lord Stanley of Alderley then moved the re-insertion of the sub-section in question, which ran as follows:—"Where, after the commencement of this Act, personal injury is caused to a workman. . . . . by reason of the negligence of any person in the service of the employer to whose orders or directions the workman at the time of the injury was bound to conform, and did conform, where such injury resulted from his having so conformed." Lord Shaftesbury expressed his regret at the course taken by their lordships in omitting this sub-section in committee, but the amendment was negatived and the Bill passed.

* Thinking the other side of the question in the matter of "the modern mansion" might as well be set forth, I submit the following.—H. L. S.

ENGINEERING ITEMS.

Concrete.—The Royal Engineers have almost completed the 100-ton gun *emplacement* in the Government Marshes adjacent to the Royal Arsenal, Woolwich, the construction of which has been required for experiment prior to mounting the heavy guns of the same type in the fortifications at Gibraltar and Malta. The work, which covers an area of about 80 square feet, is composed principally of concrete in imitation of masonry.

Society of Engineers.—The members and associates of this society have visited the works of the London and South-Western Railway Company at Nine Elms. Mr. W. Adams, locomotive superintendent, received the visitors and conducted them over the works, and with him were Mr. W. Beattie, chief assistant to the locomotive superintendent; Mr. Mather, works manager; Mr. Brown, principal foreman of the carriage department; Mr. Sullivan, chief draughtsman; and Mr. Garrett, who has charge of the works alterations. The company visited the drawing-offices, the carriage-trimming department, the carriage-painting, boiler, machine, fitting, tyre, wood, and moulding shops. In the wood shop is a large circular saw, made without hammering, the speciality of the Lane Manufacturing Company, of America. This implement sawed through a log 15 ft. long and 15 in. thick in ten seconds. In the same department several machines by Ransome & Co., of Chelsea, for planing, sawing, slotting, &c., were exhibited. In the moulding shop the process of making moulds for axle-boxes with the machine of Butterfield & Co., of Keighley, was observed with much interest. About 1,500 workmen are employed at these works.

LIVERPOOL NEWS.

A New Roman Catholic Home for the Aged Poor.—The new home for aged poor people, near to the Church of St. Margaret, Belmont-road, was opened by Dr. O'Reilly, R.C. Bishop of Liverpool, on the 19th ult. The new building is from designs by Messrs. Goldie and Child, architects, London, and has been erected by Messrs. Holme & Nicol, the builders, Liverpool. The land, which is of considerable extent, has been paid for, but the building, erected at a cost of upwards of 9,000*l*., has a debt upon it of about 5,000*l*. The new building (which is under the management of "The Little Sisters of the Poor") has at present sixty-four inmates, but there is sleeping accommodation for 100.

New Dock Works at the North End.—At a recent meeting of the Mersey Docks and Harbour Board, the minutes of the Works Committee contained a recommendation to proceed with the construction of the northernmost section of the new works at the north end, and to accept a tender for the excavation in connection therewith; but the consideration of the subject was adjourned.

The Junior Reform Club.—A temporary habitation for the members of this club has been provided in Eberle-street. The building is at present undergoing structural alteration at the hands of Messrs. Roberts & Robinson, of Liverpool, and will be ready for formal opening by Lord Northbrook on the 16th ult. Messrs. White & Son, of Duke-street, are doing the decorating, painting, and paperhanging work; Messrs. N. & T. Dutton, Great George-street, are supplying the furniture; Messrs. Ray & Miles, the carpets, &c.; and Messrs. Walker, Pendleton, & Co., Dale-street, the kitchen-ranges and stoves.

FROM SCOTLAND.

New Farm-steading at Troves, Elgin.—New farm-buildings have been erected on the farm of Troves, on the Fife estates, and about a mile to the south of Linkwood. Entering at the south gable, and passing through a large turnip store, the visitor finds himself in the feeding and cow byres, which are fitted up with all modern improvements. There is an entrance from the turnip-shed into the folds, and thus turnips can be conveyed to byres and folds without going outside. Next comes the men's sleeping apartment, which has good ventilation. The stable, which adjoins, contains six stalls. It is airy and well-lighted. After this comes the straw barn and threshing-mill, from which a stair leads up to a very commodious and well-ventilated grain loft. There is also an entrance to this loft from the north gable. The cart-

shed follows, but an intervening passage, leading from the stackyard into the square, divides it from the barn. We now come to the principal fold for the rearing of fat stock. Immediately in front of the fold is an open cattle court. Here the main entrance to the square intervenes, to the left of which are another fold and open cattle court. The folds are covered with corrugated iron, but the rest of the steading is roofed with blue slate. The poultry yard lies to the east of the steading. There are also piggeries and a shed for bolding farm implements. The architects were Messrs. A. & W. Reid, Elgin.

Aberdeen Hydropathic Establishment.—New buildings at the junction of Bridge-place, Bath-street, and Windmill Brae, intended for use as a *café* and hydropathic and Turkish bath establishment, have been erected. The building has a frontage of about 90 ft., and has five stories, the height from basement to roof being 72 ft., and to summit of tower, 80 ft. The baths department includes "cooling rooms," smoking-room, tepidarium, large plunge-bath (lined with Portland cement, and finished on the lower part with Torbay white naval enamelled paint, the upper part being lined with glazed tiles), and five smaller plunge baths. The walls of the various rooms in the two departments of the baths are of cement concrete, plastered with Portland cement, and finished with Parian cement, no lime-plaster being used in the work at all. The woodwork is of pitch-pine, stop-chamfered and finished. The hydropathic portion of the building contains a number of large apartments. In the southern wing, immediately above the *café* dining-room, is the principal drawing-room, a lofty hall, lighted by three single and three double windows. Adjoining it is a ladies' drawing-room. The rest of the flat consists of bedrooms, a store-room, the resident physician's consulting-room, and the housekeeper's parlour, communication being established between this floor and the baths. The dining-room is the principal apartment on the second floor, occupying the southern wing, and designed to seat fifty persons. The arrangements for ventilating the rooms in this department of the building comprise circular gratings in the ceilings of all the apartments, communicating with shafts which unite and have their point of egress in the summit of the tower, where a Boyle's patent air-pump ventilator is fixed. Mr. D. Macandrew has been the architect of the building, and Mr. Winchester clerk of works; and the tradesmen were:—Masons, Messrs. P. Murray & Co.; carpenters, M'Robbie & Milne; slaters, M'Grigor & Shand; plumbers and gasfitters, Smith & M'Kenzie; plasterers, R. Henderson's Trustees; painters and glaziers, Gordon & Watt; heating engineer, John Taylor; bellhanging, &c., James Laing & Co.; lamps, W. Shirras & Son; encaustic flooring, &c., James Bannochie. Mr. Winchester was inspector of works; Mr. Murray, mason; and Mr. King, foreman carpenter.

Grangemouth Park.—At a special meeting of the Police Commissioners of Grangemouth, on the 17th ult., an offer from the Earl of Zetland of eight acres of ground for recreation purposes was laid before the meeting, and unanimously accepted by the Commissioners in behalf of the town. It was suggested that the park bear the name of either the Earl or the Countess, and be called the Lumley, Dundas, or Zetland Park.

BUILDINGS FOR POOR LAW ADMINISTRATION.

Fulham.—At a recent meeting of the Fulham Board of Guardians a long discussion took place respecting the instructions to be given to architects for preparations of plans, &c., and it was resolved that 100 guineas be awarded to the architect whose plan should be accepted by the Guardians, and 50 guineas to the architect who should stand second in the estimation of the Board, such plans to become the sole property of the Board.—On the motion of Mr. Pickersgill, seconded by Mr. Turner, it was decided to allow the architect of the new building 5 per cent. up to 20,000*l.* and 2½ per cent. on any outlay beyond that sum. Mr. Hunt, in reply to Mr. Thompson, who contended that 5 per cent. up to 10,000*l.* would meet the case, said that it was not always the lowest figure that turned out the cheapest, and he believed the higher figure would be more favourable to the Board in the end. The Clerk having remarked that it was usual in similar cases to appoint some one to supply the levels, Mr. Green moved and Mr. Cockerell seconded that Mr. Sanders, of King-street, supply the levels at a fee not exceeding 10 guineas. A discussion followed, some members contending that five guineas would be an ample fee, and others thinking that such matters should be left entirely in the hands of the architect; but ultimately Mr. Sanders was appointed at the fee originally proposed. The Clerk then, at the instance of the Board, went *seriatim* through a list of requirements to be submitted to the architects on behalf of the Board. The new building must afford accommodation for upwards of 360 cases, exclusive of separate arrangements for lock and other special cases. After considerable discussion it was resolved, "That an eminent architect (such architect to be a member of the Institute of British Architects) be called in to assist the Board in deciding how far the plans submitted conform to their requirements, and also as to their relative value."

Clerkenwell.—The Guardians of the Poor of the Holborn Union propose to erect a new infirmary on the site of the old Clerkenwell workhouse, King's-cross-road (formerly Coppice-row). The cost of the proposed buildings is estimated at 60,000*l.*

Mitcham.—At the meeting of the Holborn Guardians on the 18th ult., the tender of Messrs. May Brothers, of High Holborn, for the laundry works at the Mitcham Schools, for the sum of 1,260*l.*, was accepted. It was referred to a committee of the whole Board to meet Mr. Snell, the architect, and confer with him as to the erection of a new infirmary at the schools.

PROVINCIAL NEWS.

Reading.—At a special meeting of the Court of Governors of the Royal Berkshire Hospital, Reading, on the 3rd ult., the following proposals for providing additional accommodation were submitted by the Board of management and the medical staff:—(1.) That the Nurses' Home be raised another story, to provide additional accommodation for nine private nurses and probationers, at an estimated cost of 1,700*l.* (2.) That an additional block be built on the south end of the Nurses' Home, for the accommodation of the housekeeper and twelve servants, at an estimated cost of 1,500*l.* (3.) That the laundry be erected at the south end of the proposed new dormitories, at an estimated cost of 1,500*l.* (4.) That the Nurses' Home, new dormitories, and laundry be connected with the main building by an inclosed way, to be carried along the south wall of the female convalescent ward, at an estimated cost of 500*l.* (5.) That the chapel be removed from its present position, and the side walls reduced in length to open out the quadrangle. The centre block of the hospital to be remodelled and extended. The present museum and library to be converted into a chapel, with operating-theatre and small ward over, at an estimated cost of 3,500*l.* (6.) That the out-patients' department be raised another story, to provide rooms for museum, library, and such other purposes as may be considered necessary, at an estimated cost of about 2,000*l.* (7.) That the kitchen be altered by having a lobby made at the entrance, and fitted with a ventilation-shaft, to prevent the smells of cooking, &c., from entering the wards, and the present laundry to be converted into a dining-hall for servants, at an estimated cost of 350*l.* Plans of the proposed new buildings and alterations were exhibited by Mr. Joseph Morris, the architect, and it was resolved to carry them into execution. The total estimated outlay is 11,000*l.*

Coggeshall.—A lych-gate has recently been erected at the principal entrance to the parish churchyard, as a memorial to the late Mrs. Bonton, the mother of the donors. It is executed in the style of the fifteenth century, and has been constructed in English oak, by Mr. C. H. Oldridge, of Colchester, from the designs and under the direction of Mr. E. J. Dannpier, architect.

Bath.—On the 19th ult. Mr. S. J. Smith, C.E., one of the inspectors from the Local Government Board, held an inquiry in the Council Chamber, at the Guildhall, relative to the application of the town council (acting as the Urban Sanitary Authority) for the sanction of the Board to borrow 7,700*l.* for works of wood-paving. The surveyor (Mr. Parfitt), in answer to the question by the inspector, "What wood do you propose to lay down?" replied, "Archangel; that is the best material we can find, in my opinion." The inspector: You have selected good resinous, tough wood? The surveyor replied in the affirmative, and added, that it was intended to lay the blocks with open joints, filled with concrete and bituminous compound. The inspector, before closing the inquiry, pointed out the necessity there was for care in selecting the wood; that would be the greatest boon to themselves. The good or bad selection of material would make a difference of four or five, or even six or seven years, to the life of it. If they got soft pine-wood it would only have a short life. Doctors differ!

Stafford.—The corner-stone of the new butchers' market has been laid. The buildings are being erected from the plans of Mr. Joyce, which were selected in competition. Mr. Bridgett is the contractor.

Bilston.—A special meeting of the township commissioners was held on the 10th ult., to receive the sanction for, and to authorise the borrowing of, 1,500*l.* on the security of the General Improvement rate, and of 1,200*l.* on the security of the Free Library rate, and to give instructions as to the proposed Town Hall and Free Library extensions. The Chairman said he was pleased that the Local Government Board had sanctioned the proposed expenditure. At the recent Local Board inquiry an unexpected opposition sprang up, and much was said about the state of the town. Distant papers had also published articles referring to Bilston as a "doomed town," with its collieries worked or drowned out and its manufactories closed, but this was exaggeration. Better times were in store for the town, and as the extensions were greatly needed the sooner they were commenced the better it would be.

Dudley.—On the 23rd ult. the new Corporation baths erected at Dudley were opened by the mayor. Alderman W. North, the ex-mayor, gave a detailed account of the work of the Sanitary Committee, who had had the undertaking in hand. In the course of his remarks he stated that the contract for the building was a little over 4,000*l.*, the machinery would cost about 1,500*l.*, the land was purchased for 600*l.*, and it was expected that the whole would be completed for 7,800*l.* or 8,000*l.* The Mayor having referred at some length to the various Acts of Parliament passed during the last thirty years for the sanitary improvement of the people, amongst which stood the Baths and Wash-houses Act, declared the baths opened. The baths are built of red brick, the front elevation being relieved by mouldings of a corresponding colour. There are three entrances leading directly to the private baths, sixteen in number; four first-class for ladies, and six first and six second-class for gentlemen. The swimming-bath is 10½ ft. long in its total length, but it will be divided to afford accommodation for first and second class bathers. The breadth is 30 ft. and the depth ranges from 3 ft. 6 in. to 5 ft. 6 in., and the bath is capable of holding 88,000 gallons of water. The machinery is fixed in the rear of the baths, and includes a Davey's patent differential engine of nominally 40-horse power. Two Lancashire boilers, 20 ft. by 6 ft. 6 in., generate the steam both for the pumping-engine and for heating the water in the swimming-baths. The exhaust steam is conveyed to a Berryman's water-heater, whence it is forced by Pearn's quadruple-acting pump into the boilers and to supply the private baths. An iron tank has been placed on the top of the engine-house for holding a supply of water in case of any accident to the machinery. The pumps, which are particularly adapted for the work, are fixed in a shaft 120 yards deep, from which the supply of water for the baths is taken. Messrs. Davies & Middleton are the architects, and Messrs. Holland & Son the builders. The machinery was selected and laid down by Mr. Alexander Smith, C.E.

WESTMINSTER OFFICES COMPETITION.

We understand that the referee, Mr. Charles Barry, has made his report upon the designs submitted, and that it is now being printed, in order to be dealt with at a special vestry meeting to be held next week.

Surveyorships.—At a meeting of the Aldershott Local Board of Health, held on the 10th ult., Mr. W. L. Coulson was unanimously elected surveyor out of 108 candidates.

"FOOTINGS ON ANOTHER MAN'S LAND."

THE brief note which we appended to a letter under this heading seems to have surprised a number of persons, and we have received letters from several solicitors, amongst others, calling on us to justify the assertion we made. The following will serve to represent what they say:—

"Sir,—In the *Builder* of August 21st, page 249, appears a letter, headed 'Footings on another Man's Land.' You append a note at foot saying Building Bills have been before Parliament giving right to place footings on an adjoining owner's ground. Will you kindly inform me when these bills or acts were passed and where I can obtain a copy? because there is hardly a week passes that I have not disputes brought to me as to the encroachments of the footings, and in nearly all cases I say that according to common law no man has a right to place a single brick on the adjoining property without the consent of the owner.

HENRY W. MICHELL."

We said nothing about "Acts" or Bills passed. What we said was, "Building Bills which have been brought before Parliament have contained a clause giving right to a building owner to place footings on adjoining owner's ground." The Bill to which we more immediately referred was that prepared by the Metropolitan Board of Works and ordered by the House of Commons to be printed 20th March, 1874.

Part 4, Clause 24, sets forth how, where grounds of different owners adjoin and are unbuilt on at the line of junction, and the owner of one piece of ground is about to build thereon, he is to proceed; and thus concludes:—

"Where in either of the cases aforesaid the building-owner proceeds to build an external wall on his own ground, he shall have a right at his own expense at any time after the expiration of one month from the service of the notice, *to place on the ground of the adjoining owner the projecting footings of the external wall with concrete or other solid substructure thereunder*, making compensation to the adjoining owner or occupier for any damage occasioned thereby."

This Bill never became an Act.

We might have gone farther than we did in our note, and said that at one time it was the law of the land that a building owner might place his footings on the adjoining owner's property without his consent. For the benefit of our legal friends, some of whom seem a little behindhand in this matter, we will make this clear.

The Metropolitan Buildings Act, 7th and 8th Vic., cap. lxxxiv., sec. xxxviii. says,—

"And be it enacted, with regard to walls, so far as relates to the building thereof on vacant ground at the line of junction of premises belonging to different owners or in different occupations. That one month before the owner of any piece of vacant ground, or ground not hitherto built upon, shall build any building adjoining to another piece of vacant ground, or ground not hitherto built upon, or build a fence-wall for such piece of ground, it shall be his duty, and he is hereby required to give to the owner or occupier of such adjoining vacant ground a notice, which must be in writing, and must set forth his desire to build a party-wall or party-fence-wall, and describe the thicknesses and dimensions of such desired party-wall or party-fence-wall, according to the form (No. 16) in the schedule of notices, or to the like effect; and that if within such period of one month such adjoining owner shall signify his consent in writing, then the same must be built partly on the ground of one of the said owners or occupiers, and partly on the ground of the other owner, and such last-mentioned part is to be paid for as is hereinafter directed by such other owner or occupier; but if he do not signify such consent, then it shall be the duty of the building owner to build an external wall for such building, and fence-wall for such ground, entirely upon his own ground, *except as to the footings of any such wall.*"

We may therefore repeat what we originally said, and with an addition,—Building Bills which have been brought before Parliament have contained a clause giving right to a building owner to place footings on adjoining owner's ground; and at one time, viz., till the abrogation of the 7th and 8th of Victoria, cap. lxxxiv., this was the law in London.

English Cholera in Sandbach, Cheshire. Whether the cause be the impure condition of the water in the town and the district, or whether, as alleged by Dr. Davies, it is the result of neglect in the removal of nightsoil, the fact remains that in and around Sandbach, the *Warrington Guardian* says, the epidemic, which was reported in its columns a few weeks ago, has not abated in any degree. The Local Board, it is stated, seem fully alive to the urgency of providing an adequate and purer water supply, and have in view a scheme that will furnish Sandbach with all the blessings of a full and pure supply of water.

SEWAGE IRRIGATION.

Kidderminster.—At the last quarterly meeting of the Kidderminster Town Council a discussion took place with reference to a plan prepared by Mr. Pritchard, C.E., for draining the Sewage Farm.—Mr. H. Dixon, the Chairman of the Drainage and Waterworks Committee, read his report, which stated that subsequent to the visit of the members of the Town Council to the Sewage Farm, Mr. Pritchard, at their suggestion, prepared and sent in a modified scheme and plan for the drainage and distribution of the sewage, which could be carried out for a sum varying from 2,500*l.* to 2,800*l.* It was resolved to carry out the work.

Warwick.—On the 19th ult. Mr. Thornhill Harrison, C.E., one of the inspectors of the Local Government Board, held a public inquiry respecting an application by the Warwick Town Council for the Board's official sanction to a loan of 2,500*l.* The Town Clerk explained that the money was required for the sewage farm, the management of which had recently reverted to the council. There was no opposition.

AMERICAN NOTES.

A Town Burned Down.—Eureka, a mining town of Nevada, was almost entirely burnt down on the 17th ult. The loss is estimated at $1,000,000. This fire, following closely upon the severe fire which occurred last year, has considerably discouraged the inhabitants, who had scarcely finished their rebuilding.

A Big Blast.—A big blast at the Blue Tent diggings was fired off on July 2. The charge consisted of 1,542 kegs of powder, at 25 lb. to the keg, making in all 38,550 lb. The firing was done by electricity. The result was very successful. The bank, which is 238 ft. perpendicular, was torn away for about 150 ft. back, and 200 ft. wide. It is believed that this is the largest piece of ground torn from its foundation in one blast that has ever taken place in California.

Elevated Railway for Chicago.—The Metropolitan Elevated Railway Company of Chicago, with a capital stock of $5,000,000, has been licensed by the Secretary of State.

American Locomotives.—Advices from New York state that a large new locomotive, constructed by the Baldwin Locomotive Works, to be run on the Bound Brook branch of the Philadelphia and Reading railroad, and which has since the suspension of that company remained in the possession of its builders, has been purchased by Mr. F. W. Eames, of Watertown, New York, for brake trials and tests in England. It was to be fitted with the Eames duplex automatic vacuum brake and shipped to London. Mr. Eames proposes, while showing the action of the Eames brake on railway trains at the highest speed which it is possible to attain, at the same time to settle the vexed question of the relative superiority of American and English locomotives.

Proposed Colony of English Workmen.—It is stated that Mr. Thomas Hughes, Q.C., will, during his visit to the United States, lay the foundation of a new town in East Tennessee, where a colony for English workmen is to be established. The land is fertile, and the soil rich in minerals. An American paper suggests that it be called "Tomhrown."

A Wonderful Gas-Well.—An occasional correspondent of the *Globe*, writing from Sheffield, Warren County, Penn., U.S., says:—The most wonderful part of Sheffield is a natural gas-well. The gas from this well is used in the furnace of the tannery of Horton, Crary, & Co., and runs the machinery; it also lights all the houses in the town, being brought in iron pipes two miles from the well. It was discovered in boring for petroleum. Escape pipes have been run up to a height of some 20 ft., and the huge flames from these pipes flare away day and night, and have done so for the last five years. The daily amount given off is estimated at 2,000,000 ft. The gas was found at a depth of 1,350 ft., and blew all the boring machinery out of the well. The pressure is so great when turned full on that the gas blows itself out. The smell is not the same as coal-gas, but more like petroleum. There is little doubt this gas-vein is on the edge of a petroleum field, or more probably all the land near is underlaid with it. The amount has not been found to lessen nor the pressure diminish in the whole five years.

New Colleges and Schools.—The executors of the late Alexander T. Stewart have appropriated sums, which will probably amount in the aggregate to $3,000,000, to the establishment at Garden City, Long Island, of a college for the education of young persons of both sexes at a charge of less than $100 a year, including travelling expenses from New York or Brooklyn. The first building, nearly complete, will accommodate 500 students. Two other buildings of equal dimensions will be erected beside it. A building, to accommodate 300 young women, occupying 25 acres, with annexes and surrounding grounds, will also be completed very soon. A divinity-school, to educate young men for the ministry of the Episcopal Church will also be established in Garden City.

CONTINENTAL ITEMS.

Observatory on Mount Etna.—Professor Silvestri, of Catania, says that in a short time the Observatory on Etna will be an accomplished fact. The Italian Government contributes half of the expenses, the Province of Catania a fourth, and the Commune of Catania the remaining fourth. The object of the Observatory is the study of vulcanology, and therefore it has been built at the base of the central cone, exactly on the former site of the well-known refuge called the "Casa degli Inglesi."

The Vieille Montagne Zinc Mines.—The general production of the Vieille Montagne Company's zinc mines last year was 65,839 tons, as compared with 75,955 tons in 1878. The production of galena effected by the company also declined to 5,907 tons last year, as compared with 6,499 tons in 1878. The reduction in the production indicated by these figures was effected voluntarily by the Sardinian and Algerian agencies, as in consequence of the low strength of the minerals obtained in those countries, and the difficulties attending their working, they do not yield any profit when prices fall below a certain point.

Communication with Belgium.—Sir Edward Watkin, Sir Henry Tufton, Mr. Myles Fenton, and Mr. Abernethy, C.E., of the South-Eastern Railway, have had an audience with the King of the Belgians, in reference to the construction of additional ports and harbours on the Medway and the Belgian coast, and the establishment of a fast and commodious line of steamers between the two countries.

Fire in St. Petersburg.—What is described as the most extensive fire that has occurred in St. Petersburg for the last seventeen years took place on the 16th ult., in the Ligofka quarter. More than twenty buildings were destroyed.

A large Lathe.—What is stated to be the largest lathe, not only in France, but in the world, has just been erected at the St. Chamond Steel Works, in the Department of the Loire. It is destined for the turning of 100-ton guns, and was supplied by Sir Joseph Whitworth & Co., of Manchester.

WATER SUPPLY.

Liverpool.—The Bill to enable the authorities of Liverpool to take a supply of water from the Severn has received the Royal Assent, and on the 9th ult. the Town Council resolved to proceed at once with the first section of the works. It is expected that the whole scheme will be carried out in five years, and will secure an additional supply of 13,000,000 gallons of water per day for Liverpool. Mr. Wilson, chairman of the Water Committee, remarked that the Bill provided for Liverpool a *minimum* quantity of forty gallons daily per head, and it enabled the corporation to sell water to their neighbours at a fair price. What, however, was of great importance was that the corporation had power ultimately to retain the whole water supply, the condition being that five years' notice to discontinue can be given when only thirty gallons per head are available for increased population. The only payments to which the corporation were committed were to the various interests on the Severn, 30,500*l.*, and to other petitioners for legal expenses some 1,400*l.* The engineers had confidence that the estimates submitted to the council would be ample to carry out the work. They would be increased to the extent of 25,000*l.*, owing to the additional height of the embankment at the Vyrnwy necessary to meet the increased compensation water to be given to the Severn. No amount had been included in the engineer's estimate for the purchase of

the watershed, but about 8,000 acres had been acquired for 61,000*l.*: and if the remainder of the shed round the lake could be bought it would insure the absolute purity of the water for all time. Manchester had wisely acquired the watershed at Thirlmere, and it was to be hoped the same thing would be done by Liverpool at Vyrnwy.

Llandudno.—The new Llandudno Waterworks, opened by the Prince of Wales a short time since, draw their supply from two lakes, Dulyn and Melynllyn, having an acreage of 32 and 18 acres respectively, in the Snowdonian range, and distant from Llandudno about fifteen miles. The report of Professor Frankland respecting the Dulyn water says, "For the supply of a town it is fully equal to the celebrated Loch Katrine water." The lake being 1,700 ft. above the average level of the town of Llandudno, there is no apprehension as to the flow by gravitation. The second lake (Melynllyn) is secured mainly for supplying the compensation-water stipulated in the Act of 1876. The first four miles of pipes from Dulyn to the service-reservoir are 15 in. in diameter, and, with the exception of valley crossings, are of earthenware pipes. These are laid at easy gradients, and are not under pressure. The valley crossings are provided with wash-out branches and valves. Manholes and ventilators are provided at suitable points for examination and ventilation. The 15-in. conduit-pipes are capable of delivering a sufficient quantity of water to supply the maximum summer population of Llandudno when it is double the present number of 12,000. The pipe-line from the service-reservoir to the town of Llandudno is twelve miles in length, and the pipes are 9 in. in diameter. These are laid in duplicate under the bed of the river Conway, with valve arrangements to use either of the two lines at will. The whole system is provided with sluice, air, and wash-out valves at appropriate places. The scheme authorised by the Act of 1876 included two service-reservoirs, one at Llwyngwaew, four miles from the lakes, and the other at Bryn Gosol, about two miles from Llandudno; but for the present it is considered that the existing service-reservoirs in the town are sufficient, and therefore the cost of constructing the proposed reservoir at Bryn Gosol is saved. The service-reservoir at Llwyngwaew is 535 ft. above the level of the sea. It is constructed of brickwork, backed with concrete. The earthenware conduit terminates, and the pipe-line commences there. There is a by-pass arrangement, so that water can flow direct from Dulyn to the town, while the reservoir is empty for cleaning, repairs, or otherwise. The total cost of the works when completed, including the purchase of lands and easements, is estimated at 40,000*l.* Mr. T. T. Marks, C.E., engineer to the Llandudno Improvement Commissioners, is the author of the scheme.

South Staffordshire.—New works belonging to the South Staffordshire Waterworks Company have been inaugurated. In consequence of applications for the supply of water for domestic and manufacturing purposes, the attention of the directors was in 1873 directed to the water which was being liberated in such abundance by the trial sinking for coal by the Cannock and Huntington Colliery Company at Huntington, and the water was reported upon so favourably by Dr. Hill that in the summer of 1874 the directors decided to make Huntington the site of a new pumping-station. Dr. Hill subsequently reported still more favourably of the Hednesford or Rugeley water, and his analyses were at a later period confirmed by Professor Voelcker; whilst the difficulty experienced by the colliery companies in keeping down the water in their sinkings, and the opinion of Professor Ramsey, justified this company in anticipating an abundant supply. A Bill was therefore obtained in 1875, and arrangements were made for erecting two pumping-stations, one at Huntington, and the other about three miles and a half away, on the side of the main road leading from Hednesford to Rugeley, with a capacious reservoir on the summit of one of the highest hills above Hednesford. The contracts for the engine-houses and buildings were taken by Messrs. Trow, of Wednesbury; that for the engines by Messrs. James Watt & Co., of Soho; and that for the reservoir, which is known as the Scout House Reservoir; and for the laying of the pipes and mains, by Mr. Joseph Walker, of Crewe. These stations were completed about twelve months ago, but owing to the bad weather which prevailed last year the formal inauguration of the extension works was deferred from time to time, and at last postponed until this year. The Huntington pumping-station consists of a Gothic building, of red brick with stone dressings, erected from the designs of Mr. Naden, architect, Birmingham, and it contains two powerful single-action Cornish engines of 165-horse power nominal, working up to perhaps 300-horse power, with a well-pump of 21¾ in. diameter, and a 10 ft. stroke, the quantity of water raised at each lift being something like 340 gallons. Each engine is capable of raising 2½ million gallons in twenty-four hours, or a total of five millions from this station, and a like quantity can be raised from the one at Hednesford. Leaving out of account the older engines at Lichfield, which can raise six or seven million gallons a day, this yield is nearly double the present daily demand upon the company's resources. The water is pumped direct from underground springs in the conglomerate or pebble-bed formation, a subdivision of the new red sandstone rocks, and is carried by mains to Cannock, where, at about the centre of the Market-place, it joins the supply sent down from the Hednesford station, and if there should be a demand for the water, the united streams flow on by mains altogether independent of the old system along the high road through Bloxwich to Walsall and the Black Country, being kept distinct from the Lichfield water until Wednesbury is reached. The surplus water flows back from the point of junction at Cannock to the Scout Hill Reservoir. The Hednesford Station is in arrangement and construction almost a counterpart of the other, the engines being duplicates of those at Huntington; and here, as there, cottages of picturesque design, harmonising with the pumping-houses, have been provided as residences for the engineers and their families, which, paved throughout, covers sixteen acres, and contains when full about 42,000,000 gallons of water. The company has now spent 720,000*l.* on the works, the extensions under notice, with some minor ones elsewhere, having absorbed 313,000*l.* The late Mr. J. R. McClean, M.P., was the engineer.

Littlehampton.—On the 14th ult. the Duke and Duchess of Norfolk visited Littlehampton, and laid the foundation-stone of the new water-tower, in connexion with the extensive new water-works, which are in process of completion. The Local Board, acting under the advice of Mr. R. B. Grantham, their engineer, have bored and excavated till they have obtained a supply estimated to yield 168,000 gallons per day; and, Littlehampton being built on a dead level, a tower was found necessary to distribute the water over the district. The storage capacity of the proposed tower will be 80,000 gallons; and the estimated cost of the entire works is 11,000*l.*

Dundalk.—A public meeting of the ratepayers of Dundalk was held on the 19th ult. for the purpose of obtaining their sanction to the proposed scheme of having waterworks constructed to furnish the town with a supply of pure water, the sanitary authorities having condemned the present supply as inadequate and impure. It was understood that a committee of six, composed of the largest ratepayers in the town, would be asked to assist the Town Commissioners in carrying the matter into execution.

Evesham.—At the quarterly meeting of the Evesham Town Council, a few days ago, the Sanitary Committee reported that the scheme of a supply from the property of Colonel Davies, of Elmley Castle, could not possibly be entertained, the engineer to that gentleman having sent in conditions which rendered it impracticable,—requiring, among other things, that the villages of Elmley Castle, Netherton, &c., should be supplied at cost price, the Corporation laying down pipes, and also that Colonel Davies should have a right of supply for ornamental purposes; and further, if the supply should fail, or other necessity for the abandonment of the work should arise, the whole of the plant should remain upon the estate. These conditions, Councillor New said, rendered it necessary for them to look out for another scheme. The Sanitary Committee were deputed to consider and report upon a scheme for taking a supply from the Avon. The cost of such a scheme was estimated at 16,000*l.*

Telephony.—The authorities at Newcastle have agreed to allow the United Telephone Companies to lay underground wires for telephonic purposes.

LONDON WATER-SUPPLY.

SIR,—Perhaps you will pardon my addressing a letter attempting to introduce a suggestion on so important a matter as that of the London water-supply. Taking it that there will be no dissentients to the holding of the Select Committee that "the supply of water to the Metropolis should be placed under the control of some public body which shall represent the interest and command the confidence of the water consumers," I think this might be attained without the introduction of an entirely new supply from one gigantic source, and without the removal of the existing companies, by a method of subsidising these companies from a new source or new sources of supply. According to this method, the body of control would bring in fresh supplies of water and deliver them to the companies to be distributed by them, and would also introduce water where they could not readily do so. The companies have the means of distributing to a large extent, and could increase their distributing facilities to suit the public demand. Were they supplied abundantly, and a copious filling in where there was a deficiency in any square of the area made, the Metropolis would be well provided with water. How many million gallons above their present run each company would require, what additional mains would be necessary to make the whole circle of supply complete and ample, and how much each company would have to pay for this assistance, would have to be regulated from the statistics and the plans of the city. A word might also have to be spoken by Parliament with regard to the maximum rate at which the commonalty should be supplied with a certain minimum of water, regulated by the size of the bore of the tap through which it flowed. Where a large supply of water is required it must be paid for always accordingly. W. Y. B.

P.S.—In Glasgow, when the Loch Katrine water was introduced, all the machinery for bringing water from the river Clyde was removed. The corporation now find it requisite to restore the machinery for pumping from the Clyde. It is not always advisable to make a clean sweep.

PITCH-PINE: WOOD FOR WINDOW-CILLS.

SIR,—Your correspondent "Pinus" desires further information about pitch-pine than has already been given by "A Civil Engineer." The following is at your service.

When I first used pitch-pine I formed a similar opinion as to its capabilities to that of "Pinus," but after a few years I found, on taking out some sash-frames which were but lately inserted in the building, that the oills were quite decayed, and also that the paint had not adhered to them as it had to the other portions of the frames. I have since had to use it for cills, when specified, but am so dissatisfied with its behaviour that I have not done so of my own accord for many years, considering Memel, or what we call Petersburg red deal, to be much more durable. Some kinds of imported oak (American red, for instance) I have found to be less durable than the red deal, though from the scarcity of English oak imported timber has frequently to be used for cills. An experience of forty years has caused me to form a similar opinion to that of "A Civil Engineer" as to pitch-pine,—its liability to decay quickly when exposed to damp, its tendency to twist in framing, and to shrink in all, or nearly all, situations when used in any but narrow widths. It is also inferior to Memel when exposed to transverse strains, as it snaps short with but little warning when overweighted; whilst Memel deflects considerably before breaking, and its fracture is not so short as pitch-pine.

AN OLD CARPENTER.

SIR,—I have been requested to give my experience of the different woods available and suitable for the cills of window-frames.

I prefer to class them as I consider they stand, viz., oak, chestnut, pitch-pine, Dantzic, and Memel fir. Oak is, doubtless, the most durable, but as it would be too expensive a matter to construct frames entirely of this material generally, and fir being the class of wood well-adapted to the upper portion of frames, and, beside being the cheapest article, is not so subject to warp, some suitable wood should be chosen for the cill. From my experience of the effects of oak on fir, when both are framed together, and the

oak has the slightest chance of imbibing moisture, and of thus imparting its tannin to the fir, I should by no means use it for window-cills; but for door-cills, it is quite another matter, for the wear of the cill will bring about an equal necessity for a new cill, and, partially from decay, new posts. Chestnut, well seasoned, would be decidedly preferable to oak for window-cills, being less likely to warp, less detrimental to fir, and if kept fairly free from wet, a most durable wood. But when we find that with our hard wood (I mean of English growth) fir is somewhat out of place, and fir being the material most used, both for its cheapness, abundance, and ease of working, we should try and find a wood which will by its nature agree with fir, and yet by its inherent strength and quality resist unnecessary wet, and these, it seems to me unite in pitch-pine. This wood seems to me to have been given to us by a wise Providence, not to be wasted, but to be wisely and judiciously used. I have used it for fifteen years, when I could persuade architects to allow me, and can bear witness to its quality; for what is most destructive to many other woods is simply a necessity to this,—I mean dampness, or, rather, wetness,—and that which Baltic fir most needs pitch-pine is most ready to part with, viz., resin, and thus a balance of supply and demand is kept up, and the work is preserved; but I think we ought by no means to despise either Dantzic or Memel fir for window-cills. Both classes of wood contain strong resinous qualities, and this fits them admirably for window-cills, or cills of heavy wood structures; but if I were called upon to decide in this matter, I should choose pitch-pine, both for its cheapness and durability, and also for its natural agreement with the poorer qualities of fir. But I hope that I shall not be understood to be an advocate for pitch-pine for all constructive purposes. Let it be plainly understood that this wood requires a certain amount of feeding either with oil or water; and if neither of these is supplied, and especially if fresh air is withheld from it, it will live upon itself, and, I should think, rapidly decay; and here I may remark that if architects would so arrange the ends of heavy timbers that free ventilation is allowed all round, they would save the annoyance of finding heavy floors subsiding, and main timbers rapidly decaying.

W. B. F.

Sir,—As a result of eight years' experience in the building trade in America, I have found that pitch-pine, when used in external work, will last but few years. Yellow pine, or, as it is called there, white pine, is almost universally used for window-cills and all work exposed to the weather,—of course, being kept well painted. Pitch-pine in the Southern States, where it is cheaper than other varieties, is used for flooring and bearing timber, as joists, rafters, &c.

Saml. Bland.

Sir,—Twenty years ago I bought my first dry pitch-pine plank, and it had gone rotten at the end while standing to dry. Since then I have bought many thousands, but if ever I buy them dry, there are pretty sure to be some rotten on the face, where they have been piled without slips between. I believe any timber-merchant who deals in it will verify this; and the fact that it is nearly always stored *under cover* is another proof of its being unfitted for outdoor work.

One of your correspondents speaks of the large amount of resin, &c., it contains, as being proof of its enduring qualities; but if this is so, how comes it that the best methods of preserving timber proceed on the basis of forcing out the natural juices, and filling the pores with tar, creosote, &c.?

G. M. H.

RAILWAY CATASTROPHES AND WORKMEN'S EDUCATION.

Sir,—In your issue of Aug. 21 (p. 225), under this heading, you again call attention to the necessity there is for extension in the technical or practical education of working men by means of text-books *for each trade*.

I was about to address the engineering papers in connexion with the two recent railway accidents, and to specially mention what I may be allowed to say here.

While in charge of an Eastern Colonial line of railway, I caused to be placed in the hands of every responsible working man, *i.e.*, those in charge of a gang of repairers, a tabulated form, showing position, radius, super-elevation for outer rail, gauge of different curves, inclination of road, &c., with special instructions as to lifting, packing, strengthening, &c., during traffic. I also gave them instructions on the ground on my regular visits to each gang,—visits being by walking, and not by flying past on a trolley, or upon an engine, or in a van. Each bridge was specially cared for much after the same way.

With regard to the drivers, the only information they have about the road is that of the inclination which is painted by the road-side, and seldom noticed after the first few runs.

Engine-drivers as well as repairers ought to have every information possible in their possession regarding the construction of the road, and the latter ought to be visited oftener, and in very different manner from the present, by their immediate superiors. In my opinion more knowledge of the way of keeping the road in repair would have prevented both accidents alluded to.

Jas. Douglass.

SERPENTINE.

Sir,—Referring to the notice of business premises in your paper of the 31st of July last, we shall be glad if you will permit us to state that the information you received on the premises, that the columns and pilasters referred to were of Devonshire marble, is not precisely correct. They were supplied from the Serpentine Quarries at Poltesco, near the Lizard.

Clark & Co.,
Contractors for the Shop Front.

DRAINAGE IN TOTTENHAM AND NEIGHBOURHOOD.

Sir,—I am not a constant reader of the *Builder*, but I was very glad when a friend drew my attention to the correspondence which has appeared in your paper on the above subject. The grievance of the influx of sewage and storm-water in times of heavy rainfall extends as far as Enfield, and I regret to add that my tenants have been greatly inconvenienced thereby. I can fully bear out the testimony of Mr. A. R. Brede (whose letter you published June 26), who states that every storm renders the lower part of the houses uninhabitable, and the water and filth spoil everything. It is really a very heavy loss to the owners of the property thus inundated.

I shall be very glad to be in communication with Messrs. Smith, Webber, and Brede, who have, like myself, had correspondence with the Local Board of Health, and I shall be very glad for any advice and suggestion on the subject. I hope you will be good enough to insert this letter, and that soon we may have the names of other sufferers.

H. B. P.

CHURCH-BUILDING NEWS.

Whittle-le-Woods (near Chorley).—The foundation-stone of St. John's Church was laid by Colonel Crosse, of Shaw Hill, on the 31st of July. The church is in the Early English style, and comprises: nave, 82 ft. long by 32 ft. 6 in. wide, and 45 ft. high; south aisle, 82 ft. long by 13 ft. 6 in. wide, and 30 ft. high; north transept, 19 ft. 9 in. long by 30 ft. 9 in. wide, the roof intercepting with the nave. The chancel will have an octagonal apse, 37 ft. 9 in. by 25 ft. by 32 ft., and will accommodate a choir of forty. The organ-chamber will be 15 ft. by 15 ft, and 30 ft. high, and the vestry under the tower 15 ft. by 15 ft., and 19 ft. 6 in. high. In the area of the church accommodation will be provided for 572 persons. Adjoining the north transept a lofty tower will be erected, to contain a peal of eight bells. The internal dimensions of the tower will be 15 ft. by 15 ft., and 90 ft. high. The belfry and portions of the tower above the ringer's room are not included in the present contract. The nave will be divided from the south aisle by an arcade of five bays, having pillars with enriched carved and moulded caps and bases and moulded arches. All the roofs are open, with curved and moulded principals. The whole of the work has been designed by Messrs. Myres, Veevers, & Myres, architects, Preston, who are carrying out the work. The contractors for the work are the Victoria Timber Company, Chorley, the amount of their contract being 5,428*l*. Mr. John Bowen is acting as clerk of works.

Beverley.—On the 3rd ult., the new church erected in Holmechurch-lane, Beverley, on the site of the old parish church, was consecrated by the Archbishop of York. The building has been erected under the will of the late Lord Wolverton in memory of his son, the Hon. Richard Riversdale Glyn, who was born in 1831, and died in 1859 while returning from India, where he had been engaged with the forces all through the Mutiny, and was buried at Aden. The style is Geometrical, or Early Decorated, and the tower when finished will have a peal of bells. The church comprises a nave 70 ft. long by 23 ft. wide and 47 ft. high to the ridge, a chancel 25 ft. by 23 ft. wide, a porch, organ-chamber, and choir-vestry on the south side. The tower is 19 ft. square, 94 ft. high, and rises at the south-west angle. The building is erected of Bradford stone, with Whitby Crag Moor stone dressings to the window tracery, cills, copings, &c. The interior of the walls is lined with red stock bricks. Messrs. Simpson & Malone, of Hull, and Mr. Elwell, of Beverley, are the contractors. The design of the building is by Messrs. Smith & Brodrick, architects, Hull, who have superintended the erection of the church. Accommodation is provided for a total of 360 persons.

Erlestoke.—A new church has been built at Erlestoke. It is Gothic in style, and has been erected from plans by Mr. Street, R.A. On plan the building consists of a nave, north aisle, chancel, south transept, vestry, tower, and porch. The nave measures 48 ft. by a little over 21 ft. wide, and the chancel is 26 ft. by 17 ft. 6 in.,—making a total length of 74 ft. The height of the tower is 45 ft. to the line of its parapet, and it is surmounted by a sharp-pitched roof. The whole of the roofs generally are covered in with plain red tiles, made by Mr. Box, of Market Lavington, surmounted by crestings, by Cooper, of Maidenhead. The building is built of Box Ground stone throughout,—not only in the dressings but the walling as well,—all the Box stone, after being faced up, is left "batted" from the tool; and in no instance is it "dragged" or rasped up to an affected smooth surface, as is the usual treatment in "soft" stone masonry. The interior walls, like those outside, are all of solid Box Ground stone, tooled over. The roofs throughout,—with the exception of that of the organ-chamber and north aisle, which is flat panelled, divided by longitudinal and transverse moulded ribs,—are open, and of Memel fir. The nave roof is divided into four bays, with moulded and carved and embattled bracketted hammer beams, supporting principals with curved braces and purlins. The principals rest upon stone corbels. The chancel roof is divided into four smaller bays; the principals with their curved ribs abutting on to the wall plates. There is a rise of five steps from the chancel to the altar. The chancel floors are laid with Godwin's encaustic tiles of ornamental design. The steps are of polished Pennant stone, with tiled risers, and the floors of the church generally are laid with Mr. William White, F.S.A.'s, patent Block-wood flooring. This has been put down by Mr. Gregory, of Clapham Junction. The font is of Corsham stone; it is octagonal in plan, richly moulded on all the cants. It stands upon a polished sub-base and step of Pennant stone. The old oak Jacobean pulpit has been utilised again, placed upon a Pennant base. The chancel fittings are of oak, and the body of the church is seated with pitch-pine. It is heated by Messrs. Jones & Son's (of Bankside, London) system of hot-air. The carved work has been executed by Mr. Harry Hems, of Exeter. The builders are Messrs. Hale & Son, of Salisbury, and their managing foreman on the spot was Mr. William Cowley. Mr. Street has been represented by Mr. Thomas Chapelow, his clerk of works. The cost of the church is rather over 6,000*l*., and it is anticipated that it will be opened in September. A new parsonage has been built also from Mr. Street's designs, and by the same contractors.

Marston.—Marston parish church, near Grantham, was re-opened on the 3rd ult. by the Bishop of Lincoln, after restoration. When the rector, the Rev. H. B. Thorold, first undertook to restore the chancel, nearly three years ago, the roof was flat, the east window of the south aisle was partly blocked by a brick-vault, and light was introduced into the nave by a dormer window. The rector's example was followed by, so far as the vertical line is concerned, Sir J. H. Thorold, Bart., who undertook the restoration of the chancel arch and gable over it, together with the Thorold Chapel. The Bishop of Rochester (Dr. Anthony Thorold) contributed the stained glass in the east window, as well as a sum for providing a pulpit and reading-desk and the Dowager Lady Thorold; and other members of the family, by the insertion of painted windows and in other ways, have done their part. The new chancel, built on the foundation of the old, is an example of the fullest development of the Early English style. The stained glass is by Messrs. Ward & Hughes, of London, and the pavement by Messrs. Minton & Hollins. The tower and spire are of Early Decorated work. The south aisle, also of the Decorated period, has been rebuilt and re-roofed, and in connection with it may be remarked the perforated spandrils of the arches on that side of the nave, believed to be unique. The works have been carried out by Messrs. Rudd & Son, of Grantham, from the designs

and under the direction of Messrs. Kirk & Sons, of Sleaford, at a total cost of about 2,000*l.*

Swansea.—On the 5th ult. was laid the foundation-stone of St. John's Church, Cower-road, near Swansea, Mr. John T. D. Llewelyn, of Penllergare, on behalf of himself and father, gave the site for the church (about one acre in extent), and 1,000*l.* towards its construction. The church is to contain 300 sittings. Its estimated cost, with schools, is 2,900*l.* of which sum 1,550*l.* is still required. The architect is Mr. J. B. Fowler, of Brecon, and the contractore are Messrs. Thomas, Watkins & Jenkins, of Swansea.

Culworth.—The parish church of Culworth has been re-opened, after restoration. The church is dedicated to the Blessed Virgin, and consists of a chancel, with vestry attached, nave, and side aisles, and tower containing five bells and a clock. The church was partially restored at considerable expense by the late rector, the Rev. John Spence, and about four years ago it was determined to complete the work then begun, including the restoration of the tower, the reseating of the interior, the building of a new organ-chamber, the removal of the galleries, the opening up of the tower, the insertion of three new windows, the warming and lighting of the church, and the rehanging of the bells. The estimated cost for this was 1,145*l.* A piece of ground, given by the rector, has just been added to the churchyard, and enclosed with a stone wall by the parishioners, at a cost of 105*l.* Sufficient funds having been raised to warrant a commencement of the work, the services of Mr. E. F. Law, architect, Northampton, were retained, and under his directions Mr. Cotterell, builder, of Culworth, proceeded with the work of restoration, which has now been completed. The north aisle has been lengthened, and an organ-chamber constructed at the east end; the galleries beneath the tower have been removed, and the tower opened up; the old high-back pewe have been converted into open seats; new choir-stalls have been placed in the chancel; and the whole of the stonework, which was formerly painted and bedaubed with whitewash, has been scraped and cleaned, and restored to its natural colour. Mr. Cotterell, the builder, has, at his own cost, inserted a small stained-glass window at the west end, representing the Virgin and Child, in memory of his father and mother. The window was painted by Moore & Co., of London. Under the organ-chamber a new heating-apparatus has been put in by Haden & Son, of Trowbridge. The whole of the carving has been executed by Mr. Phillips, of Northampton.

DISSENTING CHURCH-BUILDING NEWS.

St. Austell.—The Congregational Church at St. Anstell has been re-opened, after restoration from plans by Mr. S. Trevail, architect, the contractor being Mr. Thomas J. Smith, of St. Austell. The organ has been re-erected by Mr. George Tucker, of the Octagon Works, Plymouth. The whole of the plumbing work has been carried out by Mr. W. Hawke, of St. Austell. The cost of the entire work amounts to 350*l.*

Newcastle-on-Tyne.—Trinity Presbyterian Church has been re-opened, after alterations and re-decoration. The various works in the church, and in the hall beneath it, and the painting and decorating, have been carried out in a satisfactory manner by Messrs. Copland & Rollo, Northumberland-street, and Mr. James Smart, Stamfordham-place, under the direction and superintendence of Mr. J. J. Lish, architect.

Poole.—On the 18th ult., a new Wesleyan church, built at a cost of 4,000*l.*, was opened at Poole. The architect is Mr. Charles Bell, of London, and the builder was Mr. Clarke, of Parkstone. The building, which will seat 950 persons, is in the Geometric style of Gothic architecture, and is built of Swanage stone, with Bath stone dressings. The main gable faces the High-street. A tower, about 100 ft. in height, is built at the angle of Chapel-lane and High-street, surmounted by a spire. The chapel is divided into a wide nave, with side-aisles, by arcades, supported by polished Shap granite columns, with carved capitals and bases. The pulpit was carved by Mr. Hems, of Exeter. It is of Bath stone, and consists of a projecting half-octagon centre, with side-wings, the stairs being behind. The front is arcaded, with polished Devonshire marble shafts, and enriched with a carved cornice. In the centre panel is a carving of the Transfiguration, and on the two sidee emblems of St. Mark and St. John; whilst in the panels of the returns are an open Bible and emblem of the Trinity, and the head of the Rev. John Wesley, grandfather of the founder of Wesleyanism, who, ejected from the Established Church by the Act of Uniformity in 1662, became a Nonconformist minister in the town. The gas coronæ and the hot-water heating-apparatus have been executed by Messrs. Joyner, of Poole. The end window is the work of Mr. T. Cox, of Southampton-row, and the general glazing by Messrs. Brown & Boreham, of London. The general carving has been executed by Mr. Grasehy, of Dorchester.

Peckham.—A new chapel and schools for the Unitarian body is about to be erected in Avondale-road, Peckham, from designs by Mr. Bruce, architect, Dulwich.

Rushden.—The Succoth Baptist Chapel has been re-opened, after renovated and re-seating. Mr. J. Bayes, of Higham Ferrers, did the mason work and plastering; Mr. S. Knight, jun., Rushden, the carpenter's work; and Mr. J. Margetts, also of Rushden, the painting and decoration.

Statistics of Wesleyan Chapel Building.—At the recent Wesleyan Conference, the Revs. Edwin H. Tindall and Henry J. Pope (Manchester), the general secretaries, presented the report of the Chapel Committee. Under the building department there are two classes of cases, erections and enlargements sanctioned during the year, and erections completed which had been sanctioned in previous years. The following erections and enlargements have been sanctioned:—

101 Chapels, at an estimated cost of	£139,604
15 Ministers' houses	11,989
19 School-rooms	7,194
88 Alterations and enlargements	52,233
97 Modification of cases (additional)	3,720
23 Organs	6,635
341 cases. Outlay.....	£253,655

Of the proposed new chapels, 68, to accommodate 15,253 hearers, are to be erected in places where there were previously no Wesleyan Methodist chapels; and 39, estimated to provide accommodation for 13,978 hearers, are to supersede former erections reported as having provided 7,775 sittings. Three chapels are intended to provide 123 sittinge less than the former buildings. The total accommodation to be provided in the proposed new chapels is, therefore, 21,456 sittings. Under the head erections completed during the year, the following cases have been reported:—

126 Chapels, at a total cost of	£215,415
13 Ministers' houses	11,988
20 School-rooms	17,658
96 Alterations and enlargements	63,256
43 Organs	13,858
297 cases. Total outlay	£318,175

Towards this outlay there has been actually raised by voluntary contributions 215,871*l.*, to which must be added grants, from connexional funds and other sources, of 21,594*l.*, being a total of 237,455*l.* actually raised. The average cost per sitting in the 126 new chapels is 5*l.* 17s. 9½d.

SCHOOL-BOARD SCHOOLS.

Plymouth.—New buildings, erected by the Plymouth School Board, were lately opened. The schools are comprised in a block of buildings measuring about 180 ft. long by 60 ft. deep, and divided into two separate departments for girls and infants. Entering the block by the higher door, the infant department is reached, and to the right there is a suite of four class-rooms, measuring respectively—one 23 ft. by 13 ft., two 18 ft. by 13 ft. 6 in., and another 26 ft. by 13 ft. 6 in.,—fitted up with galleries or desks for the varying ages of the children. To the left of the main passage-way there is cloak-room and lavatory accommodation, the former being arranged with separate doors for ingress and egress, and fitted with wrought-iron hat and cloak hooks, and the latter with Messrs. W. Macfarlane & Co.'s patent lavatory basins, with water laid on from the town mains. To the left is the main infant school, which measures 42 ft. by 22 ft., exclusive of the main gallery recess, 18 ft. 6 in. by 8 ft., and is 20 ft. high to the under-side of the ceiling. The doorway at the end of this room leads to the two teachers' rooms, each 14 ft. by 10 ft. 3 in., fitted with lavatories, cupboards, and other conveniences. This, the infants' portion of the buildings, is of a single story,—the other portions are of two stories. Passing from the teachers' rooms by a short staircase, which forms the line of internal communication from end to end of the entire building, the junior girls' school-room is entered on the ground-floor; it measures 42 ft. by 20 ft., by 15 ft. high. Above this is a senior girls' school-room, of the same dimensions, and 16 ft. high to the under-side of the ceiling. The junior girls' class-rooms measure each 21 ft. by 18 ft., and they are of the same height as the main school-room. Opening out of the main entrance to the girls' school are cloak-rooms, and a doorway leading to the yards. Opposite the main entrance door a staircase communicates with the upper floor, which comprises the senior girls' department, and is similar in area and arrangement to that of the juniors below, excepting that a mezzanine floor occurs over the cloak-rooms, in which there is lavatory and cupboard accommodation. The heating is by open fire-places, and "Tobin's" system has been adopted for ventilation. Internally the walls are dadoed in pitch-pine to the height of the window-sills, and the main timbers of the roof are left open and varnished. Externally the treatment has been that of the Early Domestic Gothic in style. The walls are of blue limestone, with dressings of the same material of a pinkish tint for the sake of contrast. The roofing is of Delabole slate, relieved by fancy cut bands, and is surmounted by a wooden bell-cote rising about 30 ft. above the ridge-line. The playgrounds at the back and end cover an area of about 6,500 superficial feet, and have covered ways and play-sheds. A total school and class-room accommodation is provided for 673 children. The architect is Mr. S. Trevail (whose plans were selected in competition), and the contractors were Messrs. Lethbridge & Foot.

Brightside (Sheffield).—The new schools at Brightside have been opened. They were erected from the designs of Mr. E. R. Robson, F.S.A. The building has not yet an infants' department, though one will be added almost immediately. The building as it now stands, therefore, has only two stories, and it is so planned that one floor can be used for boys and the other for girls, or both floors can be used as a mixed school. The top floor has a duplicated staircase for the sexes. Each floor consists of five rooms, capable of accommodating sixty children in each room, or 600 children in the schools as they now stand. The schools are arranged on the German system of class subdivision so far as is consistent with the system approved of in English elementary schools. The block of buildings in the rear is so contrived that the space is utilised by a mezzanine story, in which cloak-rooms and teachers' rooms are provided. The style of the building may be considered as an adaptation of that prevalent in England during the latter half of the seventeenth century. Messrs. Chambers & Sons are the builders, and Mr. J. Laidler is the clerk of the works. Mr. S. Cole, chairman of the School Board, who presided over the opening ceremony, said the school in which they were assembled was built upon the largest site yet obtained by the Board. It had cost 2,000*l.*, and the total cost of the building and furniture, &c., had been 6,000*l.* additional. For the information of those who had not already seen them he would quote a few statistics about education. It was estimated in 1870 that provision would be required for the education of 300,000 children, but Lord George Hamilton has estimated it at a million and a half. That statement even was found to be below the truth. In 1870 the children in England and Wales upon the school register numbered 2,017,000, whilst in 1879 they numbered 3,710,000, or an increase in nine years of 1,693,000 or 119 per cent. The average attendance in 1870 was 1,152,000; in 1874 it was 1,679,000; and in 1879 it had risen to 2,595,000, being an increase in nine years of 1,443,000, or 125 per cent. In 1870 the accommodation was equal to 1,878,000; in 1874 to 2,872,000; and in 1879 to 4,142,000, being an increase in the nine years of 2,264,000, or 121 per cent. Notwithstanding that very large increase, and notwithstanding the influence of compulsion, there were still outside the schools between 400,000 and 500,000 children who had not yet been brought under the benefit of instruction. The cost of school buildings had been about 20,000,000*l.*, of which school boards had expended about 13,000,000*l.*

Royal Manchester Institution.—The sixtieth annual exhibition of modern works of art opens to the public this Friday, the 3rd.

Miscellanea.

Colour-Blindness.—Dr. Joy Jeffries has lately reported to the School Board of Boston, U.S., on the result of his examination of 27,927 school children for colour-blindness, with the following general results:—Of 14,469 male students, 608 were colour-blind, or 4·202 per cent.; of 13,458 female students, 9 only were colour-blind, or 0·066 per cent." He adds, "These results are so near what is found by the best observers in Europe that we may take it as the expression of a general law. Colour-blindness is not curable by any known methods, and the colour-sense does not alter through life; hence the statistics gathered from the schools apply to the whole community. We may conclude that one male in twenty-five is more or less colour-blind, and that the defect very rarely occurs among females. I would here again respectfully call the attention of the Board to the fact that whilst something is done in the primary schools in reference to teaching the name of colours, the question of colour-blindness on the part of the boys is entirely overlooked. . . . . In my previous report I spoke of the extraordinary lack of knowledge and use of colour-names by boys. My work in testing since then has still further convinced me that this does not show itself in school life, in examinations or exhibitions. Such want does, however, show itself very quickly when the boy comes out into every-day life and occupations. Thus it is that the necessity of teaching colours and colour-names to boys has been overlooked. . . . . The cultivation of the sense of colour is at present almost wholly neglected, as was once the sense of hearing and the voice. Colour-blindness, of conrse, has been as nnrecognised as nnknown. For this no blame can be attached to teachers, or those who direct their efforts. It is only since the colour-sense and its defects have been talked about and tested within the last three years, that here, as elsewhere in the world, it has been discovered that men were quite without the nse and knowledge of colonr-names compared with women, very much as it was wholly unknown, hut equally true, that the latter were so extraordinarily exempt from colour-blindness." The subject of colour-blindness was treated of in the *Builder* many years ago, at a time when the prevalence of the defect was little known.

Encouragement for Workmen.—Messrs. William Denny & Brothers, of the Leven Shipyard, Dumbarton, have issued an intimation to their workmen, in which they state that they have noticed during the last two years many improvements in the methods of the work and appliances introduced by their workmen into their yard. They state that they very readily recognise the advantage accruing to their business from these efforts of skill, and they are desirous that they should not pass unrewarded. They have therefore decided that the authors of such improvements introduced after this date shall have a claim upon the firm for reward; and to enable these claims to be readily and easily adjusted, they have appointed a committee of awards. The rewards are to be given as follows:—To anyone who has either invented or introduced a new machine or hand-tool into the yard; to anyone who applies existing machinery or hand-tools to a new class of work; to anyone who has discovered or introduced any new method of carrying on or arranging work; or, generally to anyone who has made any change by which the work of the yard is rendered either superior in quality or more economical in cost. The awards are not to be less than 2*l.* and not more than 10*l.*; but the firm may give more if satisfied that the invention deserves it.

Dock Extension in the River Thames.—The works for enlarging Messrs. Hy. Fletcher, Son, & Fearnall's upper dock at the Union Dockyard, Limehouse, are now nearly completed, and last week the works for widening, deepening, and lengthening the middle dock were commenced. The walls will be built of brickwork, backed up with concrete, and the flooring of timber and concrete. The entrance will have an iron caisson. When completed, the dock will measure nearly 360 ft. The whole of the works are being carried out nnder the superintendence of Mr. E. C. Homer, C.E.

Child's New Banking House.—The massive strong-room doors here, gates, and shutters were, with one exception, designed and supplied by Messrs. Chubb & Sons, and are fitted with their patent locks.

Proposed Art Museum, Mancheater.—On the 20th ult., a deputation from the Art Museum Committee waited hy appointment on the Parks Committee of the Manchester City Council at the Town-hall, with respect to the scheme for erecting a gallery in Alexandra Park for the reception of certain works of art of the present value of 5,000*l.* Mr. Horsfall gave a general outline of the scheme in question, and stated that a building of the simplest possible construction would, in the first instance, meet the wishes of the Art Museum Committee. Nor were they particular as to its being erected in Alexandra Park; any other of the parks would answer their purpose. He proposed that the Parks Committee should accept the gentlemen at present constituting the Art Museum Committee as tenants for the contemplated building for a period of four years, the City Council to have during that time two representatives on the Museum Committee. It was suggested that at the end of the four years the Corporation should pay the salaries of the curators, and that the management should then be vested in a committee. The Museum Committee agreed that all works of art placed by them in the gallery, except such as were only lent hy their owners, should he the property of the Corporation acting as trnstees for the citizens, and they undertook to place in the gallery immediately after its completion works of art of the before-mentioned value, and to add thereto, prior to the close of their tenancy, other works worth 5,000*l.* They believed that a gallery suited for the object which they had in view might be built at a cost of 6,000*l.* It was intimated to the deputation that a snb-committee would be appointed to meet the Art Museum Committee for the purpose of discussing the details of the project.

The Cambrian Archæological Society held its annual gathering last week at Pembroke, under the presidency of Mr. C. E. G. Phillips. The principal excursion made during the meeting was to Pembroke Castle and Monkton Priory Hall, the latter building being described by Professor Babington. Some of the excursionists visited St. Mary's Church, Pembroke, which was described in a paper hy the Rev. W. Coddington. Professor Babington, in speaking at a meeting in the Town-hall, said that Pembroke Castle originally consisted of two wards, or large inclosures within the walls. The position of the dividing wall was shown hy a ridge, under which, doubtless, were the foundations of the wall. In the inner wall there was a magnificent Norman tower, such a one as he did not believe existed anywhere else in the United Kingdom. This tower was surrounded hy openings in the outer shell, which were intended as sockets for beams to support platforms, from which stones, hot lead, and such missiles might be cast upon a besieging party by those within. With regard to that portion of the castle which was generally called the chapel, he gave his decided opinion that that room was not the chapel, but the hall, where the head persons of the castle took their food, and probably slept upon the floor. The castle appeared to have consisted of three courts, in addition to the keep itself, so giving a very great power of resistance. Monkton Hall was being altered, and not for the better as far as antiquaries were concerned. The Rev. Dr. D. R. Thomas, late general association secretary, referred briefly to the explorations in Caldy Island. He said that antiquaries would view with sorrow the brewing operations which were being carried on in what had been the chancel of the old Priory Church. Mr. Edward Laws, of Tenby, read a paper dealing with the history and probable uses of the numerous camps and earthworks found in various parts of the county of Pembroke. He said there were eighty-three of them in all.

The Great New Gasholder at Kennington.—At the recent meeting of the South Metropolitan Gas Company, with which the Phœnix Company is now amalgamated, the chairman adverted to the immense gasholder just erected at the Kennington station. He atated that its capacity was greater than that of any similar structure yet erected, being the largest known gasholder at the present time. He added that its total cost, with tank and everything complete, would he ahont 47,000*l.*, or something nnder 9*l.* per 1,000 ft. of capacity; the usual price of smaller holders being 18*l.* or 20*l.* for this amount of capacity, showing that its cost is scarcely one-half of the average of those which have hitherto been built.

The Burning of Whitechapel Church.—We briefly mentioned last week that Whitechapel parish church (St. Mary Matfelon) was destroyed by fire on the 26th ult. We gave views of the interior, and of the reredos, in our volume for 1878, pp. 268-269. The church which has been destroyed was entirely new, and was consecrated and opened for service in February, 1877. The building was erected at a total cost of more than 30,000*l.*, out of which a sum of abont 10,000*l.* was raised by public subscription, and the remainder was supplied by the munificence of Mr. O. E. Coope, M.P. Prominent among other objects of interest in the church was the organ, constructed by Messrs. Hill & Son. This, as our interior view of the church shows, was carried upwards from the organ-chamber past the clearstory windows, so as to reach nearly to the roof of the nave. When the fire bad gained a hold on the body of the organ this front formed a ready means of communicating with the roof, and this will account for the astonishingly rapid progress of the devastating fire. On the day of the firo, according to the rector (the Rev. J. F. Kitto), Messrs. Hill's tuner, with two lads as assistants, were at work in the organ. It is admitted that a henzoline lamp was used by the tnner in order to gain access to the organ, and that a candle was lighted hy the lad who blew the bellows. But it is asserted that the lamp was put out at least two hours, and the candle half-an-hour, before the staff left the church at one o'clock for dinner. However this may be, at half-past one the fire was discovered, and upon entry being made the whole of the organ was seen to be in flames. Surely this onght to be a warning, not only to organ-builders, but also to the clergy and to the public. The church was only insured to the amount of 16,800*l.* As we stated last week, Mr. Ernest C. Lee was the architect of the church.

Westerdale Parish Church (near Yarm), has just received a three-light stained-glass east window, the gift of the Rev. J. Rathbone Ellis, the rector, in memory of his late wife and danghter. The subject, occupying all the lights, is the Crucifixion, after the narrative of St. John. At the foot of Jesus on the Cross is the prostrate form of the weeping Magdalene. On either side are respectively the Virgin Mother and the other Mary; St. John and the Centurion, above whom two adoring witness-angels complete the group. The window is from the studio of Powell, Brothers, of Leeds.

City and Guilds of London Institute.—Programmes of the lectures to he delivered at the Cowper-street Schools, Finsbury, are being extensively circulated, from which workmen and others may learn the opportnnities there are for acquiring practical scientific knowledge that will be nsefnl to them in their trades. Advertisements, too, are appearing, and we desire to aid in directing attention to this movement on the part of the City and Guilds of London Institute to impart by laboratory and tutorial courses technical education at merely nominal fees. During the last spring term 192 students attended, taking out 353 tickets for the different courses of technical instruction.

Palæolithic Flint Implements. — Dr. Joseph Stevens writes to say that the brief *résumé* we gave of his paper on the discovery of flint implements in the Reading Drift, read before the Archæological Congress at Devizes, does not represent what he said. He has never found implements or animal remains in green-sand, and he did not use Sir John Lubbock's name in connexion with skulls of any kind, but Professor Rolleston's.

Trade School for Society of Merchant Venturers, Briatol.—The treasurer has informed some inquiring would-be competitors that the guinea to be paid for particulars, according to advertisement, will *not* be returned to those who send in designs, and that the Society will not bind themselves to call in a professional referee, or to employ the author of the successful design. This ought to limit the number of competitors.

Liverpool.—Memorial-stones of new Sunday schools in connexion with the Methodist Free Church, Hamilton-road, were laid on the 6th ult. The site of the proposed schools is at the back of the chapel, and when erected the building will accommodate about 400 children. The cost of the schools is estimated at 2,500*l.* This amount, however, includes the expense incurred in placing galleries inside the chapel. The contractor is Mr. William Litt, of Bootle.

Eighteen feet and a-half in Budge-row, City.—A freehold plot of ground, in Budge-row, Cannon-street, with a frontage to the street of 18 ft. 6 in., and containing about 870 square feet (with an old house on it, shortly coming down), was sold by auction on Saturday, at the Mart, by Messrs. Foster, of Pall-mall, for 6,500*l.*—equal to 7*l.* 10*s.* a square foot, or at the rate of 326,000*l.* per acre.

Berlin Academy of Arts.—The fifty-fourth autumn exhibition of this Academy has been opened. It contains about 1,000 objects of painting and sculpture, the former greatly predominating, and including the handiwork of all the chief living German masters, as well as contributions from several well-known English and American artists.

Wood Paving.—The Kensington Vestry have decided to pave the whole of High-street, Kensington, with wood, and have accepted the tender of Messrs. Nowell & Robson, 10,055*l.*

The Simla Art Exhibition is to be opened on September 18th. Lord Ripon presents a prize for the best original picture by an amateur artist.

TENDERS

For new ironing rooms at Milton House, Brompton, for the London Female Preventive and Reformatory Institution. Mr. W. P. Griffith, architect:—

Fricker	£252 0 0
Swan	210 0 0
Nixon (accepted)	166 0 0

For erecting chimney-shaft and retaining walls, at Angel-alley, Bishopsgate-street Without, for Messrs. Allen & Sons. Mr. Geo. Barnes Williams, architect:—

Parrish (accepted)	£265 0 0

For the erection of four cottages in Cardinal-street, Ipswich, for Captain Morton. Mr. Henry G. Bishop, architect:—

Bennett	£900 0 0
Cunnold	737 0 0
Felgate	675 0 0
Moss	637 0 0
Gibbons (accepted)	600 0 0

For the erection of a pair of semi-detached villas in Hampton-road, Ipswich, for Mr. W. Revens. Mr. Henry G. Bishop, architect:—

Pollard (accepted)	620 0 0

For works to Hertford House, Connaught-place, Hyde Park. Messrs. Davis & Emanuel, architects:—

For General Repairs.		
Phillips & Son	£1,300	0 0
Burdett & Sons	1,288	17 0
Colls & Sons	982	0 0
Ashwell & Stevenson	898	0 0
For Decorative Works.		
Hackforth	693	12 0
Phillips & Son	686	0 0
Burdett & Sons	640	10 0
Mellier & Co.	487	3 0
Ashwell & Stevenson	432	0 0
For Sanitary Works.		
Ashwell & Stevenson	440	0 0
C. & F. Mansfield	442	15 2

For repairs and alterations to Woodlands, Streatham, for Mr. R. H. Measures. Mr. F. Carter, architect:—

Smith	£1,600	11 weeks
Newstead (accepted)	1,470	10 ,,
Markwell	1,316	15 ,,
Cantell (part only)	922	8 ,,

For farm buildings, &c., proposed to be erected at North Forty Farm, Sudbury, Middlesex, for trustees of Mr. Young. Mr. A. R. Stenning, architect. Quantities by Messrs. Linsdell & Giffard:—

	If timbered and boarded.	If brick built.
Farm Buildings.		
Batchelor, Sudbury	£1,820	£1,916
Hussey, Harrow	1,730	1,860
Veare & Co., London	1,675	1,832
Nye, Ealing	1,543	1,678
Adamson & Son, Turnham Green	1,525	1,596
Haynes, Alperton	1,380	1,410
House.		
Veare & Co.	£1,218	0 0
Batchelor	1,107	0 0
Adamson & Sons	1,100	0 0
Nye	1,077	0 0
Hussey	1,068	0 0
Haynes	950	0 0

For the erection of six houses, Coleman-street, Southampton, exclusive of smith's work and ironmongery. Mr. W. H. Mitchell, architect:—

Dyer	£1,206 0 0
Rowland	1,272 0 0
Chapman	1,194 0 0
Crook	1,147 10 0
Stevens & Son (accepted)	1,133 0 0

For alterations and additions to the carpet manufactory of Messrs. B. Woodward & Co., Mill-street, Kidderminster. Mr. J. Mossop, architect. Quantities by the architect:—

Building.	
Thompson	£1,999 10 0
Bimnan & Son	1,684 0 0
Smith	1,515 0 0
Guest	1,310 0 0
Vale, Kidderminster and Birmingham (accepted)	1,300 0 0
Ironwork.	
Bradley (accepted)	207 10 0
J. & S. Roberts (items per ton)	—

For repairs and redecoration to West Ham Parish Church. Mr. J. T. Newman, architect:—

Gentry	£620 0 0
Cheffins	536 0 0
Reed	483 0 0
Morter	460 0 0
Norton & Son (accepted)	444 0 0

For completing six shops and premises at Willesden, for Mr. David Tildesley. Mr. W. Graves, architect. No quantities:—

Kellond (accepted)	£975 0 0

For erecting new premises, Queen's-road, Bayswater, for Mr. W. Whiteley. Mr. J. E. Saunders, architect. Quantities supplied by Messrs. Gsborn & Russell:—

Ashby & Horner	£33,979 0 0
Adamson & Son	31,196 0 0
Sabey & Son	31,150 0 0
Holland & Hannen	30,560 0 0
Lawrence	30,472 0 0
Brass	29,183 0 0

For additions, alterations, and repairs, to Griffin Public House, for Messrs. Reid & Co. Mr. W. Ansell, architect:—

Godden	£2,312 0 0
Shurmur	2,258 0 0
Oxford	2,237 0 0
Richards	2,215 0 0
Patman & Fotheringham	2,150 0 0
Macey	2,088 0 0
Langmead & Way	2,076 0 0
Anley	1,990 0 0
Cocks	1,936 0 0

For the erection of stables and fittings at Honor Oak Park, for Mr. Marshall. Mr. E. Gregg, architect. No quantities supplied:—

Lidstone & Son	£380 0 0
Pritchard	480 0 0
Amer	430 0 0
Watson & Dennett, Dulwich (accepted)	428 17 6

For alterations and additions to No. —, Orchard-street, Oxford-street. Mr. W. D. Church, architect:—

Dove, Bros.	£910 0 0
Shurmur	605 0 0
Godden	571 0 0

For erecting three houses, Astley's-row, River-street, Islington. Mr. W. Smith, architect:—

Mattock, Bros.	£2,172 0 0
Steel, Bros.	2,140 0 0
Harper	1,953 0 0
Shurmur	1,845 0 0

For foundations, &c, Monument-yard. Mr. W. Smith, architect:—

Durnford and Langhsm	£1,688 0 0
Mattock, Bros.	1,443 0 0
Larke	1,370 0 0
Harper	1,287 0 0
Shurmur	1,260 0 0
Steel, Bros.	1,223 0 0
Crabb	960 0 0

For decorative repairs and alterations to No. 12, Cornwall-terrace, Regent's Park, and to stabling in Cornwall Mews, for Mr. Charles Burge. Messrs. Ebbetts & Cobb, architects:—

Sanders (accepted)	£400 0 0

For fourteen private houses in Friern and Goodrich roads, for Mr. W. Cocking. Mr. C. W. Lovett, architect:—

Eldridge & Gee (accepted)	£5,300 0 0

For five private houses in Lordship-lane, East Dulwich, for Mr. C. Smith. Mr. C. W. Lovett, architect:—

Goad	£4,893 0 0
Fisher, Bros.	4,869 0 0
Croaker	4,390 0 0
Eldridge & Gee	3,893 0 0
Hearsum (accepted)	3,890 0 0

For a pair of semi-detached villas in Friern-road, East Dulwich, for Mr. C. Smith. Mr. C. W. Lovett, architect:—

Fisher, Bros.	£1,625 0 0
Watson & Dennett	1,527 0 0
Eldridge & Gee	1,498 0 0
Goad	1,291 0 0
Hearsum (accepted)	1,221 0 0

For rebuilding premises in High-street, Peckham. Mr. C. W. Lovett, architect:—

Thompson & Son	1,532 0 0
Eldridge & Gee	1,375 0 0
Goad	1,372 0 0
Croaker, Brothers (accepted)	1,283 0 0

For building two shops, High-street, Sutton, Surrey, for Mr. F. Monks. Mr. C. W. Lovett, architect:—

Parkin	£950 0 0
Fisher, Bros.	777 0 0
Eldridge & Gee	770 0 0
Humphreys	740 0 0
Hurbert (accepted)	541 12 0

For building stable, loft, and alteration to shop, for Mr. Ilsley. Mr. C. W. Lovett, architect:—

Colls & Sons	£670 0 0
Thompson & Son	578 0 0
Eldridge & Gee	494 0 0
Croaker, Bros.	491 0 0
Goad	477 0 0
Fisher, Bros.	469 0 0

For altering shop for Mr. Lomas, Chouinert-road. Mr. C. W. Lovett, architect:—

Peto	£249 0 0
Goad	195 0 0
Eldridge & Gee (accepted)	187 0 0

For alterations and additions to the Town-hall at Newbury, Berks. Mr. J. H. Money, architect. Quantities by Messrs. Curtis & Sons:—

Crook	£883 0 0
Nightingale	842 0 0
James	749 17 4
Harrison	739 14 0
Elliot	734 2 0
Simonds	672 0 0
Morter (accepted)	654 0 0

For completing four shops and dwellings, being Nos. 403, 405, 407, and 409, Portobello-road, Notting-hill, and four stables in the Mews in the rear thereof, for Mr. E. P. Landon and Mr. G. H. Tatham. Messrs. Ebbetts & Cobb, architects. No quantities supplied:—

King & Walker	£2,890 0 0
Holt	2,648 0 0
Burman	2,260 0 0
Shapley	2,260 0 0
Carmody	2,183 0 0
Sanders	2,092 0 0

For alterations and additions to No. 60, Hickman's Folly, Dockhead, for Mr. J. Watts. Mr. E. Crosse, architect:—

Tyler, Jamaica-road (accepted)	£405 0 0

For building ten houses for Messrs. Bliss & Sons. Mr. Charles Dunch, architect:—

Taylor & Parfitt	£2,889 0 0
Shurmur	2,880 0 0
Johnson	2,694 0 0
Wood	2,542 0 0
Wire	2,500 0 0
Higgs	2,345 0 0

For alterations to the Rose and Crown Tavern, Cullum-street, for Mr. H. Watson. Mr. W. J. Miller, architect:—

Higgs	£373 0 0
Adams (accepted)	347 0 0

For a new Infirmary, for the Guardians of the Barnsley Union. Messrs. Dixon & Moxon, architects:—

	Local Stone.	Brighouse Stone.
Powell & Sons, Sheffield	£22,224	£23,374
Howell & Son, Bristol	—	22,900
Whiteley, Leeds	20,700	21,000
Nicholson & Son, Leeds	19,413	20,197
Raynor, Barnsley	—	18,929
Longden & Son, Sheffield	18,497	18,811
Robinson & Son, Barnsley	18,000	18 750
Chadwick & Co., Rotherham	17,879	18,629
Brier, Sons, & Wilson, Dewsbury	17,023	17,393
Fidler, Eckington	16,950	17,380
Taylor & Sons, Barnsley	16,450	17,350
Armitage & Hodgon, Leeds	17,130	17,330
Humphreys & Moulson, Bradford	16,653	17,103
Bustard, Barnsley	—	16,885
Hinchliffe & Moore,* Barnsley	15,187	15,687

* Accepted, Brighouse Stone.

For rebuilding the county bridge over the Ravensbourne, at Deptford. Mr. F. W. Ruck, county surveyor. Quantities by Messrs. Ruck, Son, & Smith:—

	Con. No. 1. Ironfounder's Work.	Con. No. 2. Builder's Work.
Finch & Co., Chepstow	£3,020 0 0	—
Hanea, Donald, & Wilson, Paisley	2,760 0 0	—
Stockton Forge Company, Stockton	2,374 3 6	—
Webster, London	2,155 0 0	£4,331
Butler, Stanniogley	2,039 7 0	—
Butterley Iron Company	2,022 17 0	—
Dixon, London	2,000 0 0	2,000
Weeks & Son, Maidstone	1,963 19 8	—
Cochrane & Co., near Dudley	1,941 0 0	—
Maxwell, London	1,921 0 0	2,390
Cooke & Co., London	1,892 0 0	2,175
Tees Side Ironworks, Middlesboro'	1,736 3 7	—
Wilson, Brothers, & Co., London	1,685 0 0	—
Ball & Gammon,* Gillingham	1,663 0 0	2,080
Shaw & Co., London	1,549 15 0	2,220
Jukes, Coulson, Stokes, & Co., London	1,406 0 0	—

* Accepted.

For constructing road and retaining walls at Rochester, for the Trustees of St. Bartholomew's Hospital. The late Mr. G. Ruck, surveyor. Quantities by Messrs. Ruck, Son, & Smith:—

Calluud & Son, Rochester (accepted)	£990 0 0

For the erection of two shops and dwelling houses in Week-street, Maidstone, for Messrs. Gegan. Messrs. Ruck, Son, & Smith, architects. Quantities supplied:—

Bishop, Birling	£1,770 0 0
Naylar, Rochester	1,747 0 0
Cox, Brothers, Maidstone	1,730 0 0
Bridge, sen., Maidstone	1,720 0 0
Avard, Maidstone	1,695 0 0
Elmore, Maidstone	1,676 0 0
Vaughan, Brothers, Maidstone	1,637 0 0
Wallis & Clements,* Maidstone	1,594 0 0

* Accepted.

For the erection of a shop and dwelling-house, West Borough, Maidstone, for Messrs. Hammerton. Messrs. Ruck, Son, & Smith, architects. Quantities by Mr. T. Ladds:—

Cox, Brothers, Maidstone	£1,409 0 0
Avard, Maidstone	1,390 0 0
Naylar, Rochester	1,359 0 0
Vaughan, Bros., Maidstone	1,342 0 0
Wallis & Clements,* Maidstone	1,332 0 0

* Accepted

For the construction of a brick and concrete reservoir, filtering-chamber, &c., and the providing and laying of 9,500 yards run of cast-iron pipes, at Budleigh, Salterton, Devon. Mr. C. W. Whitaker, engineer. Quantities supplied:—

Willey	£5,867 0 0
Kerslake	5,550 0 0
Facey	5,509 0 0
Painter	5,193 0 0
Gould	4,916 0 0
Stephens & Bastow	4,795 0 0
Bell	4,795 0 0
Hawkins & Best	4,582 0 0
Shaddock	4,567 0 0
Coldridge	4,477 0 0
Phillips	4,394 0 0
Crockam	4,110 0 0
Small	4,000 0 0
Gibson (accepted)	3,620 0 0

For road making at Upper Holloway. Mr. Charles Higgins, surveyor:—

Girdlestone-road.

Waddingham, Upper Holloway	£422	0	0
Rutty, Bromley-by-Bow	394	0	0
Taylor, Upper Holloway	389	0	0
Williamson, Islington	373	10	0
Pizzey, Hornsey	350	12	0
Wilson, Chiswick	330	0	0
Irons, Dalston	324	12	0
Walker, Upper Holloway (accepted)	320	0	0

Langdon-Road.

Waddingham	414	0	0
Rutty	379	0	0
French	365	5	0
Taylor	361	0	0
Pizzey	336	8	0
Wilson	321	10	0
Williamson	317	10	0
Irons	313	1	0
Walker (accepted)	310	0	0

Hargrave Park-Road (part of).

Taylor	470	0	0
Irons	458	2	0
Waddingham	450	0	0
Rutty	447	0	0
Wilson	399	0	0
Williamson	358	10	0
Walker (accepted)	320	0	0

Anatola-Road.

Waddingham	307	10	0
Rutty	298	0	0
Taylor	287	0	0
Wilson	265	17	0
Irons	261	15	0
Walker	240	0	0
Williamson (accepted)	235	10	0

Magdala-Road.

Waddingham	297	10	0
Rutty	286	0	0
Taylor	270	0	0
Pizzey	262	8	0
Wilson	260	17	0
Irons	240	15	0
Walker	235	0	0
Williamson (accepted)	231	10	0

Annesley-Road.

Waddingham	189	10	0
Rutty	183	0	0
Taylor	174	0	0
Pizzey	165	19	6
Wilson	161	5	0
Irons	155	0	0
Walker	145	0	0
Williamson (accepted)	139	10	0

For the erection of the Charter House-lane School (for 750 children), for the Kingston-upon-Hull School Board. Mr. W. Botterill, architect. Quantities supplied:—

	No. 1.—Board to retain Old Buildings upon the Site.	No. 2.—Contractor to take the Old Buildings.
Grassley	£6,415 0 0	£6,215 0 0
Coates	5,794 14 0	5,694 14 0
Habbershaw & Son	5,667 11 10	5,473 15 0
Skinner	5,585 0 0	5,420 0 0
Marsden & Hodson	5,419 7 0	5,349 7 0
Beevers	5,427 0 0	5,297 0 0
Drury & Harper	5,382 8 0	5,282 8 0
Sergeant	5,340 0 0	5,240 0 0
Hockney & Liggins	5,381 0 0	5,205 0 0
Brown	5,313 8 6	5,183 0 0
Southern	5,272 19 0	5,133 3 0
Wilson, Bros.	5,213 15 6	5,013 15 6
Musgrave	5,990 0 0	4,790 0 0
Jackson & Son*	6,050 0 0	4,750 0 0

* Accepted. All of Hull.

For sundry works at the Spread Eagle, Stangate-street, Lambeth. Mr. W. C. Banks, architect:—

For New Girder and Alterations.

Tarrant & Son	£259	0	0
Sharp & Everard	198	0	0
Elliot (accepted)	185	0	0

For Bar Fittings.

Warne	243	0	0
Watts & Co.	241	7	0
Elliott (accepted)	237	10	0

For repairs and additions to house and new shop on the Forecourt, 124, Southwark Park-road, for Mr. John Morgan. Mr. E. Crosse, architect:—

Almond, Jamaica-road	£575	0	0
Eldridge & Gee, Fendall-street	468	0	0
White, Peckham-rye (accepted)	432	0	0

For repairs and redecoration to St. John's Church, Broadway, Stratford. Mr. J. T. Newman, architect:—

Repairs and Redecoration.

North, Bros.	£550	0	0
Hoskings	529	0	0
Morter	461	0	0
Norton & Son (accepted)	452	0	0

Gas Engineering.

Carter	85	0	0
Land & Co.	80	0	0
Wentworth	73	0	0

For alterations and repairs to 15 and 17, Old Montague-street, Whitechapel, for Mr. G. Burnell. Mr. J. T. Newman, architect:—

Knightly (accepted)	£589	0	0

For the completion of Arundel-road, Harold Wood Estate, Essex, for Mr. J. Compton. Mr. J. T. Newman, architect:—

Jackson	£348	0	0
Harris	351	0	0
Pound (accepted)	306	0	0

For stable, coach-house, &c. at Wanstead, for Mr. H. Compton. Mr. J. T. Newman, architect:—

Clevares	£220	0	0
Reed	180	0	0

TO CORRESPONDENTS.

C. H.—Col. B.—H. G. B.—C. M.—D. & E.—C. I.—B. & Son.—W. S.—A Poor Grainer.—W. C.—J. T. N.—J. W.—A. C.—R. C.—J. K.—O. & E.—E. R.—W. & D.—C. M.—Dr. P.—W. S.—C. R.—C. & Sons.—R. Son, & S.—N. & R.—W. J. M.—H. B. P.—W. P.—B. L.—D. & M.—W. G. F.—P. C. H.—T. P.—W. L. B.—E. O.—F. (no).—F. N. P. (illegible).—J. M. (next week).—W. C. T. (next week).

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NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

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The Builder.

VOL. XXXIX. No. 1962. SATURDAY, SEPTEMBER 11, 1880.

ILLUSTRATIONS.

CONTENTS.

The Kandahar Railway.

IF man has been justly defined by one of the greatest of English writers as the "minister and interpreter of nature," it is none the less true that he is on his way to become the conqueror of difficulties, and the master of nature, both organic and inorganic. Thus every tale of daring and perseverance, of struggle with the elements, of victory over time and distance, has not only the charm of a romance, but the value of a fresh title-deed of the dominion of man. Another story of successful conflict,—this time with the heat of climate, and the barren inhospitality of the desert, has been that of the completion of the first section of the Kandahar railway, extending from the river Indus for 133½ miles towards the mouth of the Bolan Pass, in four months from the time of the receipt of telegraphic order from the supreme Government of India to commence the undertaking.

In the autumn of 1876, as Colonel Sir Andrew Clarke, R.E., has recently told the Institution of Civil Engineers, that officer suggested to the Government of India the importance of taking measures for keeping open, at all times and seasons, at least one available route from British India into Afghanistan. It was not, however, until September, 1879, that authority was given for the execution of a railway from Ruk, on the Sind, Punjaub, and Delhi Railway, to Quetta, in Beloochistan.

The original project of the Indian Government was for one party to make this line as far as Dadur, at the foot of the Bolan Pass, under the direction of the Engineer-in-Chief of the Indus Valley Railway, while a second party should at the same time survey the pass, with a view to the laying of a temporary narrow-gauge railway, or tramway, on the military road from Dadur to Quetta. It was found advisable for this second party to set out the line across the desert from Jacobabad to Dadur, so as to relieve the railway staff from all anxiety except as to the actual construction. It was finally arranged that the survey party, under Colonel James G. Lindsay, R.E., should not only set out the line, but should erect huts for the expected platelayers, and do all the work that was possible in advance of the platelaying party.

Thus two distinct parties were simultaneously at work, each of which attacked the problem of housing, feeding, and watering the workers in the desert from a separate point of view. The platelayers, relying on Sukkur, Shikarpur, and Jacobabad as bases, supplied everything by railway, carrying on their materials over the line as they laid it. The surveyors proposed to rely on the natural resources of the country traversed, and to hring in supplies, partly from Jacobabad, but mainly from the scattered villages and wells along the course of the Narf; and Lehri rivers, by carts, camels, and manual labour. The resources of the country, however, proved inadequate to the demand thus made upon them, and the platelaying staff was left to carry out the greater portion of the work.

Great assistance, however, was rendered to the undertaking by the construction, by the survey party, of a reservoir of the capacity of two millions of gallons, at the forty-fourth mile, being the point farthest from the Indus at which the existing channels from the Begarri and its effluent canals could deliver water. This reservoir was filled soon after the rails were laid up to it, and was frequently refilled.

The first project for housing the labourers consisted of a train of twenty covered goods wagons, to each side of which a stout sail-cloth awning 30 ft. wide was attached, which, when stretched and lashed to rails laid temporarily on either side, formed a continuous tent 400 ft. long and 70 ft. wide, the wagons serving as the ridge. The men do not seem to have taken kindly to this common shelter, and temporary huts of reed mats were constructed, and rebuilt at every three miles of the advance of the head of the work. About 100 men were constantly employed in the erection of these flying cities, and a wagon-load of fresh mats and hamboos accompanied every train. The mats were about 4 ft. 6 in. square. A single row of mats on edge formed the back wall of the shed, and another row laid flat formed the roof. The sheds were built with their backs to the north, and gave enough shelter to allow the men to sleep under them when provided with blankets. The nights are cold enough to produce ice, while the days are as hot as in an English summer. But as, contrary to expectation, no rain fell during the progress of the works, the mat-huts turned out to be a success.

The wagons before mentioned formed a travelling shop, store, hospital, and treasury. They stood at the head of the line, and were pushed forward on the arrival of each train. They also contained a reserve supply of water, for any case of emergency, under lock and key. This was chiefly kept in 400-gallon ships' tanks.

Two trains a day appear to have been run, each carrying materials for from 1 to 1½ mile of way. The afternoon train brought out 100 tons of water; the morning train brought out the miscellaneous stores, such as 3½ tons of daily food, 5 tons of daily fuel, 5 or 6 tons of building materials for sheds, and occasionally 20 tons of forage for the cattle. The officers lived in tents, and moved camp every six miles.

In the first 45 miles no difficulties were experienced in hutting the men, or in supplying food and water. But the labour of cutting the jungle, and preparing the seat of the line over the rough ground, was considerable. For the remaining 88½ miles, the line crossed the desert, and, with few exceptions, no physical difficulties were encountered. The arrangements for supply answered perfectly. The water train never once failed. The health of the men was perfect, and the weather delightful. The first 38 miles of the line were constructed in 32 days. Then a general strike of the labourers took place; but on the 12th of November most of the men returned to their work, the ringleaders having been carefully removed, and the arrangements made for crossing the desert having been fully explained to the remainder of the men. By the 5th of December they seem to have got into the full spirit of the undertaking. During that month, 49¾ miles were laid, though two days were lost. On the 1st of January (of the present year), 2½ miles were laid for the first time,—a length that was repeated on six different days; while in one day 2¾ miles were laid. The total time occupied in the work was 101 days; of which 17 were lost, leaving 84 days for the completion of 133½ miles of railway, and, including sidings and stations, of 165 miles of single track. The actual cost of this labour amounted to 515*l.* per mile, which was thus made up:—

	Per Mile.
(1.) General charges, for collecting labour, hutting and clothing men, water and fuel	£91
(2.) Store charges for unloading, sorting, straightening and reloading materials	60
(3.) Carriage of materials and stores, and maintenance of way and rolling stock	112
(4.) Carriage of material by carts	73
(5.) Platelaying	171

The work was commenced at Ruk with 600 men, and the number was increased as fresh hands could be obtained. A mixed system of day-labour and piece-work was adopted, every man receiving a fixed daily allowance, and a fixed addition to the same for every half mile of way laid in the day over the first mile. The system was highly popular with the men, and tended greatly to ensure the rapid progress of the work.

On the arrival of each train, the materials for the way were taken from the wagons, and loaded into carts, from which they were laid out along the line ready for the platelayers to use. The laying gangs picked up the material and laid it in line. They were followed by keymen, gangers, horers, spikers, straighteners, and lifters. A third party packed and finally straightened the line. When the work was in full swing five thousand men were engaged, of whom 1,600 were platelayers.

The main difference between this series of operations and those which were carried out through the *Grandes Landes*, in 1855, by Mr. Conder, C.E., for the *Chemin de Fer du Midi* (see Proceedings of the Institution of Civil Engineers, vol. xvi.), seems to consist in the use of carts for the forwarding of the materials from the front of the completed line over the way a-head. Six hundred carts were employed, and this part of the work appears

to have cost altogether, as we have shown, nearly 138*l.* per mile. It is probable that extra speed was thus gained, but at the risk of depending on hired cattle, and to some extent on the Sindee carters. On the *Landes* the rails were sent to the head of the work, and laid at once, wagon-load by wagon-load, provisionally, as a road over which each succeeding wagon-load of materials was carried. Economy and regularity were thus secured. The rate of progress in the *Landes* only attained a mean speed of 2·06 kilomètres, or 1·26 miles per diem (which was all that was required), while that on the Kandahar line was nearly 1·6 mile per day. But the 5,000 Indian workmen were about ten times as many as the Englishmen and Frenchmen employed on the *Landes*, and some dozen horses only were at work there, instead of the 2,000 beasts which were required in India. Occasions may occur when everything must be sacrificed to speed. But when a progress of a mile or a mile and a quarter a day is enough to meet the requirements of the case, it is worth the serious attention of the engineer to endeavour to dispense with cartage, especially with hired cartage, and to make the rails themselves answer as a temporary, as well as a permanent, road for the feeding of the platelayers with materials.

The details, for which we cannot find space, will be accessible to those of our readers whom they may interest in the forthcoming quarterly volume of the Proceedings of the Institution of Civil Engineers, in the form of communications from Colonel Sir Andrew Clarke, R.E., Mr. James Richard Bell, C.E., and Mr. George Moyle, C.E.

BRIDGES AND ROOFS.

With the introduction of the railway system it became necessary to cover much larger spaces than had before been required, at the same time that the constant demand made on metallurgic industry was transposing the manufacture of iron. The earliest railway roof in the south of England, that of the station of the London and Birmingham Railway at Euston, was one of unpretending simplicity. That built by Mr. Brunel, at Paddington, remains one of the most architecturally-proportioned and graceful of our large roofs. But the desire for large unbroken spans led to further innovations, of which the science is more unquestionable than the taste. An unbroken span of 166 ft. has been provided at Charing-cross Station; one of 190 ft. at Cannon-street; and one of the enormous width of 240 ft. at St. Pancras. The height of the centre line of the soffit of this last roof, above the level of the rails, is 96 ft. We may add that the cost per square (of 100 ft.) of the three last-named roofs, exclusive of gables, was respectively 34*l.*, 43*l.* 10s., and 31*l.* 11s. There is, then, no reason to suppose that we have reached the structural limit of roof spans, nor, as the above prices indicate, the financial or economical limit. On the other hand, it may be held that the limit of architectural beauty has been wholly disregarded,—and that a very serious question may some day arise as to the prudence of erecting roofs of this magnitude, if they are not in some extraordinary way secured against the fury of an unusual, but not unprecedented, storm. If a violent wind once got under one of these roofs we should not like to answer for the consequences.

A general view of the whole subject of the arch, vault, or roof, laying down the first principles of structure; showing how these principles apply to the various materials, as affording resistance to crushing weight or to tensile strain, and citing the most famous and instructive examples of the mode in which the different cases of the problem have been solved by the great builders of the past, or of the present day, has yet to be written. It would be a work of singular value if ably executed. Our present task is less ambitious. While not closing our eyes to the certain results which science has already attained, we rather wish to take a practical view of some of the most successful examples of dealing with the problem of covering large spaces, which are,—or ought to be,—familiar to the English student. And though such a study cannot fail to result in the indication of rough general rules, we do not propose, at all events at present, to offer to our readers anything of the exhaustive and precise character of a treatise on the arch or the truss. Naturally we have to inquire into the best examples of the single arch,—as bridge, or vault, or arcade,—before we discuss the dome or roof.

Architects and engineers meet on common ground when it is a question of the design of a noble bridge. Architecturally considered, it is the elevation of the structure which first attracts the attention. When the case is one of the erection of a national monument, or the adornment of a capital, it is not easy to insist too strongly on those graceful proportions, well-defined shadows, and appropriate treatment of fit structural material, which must ever be the features that first catch, and last charm, the eye.

But when it is a question of sinking the bases of the monumental structures beneath rapid currents or stormy tides, of dealing with the treacherous basis of mud or of quicksand, of providing against the erosion of the bed of the river beneath the footings of the piers, the duty is usually handed over to the engineer. We do not wish now to raise any question as to which branch of the great structural profession is most deeply concerned in the matter. But we ask a moment's attention while we pursue the inquiry which must have suggested itself to many of our readers. How far are we in possession of materials for drawing up an approximate rule as to the determination of the best span to be used in any given case, such, for instance, as that of carrying a road or railway over a wide river valley?

A bridge is essentially a contrivance for utilising the same topographical area at two different levels, or in two different stages. Whether it be to convey traffic over water, water over traffic, water over water, or traffic over traffic, and whether we call the contrivance a bridge, an aqueduct, a tunnel, or a viaduct, the principle is the same. The most familiar and most simple example of the principle of the bridge is that afforded by the permanent way of a railway. Each line of rail is, in point of fact, a continuous bridge; of which the piers are represented by the chairs, and the arches by the rails; the object of the structure being the support of the rolling-wheels of the vehicles at a determined level.

The illustration is obvious; but it is introduced for the reason that it will enable us at once to grasp the law which regulates the strength of piers. Leaving aside for the moment the functions of the abutment, whether as a retaining wall (with which it is often combined), or as a point of resistance to the lateral thrust of an arch, the piers of a bridge have to do the duty which would have come upon the ground covered by the structure, supposing a weight to have been brought upon it equal to that which the bridge supports. Thus, if there be an arch or a girder of 100 ft. long, supported on two piers, the weight that will come on these piers will be that which would have come upon the 100 ft. of road way, plus the weight of the arch or platform itself, and the first element of proportion in calculation comes in here. If we were to omit all practical considerations, such as the fact that it may be cheaper to build one pier of 10 ft. square than two piers of 10 ft. by 5 ft., and to suppose that weight and resistance are exactly balanced, so that there is no structural waste, it would be a matter of indifference as to cost how many piers were used within a given distance. The weight of the 100 ft. of roadway demands a certain area of support, whatever that be, divided between two or more points of support.

But we have to remember that, as far as regards the weight of the structure itself, that will be, for a certain portion of it, proportionate, not to the length covered, but to the square of the spans into which it is divided. In cases of very wide spans, we shall afterwards have occasion to test the application of this rule; but we now rather look for practical examples of the difference of cost incurred by doubling the span.

The simplest method of estimating the cubic quantity of masonry that would be necessary for crossing a given valley would be to suppose the erection of a brick or stone wall across the whole interval to be spanned, under each line of rail. Since as much as 18 tons pressure is known to come on a pair of driving-wheels in some of the locomotives now in use, and since the width of a railway sleeper may be as low as 9 in., a wall of 1 ft. 6 in. thick would be subject to a moving pressure of almost exactly eight tons on the square foot. If we take 2 ft. as the thickness of the wall, we obtain a pressure of 6 tons on the square foot. The rule proposed by the Board of Trade for the breaking weight of a cast-iron bridge is not less than three times the permanent load due to the weight of the superstructure, added to six times the greatest moving load that can be brought upon it. Ordinary brickwork is tabulated to crush at 232 tons per square inch, or 33·4 tons per square foot; so that a weight of eight tons per square foot allows a fair margin, according to the usual rules for the strength of materials.

To this allowance has to be added that of the weight of the wall itself, which may be taken as about one hundredweight per cubic foot. If we allow 6 tons per square foot as the normal pressure, this pressure would be doubled at the base of a wall of 120 ft. high, so that one-sixtieth part should be added to the strength of the wall for each foot in height, in order to maintain an equal pressure. If a higher resisting power be allowed for, the proportion of addition for height will be calculated in the same manner.

On these bases, the mean width of the supposed walls for crossing a valley of 120 ft. in depth would be, for a double track of rails, $8+\frac{8}{2}=12$ ft., and the cubic contents per foot run would be 1,440 cubic feet, or 72 tons.

In the case, however, of a bridge where the resistance is not continuous, but concentrated on piers, the weight to be dealt with is not the maximum which can come in a moment on a certain point, as on a chair or a sleeper, but the aggregate of that which can come on the platform supported between two piers of the bridge. The heaviest weight that can thus come is that of the locomotive; and if we allow for this at 60 tons per 30 ft. run, or 2 tons per foot of bridge, we shall be within the mark, for a single line of track; taking, of course, the double for a double track. This gives so small a pressure compared to the other, that we should have to regard the resistance of materials to buckling or twisting, rather than that to crushing power, were it all for which we had to provide; and the pressure of a pier of 120 ft. high on its own base would be more than that of the load the bridge had to sustain. Without any allowance for the weight of the platform, the wall requisite to support the distributed load of four tons per foot run would be one-ninth of the former allowance, or six tons per foot run.

We have, however, to take into account the weight of the platform, or arch, itself. We may take as an example the Lockwood Viaduct, built by Mr. Hawkshaw on the Huddersfield and Sheffield Railway, which consists of thirty-two arches of 30 ft. span, with an extreme height of 122 ft. to the rails. The arches are of brick, and are shown on the section as 1 ft. 6 in. thick, or one-twentieth of the span. The width of the arch is 28 ft. The weight of the arch, spandrils, and backing is 312 tons, exclusive of parapets, or rather less than ten tons per foot linear of bridge, from centre to centre of pier. The load, as before estimated, is 138 tons, making a total pressure of 450 tons for the spans, of 34·5 ft. The resulting weight to be borne by the piers is thus equal to about 13 tons per foot run of centre line. This weight, compared with that before given of 6 tons per foot run, shows an addition of 7 tons per foot run for the weight of the arch, taking a 30 ft. span.

The piers on this viaduct measure, on plan, 4 ft. 6 in. by 28 ft. at springing, or 126 square feet, sustaining a pressure of 3·57 tons per square foot. At 116 ft. lower, the area is enlarged to 7 ft. 6 in. by 28 ft., or 216 square feet. The resulting pressure on the base of the piers, comprising the weight of the arch, that of the pier itself, and that of the maximum load, is 6·7 tons per square foot, showing that the engineer accurately calculated the taper to be given to his piers.

Proceeding to inquire, in the first instance, as a matter of practice, into the increase of the thickness of arch that accompanies the increase of span, we take the example of the Royal Border Bridge, over the river Tweed, which was completed in March, 1850. This fine viaduct consists of twenty-eight semicircular arches, each of 61 ft. 6 in. span. The total length is 2,160 ft., and the extreme height 129 ft. The bridge is divided into two portions by a central abutment. The width between the parapets is 24 ft. The piers are 8 ft. 6 in. wide under the springing, increasing almost immediately to 10 ft. The area above the footings of the highest pier is 11 ft. 6 in. by 26 ft. 3 in. The arch, where it rises free of the hacking, is 2 ft., and 7½ in. thick. Thus measured, to-

gether with the backing and spandrels, contains about 754 tons of masonry. To these has to be added 280 tons for the moving load, making a total pressure of 1,034 tons per pier, or about 5 tons per square foot of area. On the base, exclusive of the relief afforded by the projection of the footings, the pressure is about 7.2 tons per square foot; the total cubic contents of the arch, backing, and pier, being about 31 tons of masonry per foot run of the centre line of the viaduct, almost evenly divided between arch and pier.

We thus find, not as a matter of theory, but as a deduction from practice, taking two very admirable examples of the work of the bridge-builder, that the quantity of masonry per foot run for the 60 ft. arched viaduct is, as compared to that for the 30 ft. arched viaduct, as 31 to 13; or, abstracting the weight required for supporting the moving load alone, before taken at 6 tons per foot, we have a platform or arch weight of 7 tons per foot run, for a 30 ft. span, compared with one of 25 tons per foot run for a 60 ft. span, which is not very far from 4 to 1, the relation of the squares of the spans. And it will be remembered that in each of the arches cited the thickness of the ring is in a like proportion to the span, being almost exactly one-twentieth part of the same. The observance of this proportion might have led to the anticipation that a greater economy would be effected by the use of larger arches. It is thus the more instructive to take out all the quantities of a span of masonry, including piers, as well as arch and hacking, as by this means we arrive at the certitude that, in the additional cost attending other things being alike, on the wider arch practice accords fairly with theory.

This thickness given to the arch, in proportion to the span, is much greater in the brick arches of which we have been speaking, than is the case in some of the most celebrated stone-bridges of recent times. Of these we cite the cases of five famous bridges,—two English, two Welsh, and one Italian.

Name of Bridge.	River.	Span.	Key.	Proportion.
Pont y Cysyllte	Taaf	140	2·5	1 to 56
Waterloo	Thames ...	120	4·5	1 to 26·6
New London...	Thames ...	152	4·75	1 to 32
Chester	Dee	200	4·0	1 to 50
Turin	Dora Grossa	147	4·92	1 to 30

Of these five bridges, those over the Taaf and the Dee are of limestone, and the other three are of granite. The boldness of the two former structures is as noteworthy as the architectural beauty of the others. The first-named bridge, the work, as we have before mentioned, of William Edwards, a self-trained country mason, approaches wonderfully close to the limits of scientific precision. The thickness of the key-stone is only one fifty-sixth part of the span. The voussoirs are ashlar, but the rest of the arch is only coursed rubble. The pressure at the crown, according to an analysis to be found in vol. v. of the "Proceedings of the Institution of Civil Engineers" (p. 472) is equal to the weight of 938 cubic feet of masonry per square foot, and that at the second point of rupture (or rather where rupture would, if anywhere, occur) is 936 cubic feet per square foot. Allowing 1¼ cwt. per cube foot for the weight of the limestone masonry, we have thus a weight of 70 tons per square foot of section. This is less than half the crushing limit of magnesian limestone, which, according to Fairbairn, is 1·36 tons per square inch. But it is pretty certain that the bridge would not have stood if built in brick. In that case the weight would have been 46·6 tons per square foot (supposing the dimensions to be the same), but the resistance, according to Mr. Clark, is only ·232 tons per square inch, or 33·1 tons per foot. The rise of the arch is 35 ft., and the radius of the arc which it forms is 87 ft. 6 in. Neither the cost of the bridge nor the cubic contents of the masonry is stated in either of the three accounts of the structure to which we have referred. It is hard to form an opinion how far Edwards was guided by the instinct of genius and how far by geometry and knowledge of the strength of material, but it is highly instructive to observe the light and graceful form of an arch constructed of rough limestone masonry, of dimensions which would have caused a collapse as soon as the centre was struck had they been executed in brickwork.

We may take the 200 ft. span of the Dee Bridge as the practical limit to the width of the stone arch. As to brick, if firebricks set in cement be employed, the material may be equal in its resistance to stone. But as far as ordinary brick set in mortar is concerned, we apprehend that 120 ft. may be taken as the practical limit of span. This has been reached in India, in an arch of 4 ft. wide. But the mortar there is exceptionally good. Indian builders adopt the Italian method of wetting the lime for their mortar at the very commencement of the work, and keeping it constantly wet. Some lime which had been thus prepared by Tippoo Sahib was long after used by the English engineers at Seringapatam, with fully satisfactory results.

With regard to cost, that mode of comparing the excellence of one method of structure with another depends on so many conditions that the simple statement of cost per foot run is not in itself fully instructive. In the case of the bridges that we have cited, the cost was as under:—

Work.	Feet run.	Cost.	Per foot run.
		£.	£.
Lockwood Viaduct ...	1,428	33,000	23·1
Royal Border Bridge	2,160	120,000	55·5
Dee Bridge	426	40,900	126
Dora Grossa Bridge...	320	56,000	180
London Bridge.....	782	1,028,000	1,383
Waterloo Bridge	1,280	1,050,000	821
Thames Tunnel	1,200	454,810	379

With regard to the above prices, the first two apply to viaduct alone, without approaches. In the other case the cost of approaches is included. In the Dee Bridge the approaches cost 7,500*l.* In the Dora Bridge the cost is not distinguished. In Waterloo Bridge the land cost 373,000*l.*, and the approaches cost 112,000*l.* As to London Bridge, full particulars of the work and designs are to be found in the autobiography of Sir John Rennie, but he is remarkably reticent on the subject of cost.

THE LATE MR. J. H. HAKEWILL, ARCHITECT.

WE mentioned briefly in our last the death of Mr. John Henry Hakewill, at his residence in Inverness-terrace, in the seventieth year of his age, surviving his most intimate friend, Mr. Benjamin Ferrey, who lived in the same terrace, only eight days. Mr. Hakewill belonged to an artistic family. His father was the architect of Rugby School, and of many other public and private buildings, and one of his uncles was the author of Hakewill's "Italy." His brother, Edward Chas. Hakewill, who died a few years ago, was also an architect, and erected some good churches.

John Henry Hakewill, whom we now lament, was articled to his father, who died when John was only nineteen. His friend, the Hon. and Rev. Wm. Spenser, early employed him to rebuild his church at Erchfont, in Wiltshire, and this led to many works in that county, both in churches and parsonage-houses. He built Howbury, near Wallingford; Boulney Court, near Henley; the County Hospital at Bury St. Edmunds; and more recently Stowlangtoffe Hall, near Bury St. Edmunds; and he was also engaged on many churches, schools, and parsonages in many counties, especially in Suffolk, Essex, and Wilts. He had not many works in London, the Rectory, St. James's, Westminster; the Boys' School, Marylebone; and the *original* of St. Matthias's Church, South Kensington, being the principal.

Mr. Hakewill was elected a Fellow of the Royal Institute of British Architects in 1854. He was one of the consulting architects of the Church Building Society, and with a few intimate friends assisted in originating the Architects' Benevolent Fund. Not longer ago than March last Mr. Hakewill communicated to us some curious memoranda, left by his father, concerning the visit paid by the Prince Regent and other illustrious persons to Oxford, in 1814, which will be found in our volume xxxviii, p. 339.

Camberwell.—St. George's Church, Wells-street, Camberwell, has been re-opened, after having undergone extensive internal repairs, which have been carried out by Mr. L. C. Shipton, of Camberwell. The pulpit has been carved and decorated by Mr. R. C. Baker, its donor.

THE NEW MUNICIPAL BUILDINGS FOR GLASGOW.

THE award of Mr. C. Barry on the competitive designs for the new municipal buildings for Glasgow was unsealed on the 2nd, and it was read by Dr. Marwick, the town clerk, at the usual monthly meeting of the Town Council, over which Lord Provost Collins presided.

Mr. Marwick read the report, which stated that Mr. Barry had made two lengthened visits to Glasgow, and had devoted a great deal of time to the consideration of the ninety-six sets of designs sent for competition, comprising in all 724 drawings. He had taken twenty-one of the best designs, and had himself priced them out. Of these he had selected three of the best that he could put before the Corporation, apparently coming under or about the 150,000*l.* Of these three designs he had shown in tabular form the cost, taking as the basis the cubical contents deduced from the plans and the information therein as to height of stories, &c. He also took into consideration the least cost that, in his judgment, each of the three designs could be well executed for in a solid, durable, plain manner, without marble or expensive sculpture externally or internally, for which purpose a large extra sum could be appropriated in any design carried out. He placed these three designs before the Corporation, and thought that the premiums must be awarded to them, inasmuch as they most clearly were in accordance with the embarrassing letter of the instructions. The mottos of three designs were:—First (1), "Carton," estimated by the author to cost 150,432*l.*, his plans being 89, 90, and 91. The cost at the same rate of Mr. Carrick's plan, which was 150,000*l.*, would be 158,800*l.*, and the cost as estimated by Mr. Barry, without expensive sculpture, would be 220,000*l.* The second place is awarded to the plans marked "Fidelity." No estimate is given of the cost; but, according to Mr. Carrick, the cost would be 151,000*l.*, and according to Mr. Barry, about 200,000*l.* The third is given to the motto, "Let Glasgow flourish for ever," which the author estimates at 143,728*l.*, but according to Mr. Carrick it would be 141,500*l.*, and to Mr. Barry, 188,000*l.* Mr. Barry stated that there had been sent in designs of much superior merit to any of the three which he had selected, but also more costly, though not in his opinion too costly for so important a city as Glasgow. The cost of these ranged from 180,000*l.* to 250,000*l.* He regretted that, as he was bound by his instructions, he did not feel at liberty to mention these.

The Lord Provost stated that, on opening the envelopes which accompanied the designs mentioned, it was found that they had been contributed as follows:—That with the motto "Carton," by Mr. G. Corson, architect, 25, Cooperage-street, Leeds (750*l.*); "Fidelity," by Messrs. Coe & Robinson, architects, 4, Furnival's Inn, London (500*l.*); and "Let Glasgow flourish for ever," by Mr. E. Clarke, architect, 6, Adam-street, Adelphi, London (250*l.*).

It was stated that Mr. Barry had also sent a private letter to the Corporation, and it was agreed not to publish the contents of it without his consent.

GLASGOW MUNICIPAL BUILDINGS COMPETITION.*

IN response to an invitation issued some time ago for architects to compete for the elevations of the Municipal Offices at Glasgow, the plans of which were prepared by the City Surveyor, ninety-six sets of designs have been sent in, as mentioned above. The building is to occupy a rectangular and almost level site in George-square. The square having some of the most handsome Classical buildings of all the handsome buildings of this Classical city facing on to it, the designs were to be strictly Classic. The design to which the first premium is awarded is by Mr. Corson, of Leeds, and we will endeavour to describe to our readers the frontages, beginning with the principal one to George-square, which has double pilasters between the windows on the first floor, with colonnade between the windows. These columns support a moulded enriched cornice. The blocking course is circular, and on this rises the attic story, which is treated similarly to the first floor, with columns between

* From a Correspondent.

the windows, and above, again, a cornice similar to the lower one, with haluetrade. The angles of the huildinge project, ae Mr. Brodrick makee all his huildings, particnlarly the Leeds Town-hall, and the central portion next to the entrance ie brought forward and eupported by double columne at the ends, and filled in between with a three-light window over the principal entrance. Above the window ie a pediment with moulded cornice and coping, under which ie a group of carved figuree. Above this central pediment rises a tower which is, however, not etrong enongh, heing as elender ae that of the Bradford Town-hall, and having the appearance of being top-heavy. The lower portion of the tower is well finished, and the npper part arranged for a hell-tower. At each side of the main entrance are projecting piere, with niches for statnes, finished at the level of the roof with pediments. All the cills project so as to form a balcony around, and are eupported on corbels. The basement windowe have square heads, and all the others are cironlar, with moulded archivolts to them, and the epace hetween the windows on the ground-floor ie panelled. The windows to the ground-floor are of similar character to those of tbe first floor, hut ehorter, with carved panele nnder. The angles of the huildinge are finished with mansard roofe, breaking the outline in a picturesque manner. The George-street and Cochrane-etreet frontages partake of the character of the George-square frontage in the position and eize and ehape of the windows, with pilastere or panele between, bnt the central part is broken hy the entrance to the quadrangle, and Mr. Corson has treated thie well. The arch is enriched, and the spandrels filled in with oarving; at each side of thie entrance are projecting piere similar to the entrance to George-square, with nichee for statues. There are, again, three lights over this entrance. On the cornice of the roof and over all the double piere are placed turrets. A dome ie shown over the entrance to the qnadrangle on George-street, with gahle in the same and three-light attic window, which is far better proportioned, and looke better altogether, than the tower to the front. A elight alteration is made hetween these two frontages, that to Cochrane-street having plain square tower. A great fanlt in the John-etreet frontage of this design conoists in having no definite mode of distingniehing which part of the huilding is intended to he used ae the town-hall, otherwise the John-etreet frontage is ae expeneive as any of the othere. An area wall aronnd the building is ntilised to form a place for statnes. The drawings are well got up.

"Fidelity," by Messrs. Coe & Robinson, to which the second premium is awarded, is ae different as poseible from the deeign previously described. The ground-floor and hasement are rusticated. The ends and centre project. At the level of the first floor runs a moulded cornice of a decided Doric character, and above thie the central projection forms itself into a pediment, snppoited hy eix Corinthian pilasters, two on each side, and one between each window, while the pediment is further finished with a carved group of figures. The end projections receive dignity from the four pilasters to each, which are flated three-fourths of the distance down. The space hetween the central and end projections is perfectly plain, leaving the other portions conspicuons. The whole of the window-heads of the haement and ground floor are square. The first-floor windowe have also sqnare heads, and have moulded jambs and corhels to snpport the moulded canopy over, while the window-heads hetween the pilastere have relieving arches thrown over, the under side of which is carved; hut the key-stones of theee arches are disproportionately large, and wreathed aronnd. There is only one tower to thie design, fronting George-sqnare. The hase is vermiculated, and over thie are three windows, with columne between, and donhle colnmne at the end snpport the cornice, which, examined in detail, is the niceet part of the strnctare. The whole tower is placed on a sqnare platform, and groupe of figures occnpy the corners. But one drawing is nsed to show the Cochrane-street and George-street frontages. The entrance to the court in the centre projects, and has a eemicircular arch over two pilastere; and two columne over enpport plain pediments with dentils in coping, and cornice ends project and have double columns at the ends and single columns hetween the four windows. Gronps of figures are placed over the entrance in the pediment. An infinity of time has been epent in making drawinge of the ceilings, which are elahorately drawn and do great credit to the draughteman.

"Let Glasgow Flourish, A," by Mr. E. Clarke, the recipient of the third premium, is a design in some respects better than the others, and any exhibitor in the room might learn eomething from it. The frontage to George-square shows an ashlar basement and a rusticated ground-floor, above which is a cornice with good bold ancones nnder. The first floor, rising from this cornice, deeerves to be described in full. At each end a single-light window is arranged, with three columne on each eide and a canopy over, with enriched cornice and coping; hetween all the other windows two colnmns are placed, and all the windows have square heads with small canopy over, without any carving; hnt all the windowe have moulded architraves. Tbe central portion projecte with three pilasters at each end, which snpport a large pediment with carved group of figuree. Tbere are three semi-circular-headed windowe in this central projection, and pillare between. Square heads would have heen more effective. Over all this etory runs the main cornice of the building, backed up hy a perfectly plain attic etory, with plain square-headed windows. Probably it would be better if statues were placed hetween each window on the attic-story. A small cornice, not at all obtrusive, snrmonnts the whole building, and above, at anglee over the canopies before specified, are angle-turrete. But the thing that marks thie for a prize design is the carefully-proportioned central domed tower, with turrete at angles on a square platform. The tower is circular on plan, and pilastere and windows alternate around. Above are cornice, colonnade, and cupolas. The dome which riese above ie very gracefully proportioned. The ground-floor of tbie elevation is not good. The entrance is by three doors, fairly good hut for the pilastere between, which are out of place. This design ie one of the few that are not coloured, and exhibits more real merit than many of them. The elevatione to Cochrane-street and George-street are similar to each other. The ends are exactly similar to the ends of the George-square frontage. The entrance to the court is badly treated in most of the deeigne, and in this one it is not an exception. From the drawing, the quadrangle appeare to he expensive, but it is one of the best quadranglee in the collection. In the John-street elevation the windows over the cornice are eimilar to those to George-equare, with canopies over, while the main cornice is interrupted hy a pediment over the entrance to the hall offices. A very neat dome is placed above this, which is not thrust conepicuonsly forward, and adds a great charm to the elevation.

Several rooms are filled with deeigne, and it is ohviously impossihle to go over them all carefully, so we shall select a few of the best; foremost among which we recognise the carefully-etndied drawings of Mr. William Hill, the author of the Bolton Town-hall, signed "Adelensis." This shows three-quarter pilasters from the level of the ground-floor, two etoriee high, over the rusticated hasement, while the architrave finishes around the pilasters to the first-floor windows. The parapet above, following the lines of the cornice, forms cills for the windowe, and pedestals for figuree of all the kings and queens of Scotland, to which a dignified Classical attic etory forms a fitting hackground. The attic windowe have pilastere and cornices; and above the whole, rnnning aronnd the building, is another cornice snrmounted with an open parapet, with vases above, each end finished with emall angle-turrete. The entrance ie through three doore, with pilasters. Above is a tower, rather slender, hut suitable in every way for the style of building, placed nearly in the centre of the building, with rusticated basement, and colonnade over, and vaes above columns. On each side of the central tower are bell-turrets in harmony with the central tower. The elevations to Cochrane and George streets are spoiled completely by the entrancee to the qnadrangle; if they were away this design wonld be enhanced in valne considerably. It has pilasters on each side similar to the front on a eimilar rusticated basement. Tbe moulded frieze is taken hack the depth of the reveals of the windowe and forms moulded impoets to the same. A small room ie obtained in the turret, and forme a central object in these frontagee. The windows over the arches are richly carved. The elevation to John-street is spoiled by the anthor trying to keep within the coet epecified; and it ie easily eeen he has reduced the expense on this frontage by having no pilastere between the central projection and the projectione at the ends, and otherwise cutting down the coet where practicahle. The entrance to the town-hall ie the best in the exhihition, and the design could be carried out for the money intended to be spent.

"Classio" may come next. The walling ie boeted, with sunk joints. Square heads are shown to all the windows. The three entrances have circular heads. The ende and centre project as in other designs. There are two pilasters at the ends of the central projection, and six columns between the windowe, snpporting a moulded frieze, with wreaths carved on, and cornice and colonnade over. The windows on the firet floor have circular heads, square canopies over, supported by large corhels; ends have similar windows, but with pediments ovor, carved. Tbe second-floor windowe are circnlar, and between every window circular-headed niches for figures are formed. Each story is treated separately. There is a good tower, and well-proportioned dome over. The author shows an alternative plan, with a elender tower, with olock in eame, and no columns in the design throughout, the centre being sufficiently marked by the position of the tower.

"Clyde" sends a good design, ehowing a rnsticated gronnd-story, with frieze and monlded cornice, on which rise pillars hetween each window. The angles and the entrance project forward, and have very good turrets, raised one story, admitting of figures in the niches. The pediments are filled with carved figuree over the entrance. The gronnd and first-floor windows have circular heads, and the attic has square heads, finiehed juet under the cornice. The area-wall ie hold, showing a deoided line. "Clyde" also sends another design, showing rusticated hasement and gronnd storiee, and Ionic columns to the firet floor, supporting cornice and colonnade, above which is the attic story, with dormer lights. Tbe whole is too enriched and folinted, but it has a good cornice and colonnade.

"Civis snm," hy Messrs. Campbell Douglas & Sellars, shows a ground-story formed with one window in each angle, which is projected forward, and has bold monlded archivolts aronnd. The three entrances are also treated in a similar manner, while the portion between the ends and centre is recesed, and has threo windows with moulds aronnd. The windowe to the first floor have Ionic colnmns eupporting monlded frieze, used ae a head witb canopy, and the epace above filled in with moulded arch, with small figures under on tbe cornice. The pilastere are two storiee in height, with Corinthian caps and moulded frieze; in a line with them there is a deep cornice, blocking, and colonnade. The angles in the attic story have horseehoe-shaped windows, which are anything but in keeping, and turreted roofe over. There are two bell-tnrrets next the tower, which is octagonal, and after the etyle of Wren's tower at St. Stephen's, Walhrook.

"Lippen to me, bnt look to yonreelf," has a good elevation, with rnstic hasement and panelled gronnd-etory. There are sqnare heads to all the windowe throughont, a plain frieze, and plain projecting hlocking conse with bed-mould, above which rise Corinthian columns two storiee bigh, the windows hetween having carved panele under the firet-floor windows, and nnder the second-floor wiudow cills a key pattern string-conree. There is a deep frieze, splayed hlocking, and richly carved pediment over the entrance, and a nicely-proportioned dome is over the clock-tower, square seats at the ends heing reserved for groups of figures. This is the design of Mr. Salmon, of Glasgow.

"Spes Dulce Malum" is a very well-drawn deeign, hy Mr. Burnett, sen., finished in a pale ink, eomewhat Florentine in style, with rnstic ground-story and projecting piers for etatues hetween centre and angles, making each appear receeeed. There is only one entrance, which hae a semicircular arched head. There is also one window in each end with similar semicirenlar head, and three othere, forming an arcade between the ende and the entrance. The windows are not satisfactory.

Mr. James Barlow Fraser sent a shaded drawing, nnder the motto "Rnyal," which shows a vermiculated baement, with sqnare heads to the windows, and similar windows to the gronnd-floor, with entrances in the centre with arched

heads. The columns rise from the first floor to the roof, with Ionic caps in the central and end part of the building. The plans are very well drawn, but there is a desperately ugly dome, with the clock-tower under. There are three pediments, and the centre one is carved, and all the windows above the ground-floor have canopies over them. The design that comes next was, we may say, universally admitted to be one of the best drawings in the exhibition. It is, however, impossible to mistake it for a Classical building. The motto is given as "S. P. Q. G."

"Roman" occupies his first and ground floor with a range of pilasters. The angles and the centre project. Central columns support a cornice projecting 5 ft. 6 in., and the attic story comes on as a blocking course. This is a decided mistake. The first-floor windows have pediments over them, and the angles are raised a story, and finished each in four turrets. The tower is considerably too large for the building. There is a small cornice over the attic story.

"Suum Cuique," another shaded drawing, is by Mr. William Teit, of Glasgow. Each story is treated separately. The ground-floor has square-headed windows, and the first floor has also windows with square heads, but they have canopies circular and pointed alternately over them. The turret is peculiarly ugly, and is supported by four columns.

"Old Tee Square" has a vermiculated ground-story. In the centre are the principal doors, and over these are well-drawn fluted columns in the centre, and square columns elsewhere between each window. These columns are all two stories high, and there is a pediment in the centre with group carved therein.

"Why not?" has pediments at the ends, and central tower, large circular head to door, with projecting piers at each side, and large circular heads to windows on the first and second floors, while there are nicely-moulded window-heads of a reasonable size to the ground-story.

"Let Glasgow Flourish" (red ink) has a vermiculated ground-story with columns above two stories high, central pediment with frieze and wreaths over, and carved figures in the pediment. All the window-heads are square.

"Mottoes only" has ground and basement story rusticated and plain; small projecting pediments in centre; the ends also project. There are shown three doors, with pillars above between windows. Connected with colonnade is a deep perfectly-plain frieze and cornice, with colonnade over. Angle-turrets are placed at the ends and square tower, but the attic over the centre pediment is dwarfed.

"In Honour true," by Mr. Eaglesham,—a fanciful design. All the windows have circular heads. The ends are raised a story, and a horrible clock-tower is attached.

"Clutha," a design of Mr. Bell, is elegant; all square heads to windows, and each story is treated separately. The ground-floor shows panels between windows, and on the first and second stories columns are arranged instead between the windows. The windows have architraves, and the angles are raised one story. The clock-tower is passable.

The ground-floor in the design marked "B" has square windows. The design is of astylar composition. There are gables at ends, and a gorgeous turret. The town-hall is well marked.

"G" is very dignified. The columns commence at the ground-level, and are two stories high. There is a centre pediment, and the ends project. There is a colonnade and cornice over, and panelled attic story. The ends are surmounted by domes, and a large dome is shown in the centre.

In "Aiblins," Mr. Maclaren shows a basement battered, which gives an appearance of stability. There is a string on the level of the ground-floor, and the windows have square heads; the walling on the ground-floor is panelled. On the first floor great arched openings are evidently intended to represent Classical windows, but we fail to see the correspondence; there are three windows in each bay, and one at each end. There is a small pediment in the centre, and square windows to the second floor in the frieze. Pilasters are shown to the ends and centre dwarf domes, with buttresses around.

"1880" is a well-drawn and fair design. Entrance is very tame,—too much sameness.

We believe Mr. Thompson sent "Cavia," a good design, and it would have been better without pilasters taken up three stories; panelled ground and first floors, and fluted pilasters above at the ends, over which are well-shaped domes.

"Nitor" is a good design lost among so many others. The columns, of the Corinthian order, are two stories high from the first-floor level, and there is a panelled frieze above the angle-turrets and pediments: ugly stone transomes are shown to the first-floor windows, below arches. The centre projects, and there are figures in the pediments.

"Finis coronat Opus:" effective front, columns between each window, and two at angles. A pediment is shown in the centre, and the colonnade at the level of the attic story, above the windows and statues, looks well, but the pediment is much too large. There are mansard roofs over the angles, and large tower, and circular dormer window.

Mr. Stark sends "Palladian," which has Corinthian columns to front, fluted from ground-floor two stories high; the ground-floor windows have square heads, and the first floor circular; the cornice frieze, and colonnade over these windows are 15 ft. high. The attic windows are placed in panels with statues between.

"City Chambers," by Mr. J. Bierd, has the ground-story panelled with vermiculated quoins and archstones to heads, angle-turrets too lofty. The central projection is supported on wide, heavy pilasters, resting on slender ones, with domed roof and good dormer windows.

The walling on the ground-story to "Palladio" shows the joints sunk. There are some good corbels to support the cornice, and a central pediment is placed on the George-square front, supported by eight columns, while the end projections have four similar columns each. Over the pediment is a central domed tower, and turrets are also placed over the ends. The colonnade and cupolas are too lofty. All the windows have square heads, with canopies over, those to the first floor being circular, and those to the second floor pointed.

The following are the mottoes of various other designs that have been sent in:—"Experience," a building four stories high; "Progress" is spoilt with having no lights on the second floor; "Peace, Progress, and Plenty," an Egyptian study, very good, but out of place in Glasgow; "Fiat lux," too lofty, and perfectly plain; "Speedwell" vermiculated and plain courses, alternately, to ground-story, and very neat upper-story, supported on corbels; "Bourgeois" (by Messrs. Turnbull & Thomson), no columns, central part with angles raised a story, the centre part projecting, and the basement battered; "Ad rem" has three pediments, the centre one with six Ionic columns, and the outer ones with five columns each; "Finis coronat Opus" very similar, but the centre pediment is larger than the outer ones, and it has a better tower; "Salonica" is a well-drawn design, the centre and ends are three stories high, and between these the building is two stories high; "Apropos," a highly-shaded and coloured drawing; "Art with Economy," very plain; "Light and Shade," "Centre of Commerce," "Motto," "Town Hall," a sketchy, Gothic drawing; "Civis," "Grecian Doric," "Tree, Bird, Bell, and Fish," "Rebaiothis," "Conor," "Immutatus," "Per non Dormire:" the centre and angles project with panelled quoins at the ends and columns between, and very good dome; "Non quo sed quo modo," a poor design, covered with the Broomhall tiles; "Our will became the servant to defect, which else should free have wrought;" "Con amore" motto, St. Mungo, is a good design, and deserves a better place in our report. It has a rustic basement, and the columns are two stories high, with attic over and centre pediments, each with dome over. It was said to be by Mr. Anderson. Mr. Landless also sends a drawing, signed "St. Kentigern Primus." It is plain, with a good central dome. We should advise this young Glasgow man to persevere, as he will obtain prizes in time. "Child," by Mr. J. Thomson, Glasgow. "Let Glasgow flourish." "Justice," sketchy, and very poor. "Let Glasgow Flourish," with fish and mitre. "Glasgow floreto," columns too heavy, and too near together. "Experto crede," very gaudy. "Ex propriis St. Mungo," two lofty turrets at the ends. "Bruce," "Bannockburn," "Mendelssohn," "Quivi Trovammo," "Two Circles," "Nisi Dominus Frustra," "Simplex," "Let Glasgow Flourish," "Concilio et Labore," "Georgiana-square" by Mr. Love; "Revirescam" by Mr. Dalglish; "Curia Municipalis," windows coloured. Mr. Baird, jun., was not successful in making his mark with a design signed "My Mark," and we are not astonished. "Red Star," "Ca' Cannie," "Festina lente"; "Major Domo," enormous dormer and central pediment; "Detur Digniori," a decided Queen Anne. "Desideratum" is well sketched; "Valentine Clyclone" is by a disciple of Queen Anne; and "Athens," a Grecian drawing, is reported to be designed by a German.

THE PROTECTION OF WOOD AND IRON BY PARAFFINE.

DR. EUGEN SCHAL gives some interesting information on this subject in the *Würtembergische Gewerbeblatt*.

In chemical technology great difficulties sometimes arise when it is desired to manufacture on a large scale preparations which may be obtained with ease in the laboratory. In most cases the reason of this failure is the fact that in the manufacture the use of glass, porcelain, platinum, &c., which successfully resist the effects of the various chemical agents must be dispensed with, and cheaper and less easily breakable materials, such as iron, copper, lead, and wood, substituted. Wood especially cannot be replaced by any other material in the wholesale preparation of muriatic lyes, although the same, according to the strength and temperature of the liquid, undergoes sometimes very rapid destruction.

Dr. Schal says he acquired this experience more particularly in 1874-77, in alizarine manufactories, and that he found in paraffine a means which efficiently protects the wood against damp, acids, and alkalis, and by which a great saving is effected. The wooden vessels used, especially tanks of pine wood, for boiling acid and alkaline lyes, as well as casks of oak of the heaviest weights, for separating acid alizarine lyes at a pressure of a half to two atmospheres, were generally totally rotten after a few months, but they lasted for two years when impregnated with paraffine.

Before treating with paraffine, however, the vessels must be thoroughly dried for about three weeks by leaving them in warm and dry air, in order to prepare the wood for the absorption of the paraffine solution in its pores. The latter solution is prepared in the following manner. A part of the paraffine is melted in a spacious metal vessel over a moderate fire, the mass being stirred, the boiler taken from the fire, best moved into the open air, stirred until the mass begins to congeal at the edge, and then about six parts of petroleum, ether, or sulphuret of carbon are poured in, and stirred until solution. The preparation is then put into vessels that may be hermetically closed, or it may be used at once. In preparing the paraffine solution great care must be exercised, as paraffine as well as petroleum ether or sulphuret of carbon especially are very inflammable, and as even the vapour of the two last-mentioned substances, if mixed with air, may give rise to dangerous explosions. Those substances must, therefore, be kept in a cool space, far from light or fire, and well stoppered.

The wood is best saturated in dry and warm weather, as then it dries more quickly, and a smaller quantity of the solving agent is necessary. In winter six parts of the solvent generally do not suffice. This proportion changes with the quality of the paraffine and the temperature; paraffine solving with difficulty is better than the more readily soluble article. Vessels easy of access, such as tanks, tubs, &c., are coated in the open air with the solution as long as the wood will absorb it. The solvents evaporate very quickly, leaving the paraffine behind, so that two or three coatings may be laid on in succession. If the vessel is to be exceptionally well prepared, it is left for a day to dry, and then another layer of the paraffine given.

For vessels in which steam is used for boiling the liquids they contain, be applies after a few days a coating of oil varnish, because the melting-point of paraffine is below the boiling-point of water, and it is thus in time driven out of the pores by the water.

Instead of oil varnish, the vessels, after being well rubbed down, may also be coated with a thin solution of soluble glass, then dried, and washed with diluted hydrochloric acid. The silicic acid thus formed clogs up the pores from the outside, and provides a protection to the paraffine against the hot water. For vessels which are used only with a moderate heat or cold, the coating of paraffine suffices perfectly. The paraffine is hardly dissolved by diluted cold

alcohol, is not poisonous, and may also probably be used with advantage for vessels for keeping liquid. In the case of barrels, the solution was poured in simply after drying them; for an oak barrel holding 9 to 10 hectolitres, 1 kilo of paraffine dissolved in petroleum ether was required. All openings were then well closed and the barrel rolled about and over for about an hour, so as to bring all parts in contact with the solution. The barrels were finally left standing on their ends for half a day, after which time the remainder not absorbed was emptied, and used for the outside coating. Before applying the solution outside, however, the barrels must be well cleaned, for dirt naturally closes the pores of the wood. As these barrels were very expensive, and had to sustain a pressure of two atmospheres, besides being exposed to a high temperature, they received on both sides an additional coating of oil-varnish. It is, however, necessary to let such a barrel stand in the open air at least a fortnight for drying, and as a precaution fire must be kept away from the barrel while being prepared. As a further precaution, in applying the solution inside, the workman must not be left alone, as it frequently happens that stupefying vapours from the solvent of the paraffine arise, which stupefaction, however, soon disappears in the open air. The oil-varnish may also be diluted with petroleum ether, poured into the barrel, and then the latter rolled about, as above described; but many places escape saturation in this operation. After coating with varnish, the barrel is once more dried, and then filled with water, in order to force out the combustible gases. This is much to be advised, as an explosion once took place in consequence of a workman trying to enlarge a hole with a red-hot iron, contrary to orders. After the last operation, the inner sides of the various vessels are rubbed down with a dry duster, so as to take off all loose particles.

If impregnation of wood is intended on a large scale, the wood is best stacked in iron boxes, the paraffine solution poured over it, the solution not absorbed drawn off after some time, the solvent forced out of the wood by means of warm air, and recovered by condensation in a cooling apparatus.

If the various manipulations are carefully carried out, the duration of vessels thus prepared is increased from four to six fold, while the outlay is comparatively small, leaving out of consideration that the contents of such vessels are frequently lost by the bottom being forced out.

Paraffine, melted with equal parts of linseed oil or rapeseed oil, is also useful for coating iron vessels, which without a substantial preservative are very liable to rust in manufactories of chemicals.

Paraffine likewise protects skin efficiently against wet, alkalis (especially lime), acids, &c.

Dr. Sohal says he often found that workmen in alizarine factories suffered much from sore, ulcerating, and swollen hands, especially during winter. After the workmen began to use (twice daily) a solution of paraffine with rapeseed oil and petroleum, chapped hands (not to mention swollen or ulcerated hands) became a scarcity.

The solution is produced by melting three parts each of paraffine and rapeseed oil, removing it from the fire, and adding eight parts of petroleum while stirring the mixture. Before using, the solution is stirred a little, and the hands rubbed with it while they are clean and dry. In larger factories, earthenware and tin vessels, filled with this ointment, are placed at convenient spots, and it is believed that the manufacturer as well as the workman will find this pay.

New Congregational Chapel, Northampton.—The foundation-stone of a new Congregational Chapel, in King-street, Northampton, was recently laid by Mr. John Hensman. The new building will be faced with local stone and white brick, with terra-cotta and Bath stone dressings, moulded white bricks for strings, window cills, and cornices, from the Whitwick Colliery Company, Coalville, Messrs. Gibbs & Canning supplying the terra cotta. Mr. S. J. Newman, of Northampton, is the architect, and the work has been entrusted to Mr. Daniel Ireson, builder, of Derngate, Northampton. The cost of the new chapel, in the erection of which most of the old material has been utilised, and the expenditure, thus curtailed, will, it is estimated, amount to about 1,600*l*.

FROM BRUSSELS.

Brussels, on the occasion of the fiftieth anniversary of its freedom from the Dutch rule, is in gala costume, and the national flag flutters from every window and across every street, recalling in all but the difference of the tricolor the *fête* at Paris a few weeks since. Unconsciously the comparison with Paris slips from under the pen. Brussels, every one carelessly agrees, is "Paris in little." There exists, however, as great a difference as it is perhaps possible to imagine, when the few hours' distance that separates the capitals of France and Belgium is taken into account. The stranger who hurries from the railway station to his hotel in the higher part of the town, and in the evening saunters down the Rue de la Madeleine and through the Galeries St. Hubert, attracted moth-like by the glitter of the shops and *cafés*, and heedless that but a few yards from him lies the picturesque old Grande Place, may, of course, think Brussels a little Paris.

Thank Heaven, however, in spite of successive burgomasters and energetic magistrates, there still remains, and long will remain, a large portion of the dear old Brabançon capital untouched, to delight future generations of seekers of the picturesque. After the imperial grandeur of Paris, the homely character of Brussels is delightful. Perhaps it appeals more to the domestic Englishman than to the boulevard-frequenting Parisian. The incidents that strike the eye are so different; the open small-paned window where the industrious housewife sits knitting, for the long winter, the comfortable stockings and vests so prized by the Low-Country folk; the narrow streets shut in and shaded by their picturesque gables; the homely costumes that surround one,—for machinery has not yet entirely triumphed over tradition; the honest-hearted greetings in the market-place, alive with its vendors of vegetables under their patched and weather-beaten umbrellas,—ever suggestive of sketches for the pocket-book,—these and a thousand other incidents, from the welcome given to the stranger to the wag of the tail of the brindled dog who trundles along so happily his burden of mirror-bright milk-pots, all breathe an air of Flemish comfort and domestic ease that finds no possible comparison on the banks of the Seine, where "the blessings of civilisation" are written on every feature to be met in the streets. Brussels is a capital, and yet delightfully provincial. The Parisian, therefore, will never love Brussels; but the Englishman who knows his Paris well, from a brotherhood of sentiment, if not perhaps of blood and of language, unfailingly be led to prefer the gay little capital of Brabant.

Brussels, now *en fête*, remains still the Brussels of always, less always the difficulty of finding accommodation. The strangers fill the streets of the capital; the provincials fill the innumerable *estaminets*, where gallons upon gallons of excellent *faro*, and, perhaps better, *brune* beer, are consumed amidst revelry whose chief charm lies more in its resemblance to the life of Teniers's contemporaries than in its approach to what modern "culture" and the studies of the Social Science Congress have led us to appreciate.

After the terribly modern aspect of Paris, where the toil of its business of pleasure is stamped deep on every face, it is delightful to find oneself almost transported back in these quiet streets to the realisation of the period which tradition has pictured to us as "the good old times," where all is not scraped by municipal authority every ten years, or built five and six stories high in lines laid down by the T-rule and square. It is the Continent proper, the ideal of foreign travel satisfied, while Paris remains eternally Paris, which, as Charles Blanc remarked but a few days since, is only loved by Parisians because there still exists enough of old Paris to rouse the joyous recollections of the past. Have a care, destructive mayors and magistrates, that in your love of modernising your old towns you do not destroy that warm affection we all feel for the homes in which we have been brought up. The Bruxellois loves his Brabant town, where he sees in after-life the scenes of his youth revived, as his father and grandfather did before him,—the old houses which unconsciously affect his imagination with their quaint picturesqueness, the *estaminet* with its high ceiling, its clean-sanded floor and shady coolness, the well-filled glass of honest beer,—impossible, by the way, to find in Paris,—the satisfying meal,—another difficulty on the banks of the Seine,—and homely comforts enjoyed by his ancestors, and which to him form the great features of his existence.

Purists may shudder at the boorish life, the *bourgeois* existence, the aspect of decadence that stamps each nook and corner of the quiet old Flemish and Brabant towns; but let us remember that this seventeenth century that strikes the eye at every turn was the great period of Belgian history, when after the gigantic effort that shook off the Spanish rule, Belgium, or rather the Low Countries, began that epoch of prosperity it has ever since enjoyed, when the cannon of her great three-deckers,—to the designing of which the decorative skill of Van der Velde was not ashamed to devote itself,—thundered within sound of London Bridge, when still the commerce of the East and West poured through the gates of the Flemish towns, and along the broad flat roads from Ghent, from Bruges, from Antwerp, and from Brussels, to Northern Europe; when foreign influence was stoutly combated, and new-fangled fashions took a century and more to wedge their way into a position, and then, even, never succeeded in taking a good hold, —a fact which nothing shows more plainly than the development in Belgium of the varied architectural styles that have swept over Europe since the Middle Ages. The Low Countries have accepted each of these, like poor Ophelia's rue, "with a difference," and Belgium, for this reason, will retain to the artistic eye, for many a century yet, a peculiar charm of originality due to the peculiar character of the nation.

Respect, then, lover of a purer art and purer periods, the strength of a people whose force was sufficient to resist the foreign influences that neighbouring countries allowed so easily to acclimatise themselves. When one travels abroad, one's tastes must be allowed to become eclectic, in the too-little understood foreign acceptation of that word. They must be riveted temporarily to no one period, to no one fixed idea, or many a pleasurable illusion will be destroyed, and many a disappointment met. Brussels is essentially calculated to try the strength of the prejudices that a home course of artistic study may have engendered. It completely satisfies the ideal of romance, the ideal of the existence of the past, while calm reflection leads one to remember the period to which the greater part of all this effect belongs.

At the present moment, however, it requires a power of abstraction more than usual, not to be affected by the general bustle which attends the *fêtes* and ceremonies, placarded programmes of which enliven with their bright colours the walls of many a gloomy old burgher's warehouse, with flags flying overhead and unusual gaiety in the streets. Brussels in this excitement is the capital of Belgium, but scarcely Brussels itself, except to those who know the town of old; true, the Grande Place, with its familiar features, is little affected by this gaiety, though high up in the air, under the gilt St. Michael and the Dragon, on the spire of the Hôtel de Ville, flutter a bundle of national tricolor flags. In the town, the talk is all of the great historic cavalcade, the success of the first "sortie" of which has led to two further representations. Certainly the cavalcade is all that in the present day we can expect in a thing of this nature.

Needless now to describe the procession in which the whole history of Belgium was represented in costume, the long struggle between the patricians and the burgesses, the communes, the brilliant reign of Philippe le Bon and his artistic and literary court, and the later rule of Maria Theresa, followed by a long series of allegorical representations of the great industries of the time, and the deputations from the various provinces, cantons, and communes of the country. By this feature alone, long will the fiftieth anniversary of the independence of Belgium be remembered.

The exhibition, of course, forms to the stranger the chief object of temporary interest in the city. Being a strictly national show, Belgium is thoroughly well represented in its art, its manufactures, and its science. There remains, therefore, much to be seen,—and said.

Builders' Benevolent Institution Dinner.—The annual dinner in aid of the funds of the above-named Institution is fixed to take place at the Freemasons' Tavern, Lincoln's-Inn, on Thursday, 11th November, Mr. T. F. Rider, president, in the chair. The committee will be glad to hear from volunteer stewards.

AMERICAN PROGRESS.

It is hut natural that a country, whatever may he its size or importance, should look with interest to the period when the time for numhering its inhahitants should arrive, for then is the opportunity afforded for noticing whether its condition is progressive or retrograde; and in proportion to the vitality and energy of that country, so is the interest greater and keener, and the efforts to insure a true and accurate accounit more complete and exhanstive. The period of a census, indeed, is a kind of birthday of a nation, when stock is taken and its values ascertained; and as it is seldom an occnrrence of anything like an annual repetition, it really hecomes an inqniry of the greatest importance. In this matter England, which shonld be first and foremost, is almost hohind every other nation, and seems to care, less than all, to know what way she has made in the last ten years, or to gain that knowledge of herself which is so emphatically useful for futnre guidance.

Our own census is looming hig, and preparations are heing made even now for taking it. Of all the European, American, or other censuses, it will be probably the haldest and the least instrnctive, going very little further than a mere numhering of the people, and wilfully ignoring the openings naturally offered of getting information as to the real condition of the people, social, religions, or indnstrial. It is very much to he regretted that onr Government, either from a misplaced grudging of a few thousands extra (whichare sure to he wasted in some other quarter) or from a fear of injuring its popularity with its political supporters, should have refnsed to allow the census to be made useful for anything hut the hare figures of the population. Perhaps in ten years hence we may learn a little wisdom, and do thon what America is doing now, viz., seeking to find out in what direction her giant powers are extending themselves most, so as to gnide her energies more profitably during tho next decade.

The industrial history of New England is not only a romance of itself, hnt is a romance almost of our own day; and although we in the old country are fond of pointing to the rapid development of some of our manufactnring towns, the rate of progress is thrown into the shade hy most of the American towns; nor have we any reason to donht that, in most cases, the progress is as sound commercially as it has been rapid. It will he instructive to note from time to time some of the principal American cities; for, it must not he forgotten that England and America are becoming so interwoven in commercial matters, and so closely connected hy ocean steamers, telegraphs, and (very soon, probahly) hy telephones, that we all have a directly personal interest in her trade and manufactures, and cannot afford to talk of them as far-off things whioh do not affect us. Looking at America from an American point of view, there are many branches of the snbject of her development which are deeply interesting, and which, perhaps, the *Builder* will tonch upon at another time, snch as the migration of industry from the Eastern States to the Western, and the consequent variations in the halance of the trade and commerce of the country. At present, however, we propose to briefly consider the population of some of the chief centres of the States, in connexion with their past and present progress. It is too soon, as yet, to obtain the statistics generally of the American censns of 1880, hut sufficient is known as to the numerical condition of the great cities to enahle us to draw some conclusions that may be of interest.

The New England States of Connecticut, Maine, Massachusetts, Rhode Island, New Hampshire, and Vermont are all remarkable, from an industrial point; for not only were they amongst the earliest pioneers of trade, hut they stand out from amongst their own people by their peculiar force of character, and hy the perseverance and energy with which they have drawn into their own focus such a large proportion of American trade and manufactures. Let us take, for instance, the small State of Massachusetts and its capital, Boston, which, on the principle that Paris is France, may he spoken of in the same way with regard to the state. Boston, according to the present census, contains 352,000 inhahitants, an increase of 40 per cent. dnring the last decade. Whether this amount includes the neighbouring towns of Roxbury, Charlestown, Dorchester, and Brighton, which have spread ont their wings so greatly as to have become snhnrhs of Boston, seems donhtful; hnt there is no donht that the increase since 1870, when the census reports gave Boston 250,526 inhahitants, has been at a remarkahly-rapid rate. Eighty years ago, the popnlation was returned at 40,000, and the port was then spoken of as "doing a nice little trade" with the East Indies. The nice little trade had risen in 1849 to the value of 1,222,800*l.*, and hy 1878 to 6,130,000*l.*

The six New England states of Massachnsetts, Connecticut, Maine, New Hampshire, Rhode Island, and Vermont, are estimated to possess a capital in the shape of their manufactories of 108,173,840*l.*, and to employ 556,000 workpeople ont of the total population of 3,362,000. The manufacturing capital of Massachnsetts alone amounts to 56,576,720*l.*, while it has 317,000 artisans ont of a popnlation of 1,653,000. The greater part of these artisans are highly skilled, and contribute, together with the perfect machinery in use, to a very large production. Textiles are the main hranch of manufacture, while second only to these is the hoot and shoe trade, which keeps more than 1,400 factories in constant employment, tnrning ont, one year with another, some 60,000,000 pairs of the value of 16,000,000*l.* Several of tbe Massachusetts towns are almost exclnsively devoted to St. Crispin, and it is not too much to say that at least half the hoots and shoes worn in the United States issue from this one little state. A single factory at North Brookfield makes from 5,000 to 8,000 pairs a day, giving work to 1,000 people, at wages from 5s. 6d. to 10s. The watch trade, again, is another marvel of rapid development, dating back for a very few years only since its commencement. It was but in 1850 when two Boston artisans, Allan Denison and Edward Howard hy name, first opened a small workshop for watchmaking at Roxbury; hut, finding the place not sufficiently quiet for their wishes, they changed their locality to Waltham, a little town about 11 miles from Boston, and here they established themselves on the banks of the Charles River. Although they demonstrated the feasihility of making watches hy machinery, they failed in a pecnniary sense, not having started with sufficient capital, and the concern then passed into the hands of Mr. Robbins, who founded in 1858 the now celebrated American Watch Company. Considerably more than a million of watches bave issued from this factory from then till now, and although they were originally intended and expected to supply the home trade only, their cheapness and excellence have canscd a demand for them in foreign countries, England not excepted. Over 800 operatives are employed hy this company, working eleven hours per day (except Saturdays, when tbe limit is nine hours), the men earning daily from 7s. 6d. to 11s., and the women from 3s. to 6s.

The little state of Rhode Island competes hriskly with Massachusetts in industrial honours. Although she is only about 40 miles in length and 82 in hreadth, possessing not more than 250,000 inhabitants, she counts 46,000 of these as working people, with an industrial capital of 13,320,000*l.*, while, according to the last census, the valuo of the manufacturing production was estimated at 22,280,000*l.* What the revenne may he according to the exhaustive inquiries of the present census (now heing made) it is impossible to say; hnt it must clearly show a very great increase. The production of the state of Maine is estimated at 14,000,000*l.*, and that of Vermont at 6,400,000*l.*, the latter state having three specialities, viz.,—tanning, carriage huilding, and the making of scales and weights. Connecticnt, in addition to her textiles, of which we shall have more to say further on, is noted for her hardwares, sewing-machines, axes, and agricultural tools, besides running Massachnsetts closely in the matter of clocks. New Hampshire prides herself on her steam-engines and locomotives. Maine, that happy state where the people will neither drink themselves nor allow anyhody else to do so, except an unlimited supply of water, was formerly nothing but a saw-mill or lumher state. This trade (a very important one, hy the hye) still flonrishes there, and is a valuable source of income; hnt lumher is rather an industry of the more primitive regions, where forests still flourish in their primæval glory and where "clearings" are the first thought of man. Maine still possesses a considerable area of nninhabited country, hut she also has several active business towns, such as Portland and Augusta, which can show a fair proportion of mills and factories, with their hattalions of skilled workmen. Massachusetts is *par excellence* the cotton-spinning state, to which succeed in order Rhode Island and Connecticnt. But although New England may be counted as the Lancashire of America, it is hy no means exclusively so; for, of late years particularly, the cotton trade has increased in a very remarkable degree in the Southern States of Georgia, Tennessee, and North Carolina. A great change is coming over the United States in this respect, as in many other industrial respects. It was possibly a mere chance that first influenced the establishment of mills in the New England states, hnt what fixed them there was the character of the country, and the ample supply of water-power, which commended itself at once to the notice of the early indnstrial settlers. The cotton in those days was, therefore, all brought from the Sonth to the North, just as it is brought to Manchester, and it was not antioipated that a cotton-manufacturing element would grow up in the South. But it has done so, and to a hy no means inconsiderable extent, that is increasing every year. The following hrief table will show how the thin end of the wedge bas been introdnced, giving the figures of the Northern and Southern cotton-spinning States respectively:—

	No. Mills.	No. Spindles.	Pounds of Cotton used.
Northern States.			
Massachusetts	296	3,775,634	2 8,894,352
Rhode Island	129	1,438,479	61,409,470
Connecticut	108	889,784	45,492,513
New York	60	615,205	28,473,469
Pennsylvania	60	451,9 0	31,572,305
New Hampshire	36	815,709	37,326,123
Maine	27	633,944	33,693,236
New Jersey	22	178,928	10,114,300
Maryland	20	127,353	21,368,029
Vermont	10	46,344	2,372,420
Delaware	8	42,276	2,358,162
Ohio	4	13,000	1,764,000
Indiana	4	22,988	3,261,349
Total	694	9,057,543	509,009,613
Southern States.			
Georgia	47	131,349	23,299,303
Tennessee	49	55,384	6,701,718
North Carolina	31	54,500	6,694,841
South Carolina	18	70,282	9,671,028
Alabama	14	58,480	6,756,170
Mississippi	9	18,256	1,990,870
Virginia	9	54,624	5,660,836
Kentucky	3	9,614	2,420,362
Louisiana	3	2,269	713,933
Missouri	3	19,700	2,810,485
Texas	2	5,700	982,365
Arkansas	2	1,781	132,400
Total	181	481,821	67,733,140

WORK AND WAGES IN ANCIENT GLASGOW.

THE records from which the following notes are gatherod date from the year 1573 to 1627, at which period the majority of the citizens resided in the neighbourhood of the cathedral and around the preoincts of the bishop's palace, now covered hy the Royal Infirmary. The Drygate was the chief-street, and the Rotten-row of ancient Glasgow, like that of present-day London, was the promenade of nobility. In the middle of the sixteenth century the population of the city did not exceed 2,000, the male portion heing principally made up of ecclesiastics, salmon merchants (Sir Walter Raleigh was as yet unknown on the banks of the Clyde), fishermen, and a ew tradesmen and mechanics. Except in a few instances it is impossible to get at the exact amonnts paid for wages aud work done. The accounts are sometimes terribly mixed. For example: "To Matthew Ker,"—Matthew was the keeper of the Tolbooth, *i.e.*, the court-house, council-chamher, and jail, rolled into one,—"for winter candill and for the mennis suppers that war execnt, 25 shillings and eight pence." In this instance the calculation of the price of candles is rendered impossible by the grim "sundries" in the shape of a last meal to the condemned. When the town hegan to spread to the low lands on the river side, causeway-laying hecame a necessity. The town possessed quarries in its immediate neighhonrhood. The qnarriers were paid by the "ontpnt." "To the quarriers for quarrying of fonr hundred cartloads of whinstone to the calsay, 9 pounds, 6s. 8d. Scots." Causeway-maker Glasgow had not, hut it horrowed one, a Walter Brown, lent by tbe provost and magistrates of Dundee. Walter comes, makes a snrvey of the joh, and departs. October 28, 1577, "To Valtir Brown, calsay maker, for his expensais in cuming fra Dundey and ganging thereto again when he was feit [paid] 40 shillings." Among the items of the

causeway-laying accounts are, "Given at the Maister of Works command to Mathow Millar and John Brokes for leading of threescoir cartis [cartfuls] of stanes to the calsay from the twelt of November to the sixteenth thairof, 30 shillings." "To John Houston for 1 week's labour at the calsaye, 20 shillings." In the following month this same John Houston receives "for the making of ane [oue] rnde and ane half of calsaye above the Grayefriers, 3 pounds Scots." "Item, for Danskyn iron to he ane calsay bammer, 27 shillings." Two kinds of iron are frequently referred to, Spanish and Danisb iron, the latter being used for fine work. Bars and stanchells are wanted by the master of work, wbo, whoever he might be for the time, seems to have been vested with the anthority of a whole Board of Works. At bis order 41 stone 14 lh. of "Spanye irne," price of tbe stone, 12s., and 3 stone of "Danskyn" iron, price of the stone 15s., are "furneist" to the windows of the Tolhooth. The name of the civic blacksmith appears in the following entry:—"To Robert Muir for ane pair of fetters of irne [iron] 3 pounds Scots." The smithcraft was jealously looked after by the anthorities. Feb. 16, 1600: "The provest, bailleis, and counsale, dischargeis" [commands] tbe dcacon and quartermasters of the smithcraft not to visit the smithies in Bannockburn until they produce their warrant and letter of deaconhood. In Scotland in those days the wages of a smith were included in the price of the iron supplied by bim.

Tolerably satisfactory information is given in connexion with the building trades. In 1597 the magistrates covenant with John Liddell, the lime-man, "that he shall deliver to all the inhahitants bis lime, every boll good and sufficient without stones, for eighteen pennies the boll." The price of sand was about one penny Scots a cart-load. A mason's wage was five shillings, and that of his labourer three shillings Scots daily. Until the year 1600 the masons and wrights (carpenters) formed a united craft. On an appeal from the carpenters to the magistrates a separation took place. In the case of two individuals a strange exception is made; "The provost, &c., notwithstanding the letter of deaconhood granted to the wrights this day [May 3, 1600], has ruled that the same shall not prejudge or hurt John Frelands and John Maxwell, that presently works both mason craft and wright craft." As to carpenters' wages. A door is to he made for the Tolhootb. For a plank of oak to be one breadth to the door, three shillings Scots is dishursed. Robert Pettigrew, carpenter, receives for work upon the said door five shillings and eightpence Scots daily, the regnlar wage, as shown in other entries. Glass, in 1627, cost eight shillings Scots, that is eightpence of the present time, per foot. A curious contract exists hetween the Earl of Eglinton and George Elphinstoun, "glasin-wricht," burgess of Glasgow, dated July 12, 1577, by which the latter is bonnd to mend, make new, and repair all the "glassin" work in five towns named, Glasgow being one, during "all the days, years, and terms of his lifetime"; tbe earl furnishing glass hands "soilhnrdis" (frames and sills), lime, and sand, and for remuneration the glass-wright was to receive yearly two holls meal and one stone cheese, besides his "meit" (food) on certain occasions, the use of a horse to carry his panniers of glass and lead, and,—perhaps an important item,—all the blown-down glass and lead.

Three hundred years ago Glasgow had only two town clocks, but no clockmaker: so David Kay, clockmaker in "Carrail," is sent for by the magistrates "to set np and repair" or mend the "twa knokkis," the one made by bimself, and the other old "knok" mended hy bim as often as he is required thereto, for which he is to he paid "rationable" expenses. David Kaye received large sums of money, hut no items of time or labour are given. He receives 100l., Scots for the new clock, and 3l. 6s. 8d. for setting it up. "Carrail" lent a clockmaker to the town that has become the commercial capital of Scotland. Carrail modernised into Crail is now a small village on tbe Fifeshire shore, where gray cairns and green mounds tell of a palace and a priory and noble mansions which stood in their pride when Glasgow was as yet unknown.

The citizens were bound, when called upon by the magistrates, to do their "day works" in carrying out civic improvements, or, failing to do so, forfeit for each day 6s. 8d. Scots. The Dean of Guild appears to have been also city architect. Five "lynaris,"—liners, or land surveyors,—were chosen yearly, and plenty of work they seem to have had in settling disputes as to boundaries, and assisting the Dean of Guild in keeping the streets and houses in proper repair.

In Novemher, 1577, the town purchased "tbe *old* bell that went through the town of *old* at the burial of the dead" for ten ponnds money, and also granted the seller to he made a burgess "gratis," and made special enactments for the safe-keeping of the relic, which was called St. Mungo's Bell. Saint Mungo's Tree is frequently mentioned as a boundary mark. Can it be tbat that bell and that tree were tbe originals of tbose incorporated into the city arms?

TEMPERATURE OF WATER AND THE GENERAL HEALTH.*

In a paper read last year before tbis Association, the author gave the results of a series of experiments, extending over a considerable period, of the temperature of town water-supplies, and referred to the influence of the temperature of town water upon public health.

In tbe communication referred to it was sbown that the temperature of water, as delivered through the water mains to the house of the consumer, was totally independent of the temperature of tbe water at its source, and that the temperature of the water supply was governed, to a great extent, at all periods of the year, by the temperature of the ground at the depth at which the water mains were laid.

It was further pointed out that the influence of temperature upon water supplies had a very marked effect upon certain classes of disease, especially diarrhœa and cholera, and tbat it was not until the temperature of the water reacbed about 62 deg. that these diseases became epidemic in a district.

In order that it may be shown that it is not the effect of increase in atmospheric temperature that is instrumental in the propagation of diarrhœa and cholera, but that these diseases are governed hy the changes which take place in water when its temperature is increased, it may be pointed out that in districts in whicb the source of water supply is not liable to increase of temperature by reason of the arrangements adopted for its distribution, summer diarrhœa does not become epidemic. For example, we will take tbe three years 1877, 1878, and 1879. Both the years 1877 and 1879 (especially the latter year) were years in which the temperature of town water did not reach its most dangerous temperature, hut in 1878 the temperature of town water-supplies arrived at a high and dangerous degree of temperature.

The water distrihnted under the system of constant supply at the author's house in Croydon, when drawn direct from the mains, had, in 1878, a maximum temperature of 64·8°, and in Westminster the water supplied hy the Chelsea Water Company reached a temperature of 68·4°, while water taken from a cistern in Croydon had a maximum temperature, in the same year, of 71·5. In 1879 the highest temperature of the water in the cistern at Croydon already referred to was 67°; the highest temperature of the water as delivered from the mains in Croydon in 1877 was 61·7°, and in 1879, 60·7°; whilst in Westminster the highest temperature of the water in 1879 was 64°.

The deaths from diarrhœa in Croydon in the three years 1877–9 were as follows:—

1877 = 0·48	per thousand	living in the district.
1878 = 1·00	ditto	ditto.
1879 = 0·34	ditto	ditto.

In London the deaths from diarrhœa were:—

1877 = 0·70	per thousand	living in the district.
1878 = 1·02	ditto	ditto.
1879 = 0.52	ditto	ditto.

If these death-rates are compared witb the death-rates of districts in which the water is principally taken direct from wells, it will be seen that in these latter districts tbe death-rates are very much lower; as, for example, in the districts of Mitcham and Merton, which are partly supplied with water from artesian wells (of a uniform temperature of abont 54·6°), partly by surface wells, and partly by the Lambeth Water Company. These two districts have a population at the present time of abont 11,000 persons. In 1877 the death-rate from diarrhœa was ·39 per thonsand; in 1878, ·47 per thonsand; and in 1879, ·46 per thonsand. In Beddington, whicb is also principally snpplied from local wells, in 1877 the death-rate from diarrhœa was ·20 per thousand; in 1878, ·49 per thousand; and in 1879 there were no deaths whatever from diarrhœa.

For the three years 1877–9, in the districts of Mitcham and Merton, there were fourteen deaths from diarrhœa recorded, of which ten occurred in roads supplied with water by the Lambeth Water Company, and four in roads snpplied with water from sballow and artesian wells.

In order to further sbow tbat tbe temperature of water has an influence on bealth, the author placed upon a map the wbole of tbe deaths from diarrbœa whicb have occurred in Croydon during the eleven years, 1869 to 1879 inclusive. Tbe water-supply of Croydon proper is taken from wells, the range in the temperature of tbe water of wbich bas not exceeded 1·15°, its highest recently-observed temperature being 51·9° on the 19th of Jnne, 1880, and the lowest temperature 50·75° on the 15th of Decemher, 1878. The water, after leaving the wells at Croydon Waterworks, is pumped to a summit reservoir, from which it is distributed to tbe town. In order to raise the temperature of the water it is necessary for it to flow a certain distance through the distribnting mains before its temperature becomes affected. It is a significant fact that in the district within a mile of the reservoir in which tbe water is always at its coldest temperature in summer, during the whole period of eleven years not a single death from diarrhœa has taken place in the neighbourhood of the leading mains; but the distribution of the deaths occnrs in the most remote and lowest portions of the district, or those which are naturally subject to the greatest changes in the range of temperature of the water-supply.

The incidence of tbe deaths from diarrhœa in London and neighbonrhood also shows that this disease is due to the increase in the temperature of water-supply, and not to atmospheric temperature, as in all those districts supplied from the river Thames, the water naturally gets to its highest temperature at an earlier period than it does in those districts supplied from wells, as in the Kent Water Company's district, where the temperature of the water at its source is pretty nniform throughout the year, and in wbich the water is naturally colder in snmmer at starting through the mains than is the case with the river water. An examination of the mortality tables of London shows that, while the general mortality from diarrhœa in districts supplied hy the Kent Water Company and the river water companies is practically identical, the disease always first manifests itself in the district taking water from tbe Thames. For example, in 1878, diarrhœa may he said to bave been epidemic in Lambeth, supplied hy river water, in the week ending Jnne 29th, and got to its highest pitch in the week ending July 27th, whereas in Greenwich, supplied by the Kent water, this disease did not become epidemic until the week ending July 27th, and got to its highest pitch in the week ending August 3rd, showing the incidence of this disease to he later in the Kent Water Company's district than in the district supplied from tbe river Thames, the reason being that, as the water of the Kent Company is colder tban the Thames water, naturally it requires the ground to be raised to a bigher temperature before it reaches a dangerous point, and therefore tbe incidence of the disease falls later in the Kent district than in the districts supplied from the river Thames. The development of the disease in these districts is also conformable to water being the cause, and not general atmospberic increase in temperature; for if the cause were due to atmospheric influences, which are general, the incidence of the disease should have fallen at the same period in each district; hut as the incidence is stricty conformable to increase in temperature of the respective water-supplies, and does not conform with atmospheric causes, the inference to be drawn is that summer diarrhœa is governed by the influence of the temperature of our water-supplies, and invariably the disease becomes epidemic when the water, whatever he its source of supply, reaches a temperature of about 62°.

Having now shown that water may be affected for good or evil hy reason of its temperature, and baving shown that the earth has enormous powers of influencing the temperature of water-supplies, the author desires to point out a mode hy which tbe temperature of

* By Mr. Baldwin Latham, C.E., read at the British Association Meeting, Swansea.

the earth may he made nss of in order to give watar a nearly uniform temperature throughout the year, which, if brought into general operation, the author believes will remove these dangerous conditions of town water-supplies arising from an increase of temperature in the summer time, and also, possibly, from the extreme coldness of the water in winter periods, which affect public health.

The great changes of temperature in the earth occur within a few feet of the surface. The greatest range of temperature occurs at the surface, and as we pass downwards from the surface to a depth of from 30 ft. to 35 ft., the temperature becomes nearly uniform throughout the year, and at the point of uniform temperature the temperature is equal to the average yearly temperature of the place where the observations are made.

From a number of observations made by the author at depths varying from 6 in. to 50 ft., it is shown that at a depth of 20 ft. the coldest temperature is experienced in the middle of May, and the warmest temperature at this depth at the end of October. The range in temperature observed at this depth is 5° in Croydon. At 25 ft. in depth the coldest period occurs at the beginning of July, and the warmest period in the winter, the range in temperature being a little over 1°. At a depth of 30 ft. the coldest temperature occurs in July. If an apparatus similar to that which has been invented and patented by Professor J. T. Way and the author is used for tempering the water, and which consists simply of a vertical tube driven or screwed into the ground to a depth of about 25 ft. and the water or other liquid to be tempered is admitted at the top and withdrawn at the bottom of the tube, special arrangements being adopted for the protection of the ascending pipe, the range of temperature in the water required for dietic purposes need not exceed 3° throughout the year when drawn from a 3 in. tube at a rate not exceeding one gallon every half-hour. The range of temperature observed in cistern water at Croydon has been 38·7°, or on the 22nd of July, 1878, it was 71·5°, and on the 20th of January, 1880, it was 32·8°. The town water-supply of Croydon (drawn direct from the mains), the temperature of which has been shown to be nearly uniform at its source in the wells when distributed by a system of constant service, was shown to be 64·8° on the 22nd of July, 1878, and 37·2° on the 28th of January, 1880, giving a range of 27·6°.

In the tempering tube, when the conditions of the water-supply are at the worst, the underground temperature is favourable for modifying these dangerous conditions. The cold of winter only descends to the greater depths in the heat of summer, and the warmth of summer only descends to the greater depths in the winter-time, so that the temperature of the cold water of winter is raised by the previous summer's heat, whilst the warm water of summer is cooled by the previous winter's cold temperature.

Experiments made at the author's house in July, 1880, show that if ten gallons of water are drawn at any time within half an hour, the following results are obtained :—

1st gallon. Temperature of water going into tube, 68° 4′; and the temperature of the water coming out was 50° 4′.
2nd gall. Temperature was reduced from 68° 2′ to 50° 8′.
3rd gall. Temperature was reduced from 68° 2′ to 51° 7′.
4th gall. Temperature was reduced from 68° 0′ to 52° 4′.
5th gall. Temperature was reduced from 68° 0′ to 53° 3′.
6th gall. Temperature was reduced from 68° 0′ to 54° 2′.
7th gall. Temperature was reduced from 68° 0′ to 55° 0′.
8th gall. Temperature was reduced from 68° 0′ to 55° 8′.
9th gall. Temperature was reduced from 68° 0′ to 58° 4′.
10th gall. Temperature was reduced from 67° 9′ to 57° 2′.

These experiments have been repeated several times, and give precisely identical results. In the winter the water is raised in temperature; as, for example, on the 3rd of February, 1880, water going into the tube had a temperature of 34° 8′, and coming out a temperature of 49° 2′.

The advantage of the use of this apparatus consists in the fact that it is entirely self-acting, and the whole of the water supply necessary for dietetic purposes may be filtered, purified, and tempered without any greater cost than now incurred, after the first cost of the apparatus, and without adding anything of a deleterious character to the water, as may be the case when ice is used, which has been shown, especially in America, to be a prolific cause of disease when collected from impure sources. Moreover, the results secured by the tube are more than equal to those attained by the most bountiful use of ice, and further, it is delightful if, by the use of ice in water already subject to influences that are deleterious to health, the time allowed before the water is consumed is sufficient to destroy the noxious properties. In the case of the patent tube, however, a mass of water is gradually undergoing the process of tempering in a perfectly natural way until it arrives at a temperature which is shown by experience to be most healthful.

THE ANTIQUITIES OF THE PYRENEES.

AMONG the papers read at Swansea before the British Association was one by Dr. Phené, "On the Retention of ancient and prehistoric Customs in the Pyrenees." We print a portion of it bearing on statements already made by the writer in our pages :—

It would be too long an occupation of the time of the section to enumerate all the objects, evidently of ancient Celtic arrangement or construction, the quaint churches of the Templars, and the various customs found in these valleys, but on the crests and sides of the mountains, on both sides of the Pyrenees, *i.e.*, in Spain and France, are found sepulchral arrangements of stones, somewhat different to any distinctly recorded amongst our antiquities. These consist of a number of circles adjoining each other, in the centre of each is a cist with an urn, having burned bones, and the form of the circles is that of a wavy or serpentine cross.

Mons. Gourdon gives a drawing of one on the Spanish side, and I have found several on the French side of the Pyrenees.

The quaint old customs of early Celtic life are kept up all along the Pyrenees, but not in the towns in the plains or champagne country,—one of those which I described last year as still existing in Brittany, that of a wooden tally, in lieu of a bill or account, on which the baker marks by notches the number of loaves he supplies, and which attracted the attention of the President of the section last year, is also existent in the Pyrenees. I purchased the baker's bill, now exhibited, at Perpignan a few months ago, and though not so rustic as that of Brittany, it approaches more to our old Exchequer tally, and to the Welsh stick of writing, described in "Bardas," as well as to some elaborate and really wonderful calendars, still to be seen in the Chesthan Museum at Manchester, than to the rustic tally of Brittany. On crossing into Spain and proseconting inquiries, I found the serpent or dragon emblem every where prominent, and even learned that the Tarasque, the ceremony of which is performed at Tarascon, in Provence, of which I gave a detailed account last year in the *Builder*, was a well-known dragon with the Spanish people, and on my explaining that I was making a study of the subject, I was told that though used as a popular diversion at fêtes, it had always a religious meaning, and that an old and well-known Spanish proverb ran thus :—

"*No hay funcion sin Tarasque.*"
"No religious solemnity without the dragon."

The prevalence of this custom in Spain, and the crowded and multitudinous emblems, of this nature, indicate some strong pre-existing national feeling or worship, and perhaps explain a very extraordinary ceremony that takes place annually on the French side of the Pyrenees when on the eve of St. John, the whole Pyrenees being alive with the fires handed down from time immemorial as a custom, a vast pine split into many vertical clefts, is raised at Luchon, and along the route I have described in the most secluded valleys, quite up to the Spanish frontier, as at the Valley du Lys, the pine has a cross of flowers on its summit, and being filled with combustible matter, burns in a brilliant column of fire. The torch is applied by the principal ecclesiastic, after a procession from the church-door, amid the chanting of a litany.

But at Luchon, in particular, living serpents are consumed in the flames. The priest, while he applies the torch, turns his face towards Spain and the Maladetta, or mountain of bad omen. The youths of the village have miniature cloven pines which they burn. I procured one with some little difficulty, which I produce; these they brandish while flaming, in serpentine curves, and cry loudly, "hilla-hilla" (dead),—pronounced "*ella*." Here we have apparently a corruption of the old classic cry of the Bacchanals, who, when lamenting the death of Bacchus, holding serpents in their hands, rushed about wildly crying "Eva, eva." These ceremonies are often prolonged into the night, and the wild cries are heard echoed from mountain to mountain. M. Sacaze states that this cry is an invocation of the Sun God; he that as it may, it is the cry of the ancient Bacchanals, and is here accompanied, sometimes with real serpents, sometimes with simulated serpents of fire.

The split pine was this year raised in my presence, on the back of the principal serpent mound in the valley I have mentioned, amidst the clanging of bells during a service on Sunday. If there had been no other satisfaction to me in this, the evidence that this mound was artificially constructed, and not a natural formation, as shown by the cutting made into it, would have been great. The place where these cries are mostly practised has most remarkable sculptures of serpents, which I had photographed, and now produce.

After the burning of the pine a rush is made by the more powerful, and the burning embers are carried off in their hands regardless of pain. Pieces are then distributed to every household, and kept religiously during the year, as was the custom with the ancient Britons.

SIR JOSIAH MASON'S SCIENCE COLLEGE AT BIRMINGHAM.

THE Gothic buildings erected by Sir Josiah Mason's trustees as a science college for Birmingham and the district, are now very nearly complete in all their internal arrangements, and the institution is to be opened on the 1st of October, with an introductory address by Professor Huxley, the winter term commencing on Monday, the 4th of October. The buildings have a frontage of nearly 150 ft. to Edmund-street, just in the rear of the Town-hall and the site upon which the Free Library is being rebuilt. The front is built of red brick, with Portland stone details. The elevation, which is divided into four parts, rises in the centre to a considerable height, the walls of the upper floor receding sufficiently to allow of a passage guarded by a pierced parapet. On the ground floor in the centre is the large entrance gateway, and on each side, a pair of windows lighting the janitors' rooms and clerks' offices. There is a projecting stone balcony over this gateway, and on the next floor are the six large and lofty pointed windows, which will light the chemical lecture-room. From this floor rises a large bay window, resting on a series of corbels, and above it, dividing the attic story, a small gable, terminating with a turreted niche, the point of which is 122 ft. above the level of the street. Portions recede from the predominant central block, at the extremities of each of which are projecting wings terminating in lofty turreted gables. These projecting wings reach a height of 90 ft., and have three windows grouped together on each floor. The intermediate portions between the gables and central block are lower, being about 55 ft. in height. About 2,400 square yards are occupied by the present building, but when the original plans are fully executed, the edifice will occupy nearly double that area, the extension being made in the rear. At right angles to the block fronting Edmund-street three parallel blocks recede upon the sides of two open courts, and are joined at the south-west by a wing parallel to the front block. The buildings are therefore arranged almost in the shape of a double parallelogram, the central block, which extends from Edmund-street towards Great Charles-street, forming one of the sides for each. The ground floor is entered from Edmund-street by a large and lofty gateway with deeply-recessed shafted jambs and moulded arch, and the main corridor, in which the visitor finds himself, will be eventually continued into Great Charles-street in the rear. The groined arches and moulded ribs rest on dwarf columns, carved capitals and spandrels, and geometrical tracery. The landing on the ground floor, which is reached from this point by ascending a broad flight of steps, is 6 ft. above the level of the street, and from it runs the wide central corridor, another corridor extending in a transverse direction along the Edmund-street frontage, having at each end a staircase leading from the basement to the top of the building. Further down the central corridor, the main staircase is situated, opening to the right, with an arcade of four arches on granite columns, and communicating with every story. Beyond this, the corridor passes into the back range of buildings,

the doors on one side opening to a library and reading-room, and on the other to the physical laboratory. The first floor contains the chemical lecture-room, three other large lecture-rooms, chemical preparation-rooms, professor's apartments, class-room for magnetism, rooms for chemical collections, models, and apparatus, the lecture-rooms being exceedingly handsome and commodious. In the south-west block at the back are several large rooms for drawing. The floors above are entirely devoted to chemistry. In the front block a spacious apartment is set aside as the professor's laboratory, and there are also rooms for the study of organic chemistry, and for gas, water, and spectrum analysis. A large room, formed principally in the roof of the central front block, will be used as a museum for collections of specimens in connexion with the chemical department. There are, in addition to those already mentioned, about twenty-four smaller rooms for professors' assistants, classes, &c., and on each floor opposite the principal staircase are the necessary class-rooms and lavatories. The college contains in all nearly a hundred rooms. The several laboratories will be plentifully fitted with small and large evaporation niches for the removal of injurious vapours and gases, and with the fittings necessary for the various studies.

PROTECTION OF BUILDINGS FROM LIGHTNING.

Mr. Richard Anderson read a paper at Swansea "On the necessity for a Regular Inspection of Lightning Conductors," which demands attention. The closing passages of it will sufficiently explain and emphasise his object:—It is evident that it is not sufficient merely that rods of copper should be attached to a building, but it is necessary that once put up they should be regularly inspected to see if they are in good order, so as to be really efficacious. That this is rarely done is one of the main reasons why accidents by lightning occur in places nominally protected by conductors. It is, perhaps, not too much to assert that at present not one in a thousand of our public buildings in England is regularly tested.

There can be no manner of doubt that in the matter of lightning conductors they manage things better on the other side of the Channel than with us. The French Government are in the constant habit of consulting the most eminent scientific men on the subject of protecting public buildings against the destructive influence of lightning. There is scarcely an instance in which a British Government ever did such a thing. It is true the Houses of Parliament had lightning conductors erected upon them at a very great cost and under scientific advice. But all who understand the subject practically agree in saying that it is very doubtful whether the magnificent pile of buildings in which our legislators assemble is really, that is efficiently, protected. At all events, I understand the earths have never been tested since the conductors were erected in 1852. That the Victoria Tower should have been struck in June, 1868, and slightly damaged, tends to show that the conductors at that time were not in an efficient state.

From the examination I have made, I am pretty correct in stating that one-half of our cathedrals and three-fourths of our churches have not even nominal protection. For all that science has done, the Queen might any day be killed in her apartments in Windsor Castle, the Prince of Wales in Marlborough House, and the Prime Minister in Downing-street. To see the difference between England and France in this respect, one has but to cross the Channel between Dover and Calais. At Dover, there are huge barracks of great length, on the top of high hills, exposed to the full fury of storms sweeping across the Channel, and the few conductors to be found upon them at long intervals are certainly not numerous enough for efficient protection against lightning, and their efficiency has never, so far as I can learn, been tested. The contrast in this respect on crossing the Channel is of the most striking. At Calais, the Hôtel de Ville, in the Grand Place, literally bristles with lightning-conductors, and so all the churches and chief buildings in the town. The same all over France, Germany, and Belgium. Without slavishly imitating our scientific neighbours, we might yet bestow some of the care they do upon the protection of our property as well as our lives against the terrible effects of the electric force.

NEW WESLEYAN SCHOOLS, TOTTENHAM.

These schools are built on a fine open site in the rear of the chapel, having frontages on each side for light, and therefore the architect had ample scope for planning them. They are on the American system, and faced with Kentish rag stone and Bath dressings, with all the class-rooms opening into a large central room. This room has an open-timbered roof and is lighted by windows at each end high up in the gables, and by dormers at the side. On each side of the platform are rooms for select classes, with separate entrances to them. The four class-rooms in front of the platform are for single classes, and each has a window and a fireplace. An infants' room, with separate entrance, is provided, and divided by the library from the school proper. A secretary's room, kitchen, with serving-hatch to the school, and heating chamber are also provided. Offices for the children are carefully arranged with distinct entrances. The school will accommodate 500 children, and seems to be very complete. The warming is by Grundy's hot-air system. The architect is Mr. Charles Bell, of Dashwood House, New Broad-street; and the builder, Mr. Humphrey, of Tottenham. The total cost, including furnishing, will be nearly 3,000*l.*

NEW (R.C.) PRESBYTERY, ORMSKIRK.

This presbytery, now in course of erection for the Rev. J. A. Hickey, O.S.B., is being built with the local red bricks. The cills of windows and weatherings to chimney and cap are the only portions of the building which are of stone. The roofs will be covered with green slates, as also the roof of the corridor which leads from the house to the sacristy. Most of the internal fittings will be of pitch-pine. It is being erected from the design, and under the superintendence, of Messrs. Pugin, architects, Westminster. The total cost will be about 1,522*l.* Messrs. Thomas Riding & Son, of Ormskirk, are the contractors.

RE-ARRANGEMENT OF EXETER HALL.

The two plans we publish will serve to show the chief alterations proposed to be made for the Young Men's Christian Association, under the scheme proposed by Mr. Alfred R. Pite, and which has been determined on. The prominent features of the scheme are,—1. The utilisation of the entire basement. 2. Ground-floor alterations, appropriating the whole area for the Association work: this would comprise spacious reading-room and reference library, with arched recesses for readers, and glazed screens to corridor, convenient coffee-rooms with domestic offices, and arrangements for the enlargement of the lower hall. 3. The mezzanine floor still reserved in its entirety for offices, calculated to secure a valuable rental, or available at any time for class-rooms. 4. The re-arrangement of the large hall, to secure increased accommodation and facility of egress and access, for which latter two spacious staircases are provided, with lavatories accessible for festival occasions. In the *basement* there will be a double gymnasium on the north-side, 28 ft. in height, with access direct to new staircase to Exeter-street and ground-floor; a lecture-room on the south side, capable of accommodating 200 persons, and suitable for tea-meetings, being adjacent to class-rooms, and accessible immediately by new staircase from the front lobby of the Strand entrance, and spacious night-schools, capable of accommodating 300, having also accessory class-rooms.

The *ground-floor*, of which plan is given, presents the largest aspect of alterations to the building, as the whole of the existing offices would be utilised for Association work. On entering the main corridor, by grand staircase, will be found an improved entrance vestibule. A margin of new Portland stone paving will be laid throughout, with a central footway of bright coloured tiles and borders up to the main stairs, which will be cased with Hawksley's patent, the landings being lined with ornamental tiles. Turning from corridor eastward, access will be gained by a staircase to the basement lavatories, and immediately opposite will be the secretary's office, from which point supervision will be exercised over all persons entering the building. On the south-east side a handsome reading-room is obtained, with arched recesses for readers, and glazed screens to corridor, communicating direct with reference-library. For special meetings, the reading-room will be capable of accommodating 250 persons. On the north side the offices are obliterated, and a spacious coffee-room obtained with arcaded recesses for tables, and glass partitions to corridor, all in direct communication with a buffet, having counter and still-room, and the doors opening at foot of main staircase for convenience of large hall. The coffee-room would provide space for a special meeting, to hold 250 persons. The kitchen is made external and placed at the north-east angle of the hall. On the south side, adjoining the secretary's office, and approached by a new corridor, "The Young Men's Parlour" is placed, having central communication direct with the lower hall.

With regard to the Lower Hall the present plan shows the whole area of the present main corridor, above and below, thrown into the hall: this allows a spacious gallery, and taking the present accommodation of the hall to be 450, the enlargement would provide for 770 persons. A second method of enlarging the hall is based on the fact that it is only on exceptional occasions that the large hall and lower hall have meetings proceeding simultaneously, in which case the carriage corridor would be, if not an essential, a great convenience, and to meet this a dado division is placed on dotted line, being the area of the present hall. By this arrangement the corridor egress would still be maintained, and the hall with enlargement provided by galleries over the corridor would accommodate 650 persons. The approach to the lower hall will be improved by an entrance of more dignified character than the present. The gallery to the lower hall will be approached by a new staircase, provided at the south-west corner, and a new lobby-entrance to the corridor.

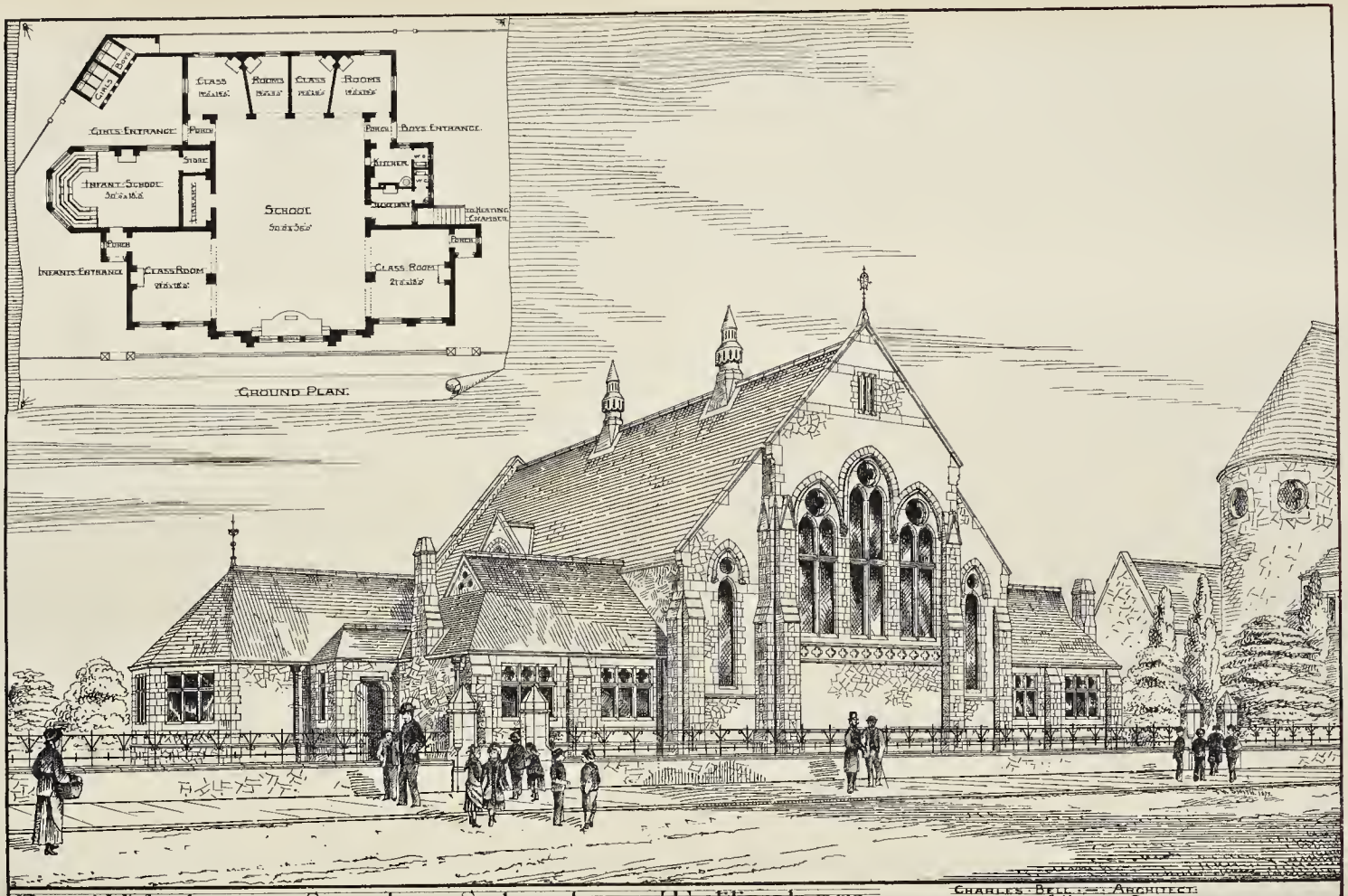
The saloon off the grand staircase remains untouched; when appropriated for meetings it will accommodate 250 persons. It is proposed to lower the present staging seats to the large hall, and place the floor on an inclined plane from its present central level, but reducing the height. Easy access and egress will be obtained by the two additional staircases. The present platform is to be re-arranged to accommodate 200 persons for public meetings and conferences, having movable seats as fitted fixtures to be placed when required on staged floors for orchestra, so that the conductor of the festival would have the platform placed in position to secure entire control of both the area and seats. Access to ladies' galleries, level with platform, with stairs to the latter are provided, from the north and south retiring-lobbies, while the existing staircases to the organ will remain. By this arrangement of platform, orchestra, and galleries, large gatherings of schools or public institutions can be held without interfering with the body of the hall, and immediate exit will be obtained by the staircases provided.

The expenditure will probably amount to 15,000*l.*

WELSH CALVINISTIC CHAPEL AND SCHOOLS, PENDLETON, MANCHESTER.

These buildings, which have been lately completed, were designed and carried out under the superintendence of Mr. W. Dawes, architect, Manchester. The chapel accommodates 305 on the ground-floor, and 258 in the galleries. Including the schools and chapel-keeper's house, the cost has been about 5,500*l.*

Artisans' Dwellings in Liverpool.—It has been decided by the Liverpool Health Committee to recommend the council to communicate with the Local Government Board, requesting them to approve of the erection by the council, upon the Nash Grove site, of dwellings suitable for the labouring and other classes. The site was cleared, some time ago, of low class and unhealthy property, and the engineer is of opinion that shops fronting the main streets, and improved industrial dwellings, would be the best class of buildings. The estimated cost of carrying out the scheme is 115,000*l.*, the annual expenditure on the property, including interest on the original outlay, repairs, &c., is estimated at 5,377*l.*, and the receipts from rents at 4,259*l.*, showing an annual loss of 1,118*l.* On the other hand, the Markets Committee have recommended (as stated in the *Builder* some time ago), that the site be utilised for the erection of wholesale vegetable, fish, and poultry markets.

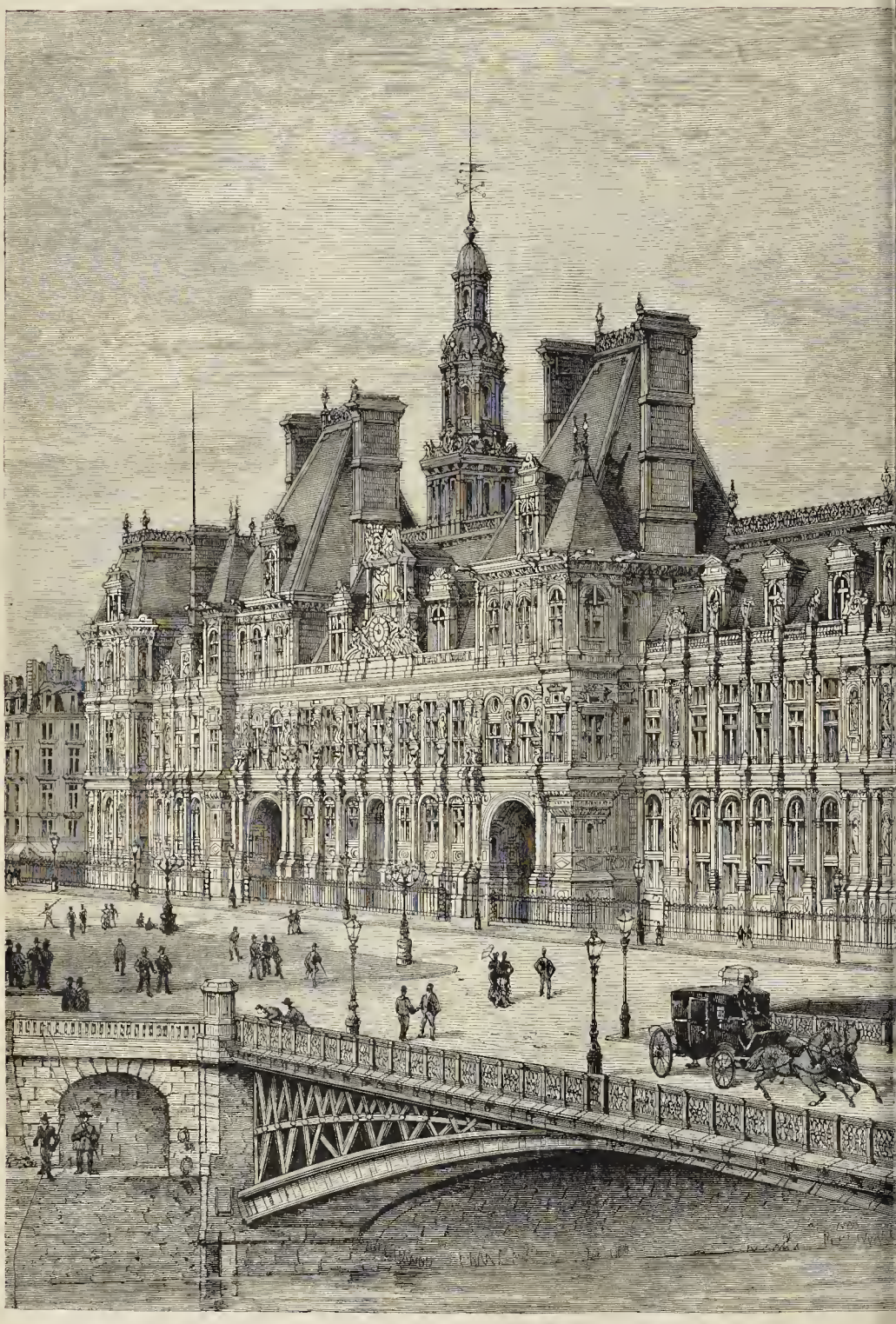


New Wesleyan Sunday Schools, Tottenham.

Charles Bell, Architect,
4 Union Court,
Old Broad St., London E.C.

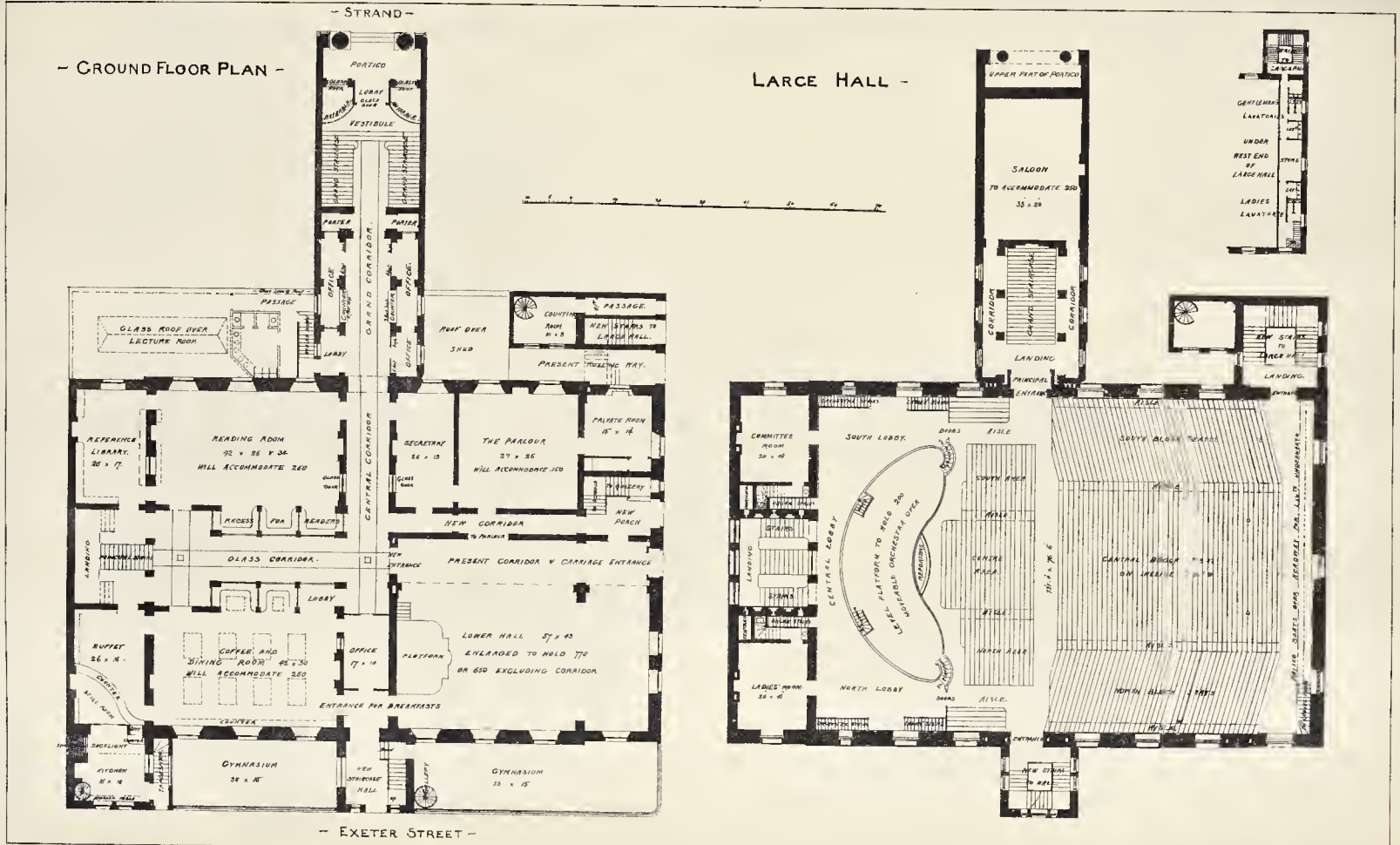
Whiteman & Bass *Photo-Litho* 236, High Holborn

Wyman & Sons, Printers, 74 Queen St.



THE "HÔTEL DE VILLE," PARIS: AS I

—Messrs. Ballu & Deperthes, Architects.



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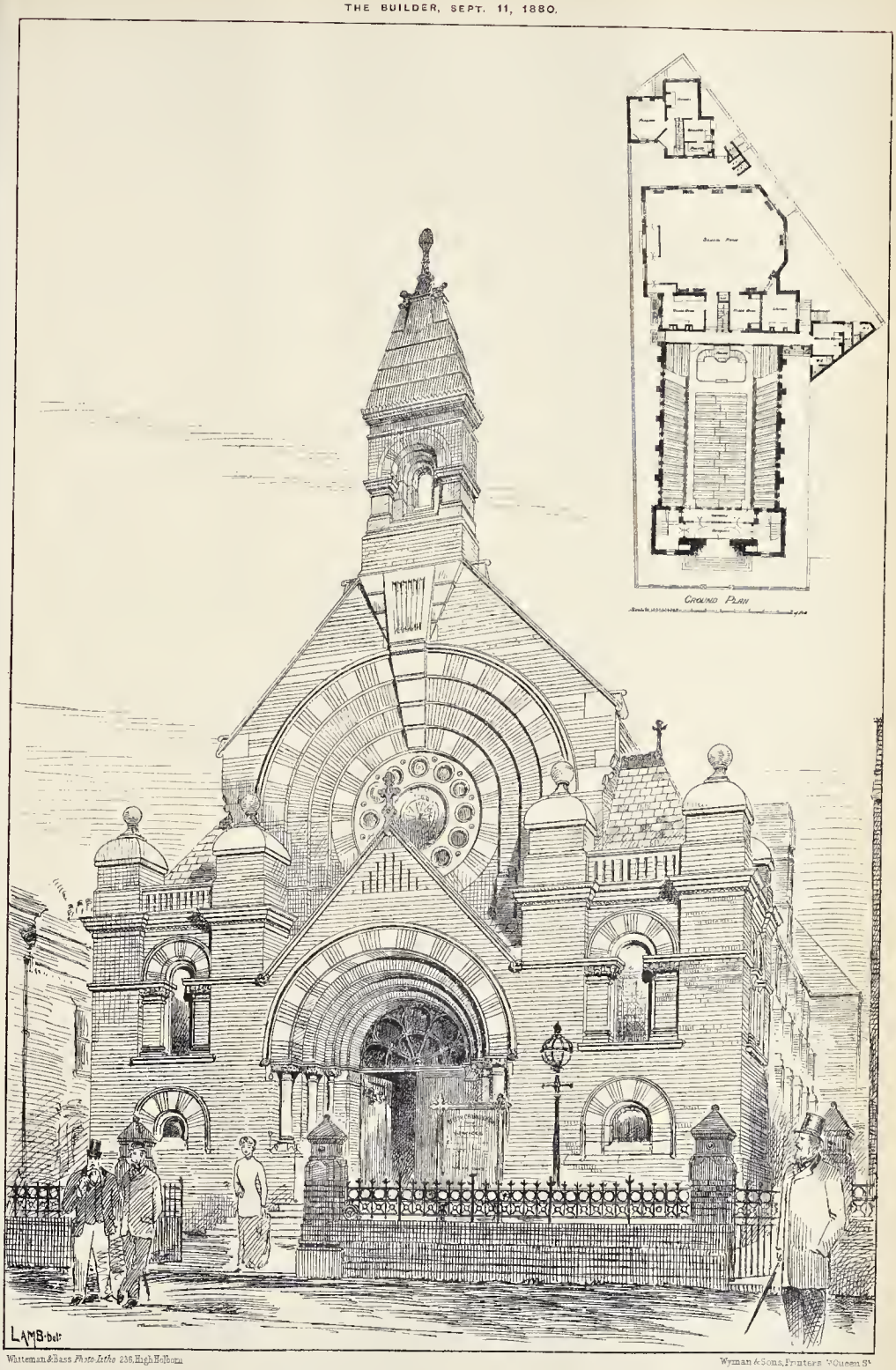
EXETER HALL, STRAND: RE-ARRANGED.——Mr. Alfred R. Pite, Architect.

Wyman & Sons Printers Queen St



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WELSH CALVINISTIC CHAPEL, PENDLETON, MANCHESTER.——MR. WILLIAM DAWES, ARCHITECT.

THE HÔTEL DE VILLE, PARIS.

As early as the eleventh century,—at the epoch when in certain provinces the enfranchisement of the communes commenced,—as soon as a city obtained by gold the concession of a charter from his majesty the king, the inhabitants erected a municipal building surmounted by a belfry,—symbol of independence. When the town was menaced, the tocsin was sonnded from the belfry, and the citizens flew to arms, and united together for the general defence.

The Hôtel de Ville of Paris, however, dates no further back than the fourteenth century. It was in 1357 that Étienne Marcel bought, at the cost of the municipality, a house styled the *Hôtel du Dauphin*, later on the "House with the Pillars," and there was held the *Parloir aux Bourgeois*. It was quite near to the Châtelet, and on the site where, later on, in the sixteenth century, the great Hôtel de Ville was destined to be built.

At the commencement, this meeting-house of the citizens consisted, says Sauval, one of the historians of Paris, of a little dwelling surmounted by two gables, and which abutted on to several other domiciles. This building, in which a number of pillars supported the first story, was bought by the Provost of the Trade Guilds for the sum of 2,800 *livres* (of Paris). It contained a state reception-room, an audience-chamber, called the *plaidoyer*, a wainscoted chapel, and a large loft for the arms.

Towards the end of the fifteenth century, notwithstanding reparations, the "House with the Pillars" threatened to fall into ruins, but they managed to preserve it until the reign of Francis I. At length, however, on the 15th of July, 1533, the first stone of a new edifice, the Hôtel de Ville, was laid with great ceremony by Pierre Viole, Provost of the Trade Guilds, assisted hy four sheriffs. While the first stone was being laid, "the fifes, trumpets, tambourines, and clarions were heard; guns too,—fifty arquebuses, carried hy the arquebusiers of the city, who are numerous; and the chimes rang out from the bells of St. Jean en Grève, Saint Esprit, and Saint Jacques de la Boucherie. In the middle of the Place de la Grève casks were tapped, tables laid out, bread and wine given to all comers, while the lesser folk cried with a loud voice, 'Long live the King, and Messieurs of the City.'"

The Italian Dominique Boccador, called of Cortone, had drawn out a plan of the edifice, of which the works, interrupted or suspended hy the religious wars, were resumed in 1606, by an architect named Marin de la Vallée.

In the reign of Louis XIII., in 1628, this monument was completed. It consisted of a central block of buildings surrounding a quadrangular court. The central building was composed of a ground-floor and a first story. The two angle pavilions had one story more. The frontage was pierced with square or arched windows, with columns and ornaments of every description. A stone staircase placed beneath the clock led to the inner court.

It was for a long time a question as to yet further enlarging this fine building, but the project propounded during the First Empire was not put into execution until the reign of Louis Philippe.

The buildings erected from 1837 to 1844 retained the physiognomy of this historical monument, but they doubled the extent of the ancient façade, and formed an enclosure of immense extent. Mr. Godde, architect to the city, assisted by Mr. Lesueur, superintended the building. It contained rooms for the municipal assemblies, offices for the communal and departmental administrations, saloons and galleries for *fêtes*, reception-rooms, and an apartment for the Prefect of the Seine. The edifice formed a rectangle, of which the great sides presented a development of 120 mètres in length hy 80 mètres in hreadth. Niches with pediments between the columns, contained statues of those men who had done something illustrious for the town of Paris. On the ground-floor was the immense Salle St. Jean, where the city lotteries were drawn. All the rooms were richly decorated, and presented a magnificent *ensemble*. We well remember the admiration that was expressed by a large number of our countrymen who were entertained here hy the City of Paris, after the Great Exhibition of 1851.

The important part the Hôtel de Ville has played in the history of Paris is well known to readers. And we have not space here to retrace incidents, though they are full of interest. We will only recall to mind that on the 18th of March, 1871, the Central Committee installed itself here, and in turn gave place to the Commune on the 26th of March. During the month of May the members of this Government maintained their position at the Hôtel de Ville up to the last moment; but when they were no longer protected by barricades they fled, after setting fire to this monument—essentially the "people's"—and scene of so many great deeds. All had been so well prepared for the conflagration, that there only remained of the Hôtel de Ville a few blackened ruins.

It was the palace of the citizens and of the traders of the city, and this building, which had so often opened its doors to receive a victorious people, was destroyed by the people. But the idea of raising it from its ashes could not be abandoned. In 1873 the Government invited designs in competition for the reconstruction of the Hôtel de Ville. Sixty-six projects were presented, and from these a special jury selected that of Messrs. Ballu & Deperthes. We give a view of the new building, which will now soon be completed.

The edifice is erected on the site of the old one, and is essentially the same, with a few slight modifications. A greater development is given to the façade and to the wings, which have a different disposition. But the general aspect is the same, and now Parisians will once more he able to see their Hôtel de Ville,—"The belfry-house" of the old city.

THE WORKING GILDERS OF LONDON.

A MEETING of working gilders and "preparers" in the looking-glass and picture-frame trade was held in the Lectnre Theatre of the schools of St. Thomas, Charterhouse, Goswell-road, on Monday evening last, "to consider the causes of the great depression in the trade at the present time." The chair was occupied by the Rev. Stewart D. Headlam, B.A. About 150 men and youths were present.

Mr. George Ryan, at whose instance the meeting was convened, made a short statement as to the object of the gathering, saying that for the past three years the trade had been in a most depressed condition, partly caused hy the very large importation of German mouldings and the extensive use in this country of "Dutch metal" instead of gold leaf. He read a letter from a tradesman at the West End showing how the public were being deceived by the employment of "Dutch metal," instead of gold, in decorative work, with the inevitable result that in a very short time the so-called "gilding" would turn quite black, and suggested that both in picture and looking-glass frames and decorative work the public might protect themselves by testing the work with aquafortis.

The Chairman having invited others present to speak as to the causes of the depression in the trade, and to offer suggestions for improving the condition of its members,

Mr. Shaw pointed out that although the use of "Dutch metal" and German mouldings had a great deal to do with the low condition of the trade, other causes had been at work, notably the use of oak, walnut, and ebonised frames, and the large demand for what were called "Oxford" frames, which were seldom gilded. He hoped and believed that when the public knew the worthlessness and want of durability of work coated with Dutch metal they would insist upon having genuine gilding.

Mr. Hamer thought that the evil was more deeply seated than some present seemed to think. The use of "Dutch metal" would, he believed, eventually do the gilders a great deal of good, for the failure of the baser material would lead the public to demand honest gilding. Unfortunately, there was foreign competition in the trade in other ways, many young Germans being at work in gilders' shops in London. In his opinion, the low condition of the trade was entirely due to its want of unity and organisation. There was no limitation in the trade as to the number of boys employed. He had been in gilders' shops in London where there were ten boys to every man employed. It had been suggested that a good strong society should be formed for the gilders of the East End of London, but that, though perhaps desirable in itself, would not increase the demand for gilders' work.

Mr. Rayment contended that the use of German metal was doing a great deal of good, inasmuch as it afforded employment for many gilders who would otherwise be doing nothing. There was a demand for very cheap picture and looking-glass frames, and so long as "Dutch metal" was sold as such, and not palmed off upon the public as gilding, there was little to complain of. As to German mouldings and "Dutch metal," it had been suggested that a protective import duty should be put upon them, but surely such a departure from Free Trade would only make matters worse by keeping out of England materials which, though very cheap, yet afforded employment to many people in the gilding trade.

Mr. Hamer said that the only good which the use of "Dutch metal" did for the gilding trade was that it turned black within a very short time. With the use of "Dutch metal," forty men could turn out as much work in a week as could be done by 100 gilders in the same time.

Mr. Williams said a lot of people in the trade grumbled about metal-gilding because they could not do it (cries of "Why, boys do it!"). It took a good mechanic to do a "metal" frame, but a "duffer" could do a gilt one. (Loud expressions of dissent.)

Mr. Mills said any child could do a "metal" frame, but it took a gilder to gild with gold. In his opinion, the great cause of the depression in the trade was the competition amongst the small master-men, known in the trade as "garret-masters," who so underbid each other in the price at which they would take work that they could not afford to pay fair wages to journeymen.

Mr. Thacker, as a small master for sixteen years, admitted that the condition of the trade was very bad. He found it impossible to earn 4s. a day for himself, even though he employed ten men. He should be better off as a journeyman.

Mr. Hamer said that one great object which the establishment of a trade society for the gilders of the East End of London might advance was the reduction of the number of hours worked hy members in the trade, which were sixty per week. That should be reduced to fifty-four per week. The work would he then more evenly distributed amongst the men in the trade.

Upon this several speakers pointed out that if the men in the gilding trade worked only fifty-four hours per week they must not expect, under the present conditions, to earn as much money as when they worked for sixty hours.

A great deal of animated discussion ensued, in the course of which it was stated that the gilders of the East End of London, though forming the majority of the trade in London, were without a trade society; that the gilders of the West End had one or more societies, and would doubtless he willing to help their brethren of the East End if the latter showed a desire to unite and sink minor differences; that a former attempt to maintain a society at the East End had failed from lack of support, although the contributions were only 1d. per week; that this failure was entirely due to lack of unity caused hy "jangles" between members working in different shops. One speaker attributed the depression in the trade to the use of velvet coverings for furniture in lieu of gilt surfaces,—a fashion which, amidst much laughter, he reproached High Church clergymen for introducing. Eventually, resolutions were passed appointing Messrs. Mills, Colloppy, Wyndham, Shaw, Brown, Thorpe, Williams, Wilson, Carpenter, and Richard Thacker a provisional committee (with power to add to their number) to confer together and take steps for the formation of a trade society for the gilders of the East End of London, and it was arranged that a trade meeting be held in the same place on Monday, September 20th, to consider the proposals of the committee, and, if such proposals were approved, for the enrolment of members.

The meeting terminated with brief addresses by the Chairman and Miss Edith Simcox, who referred to the influence of "fashion" on the trade, and exhorted the men to exercise forbearance and to he united for their common good.

In the course of the proceedings it was stated that whereas a book of gold-leaf, costing 1s. 3d., contained only twenty-five leaves $3\frac{3}{8}$ in. square, a book of "Dutch metal," costing only $4\frac{1}{2}$d., contained no fewer than ninety-nine leaves, each $\text{fi}\frac{1}{4}$ in. square. It was, therefore, urged that the public were grossly swindled when they paid for gold and only got "Dutch metal." A show of hands called for during the meeting revealed the fact that nearly one-third of those present were out of work.

SWANSEA WATERWORKS RESERVOIR.

ONE of the excursions made by the members of the British Association during the recent meeting of that body in South Wales was to the Swansea waterworks, where Mr. Edward Cousins, M. Inst. C.E., read a paper embodying some notes on the construction and repairs of the Lliw reservoir, Swansea. He said,—

The Act of Parliament giving powers to the Swansea Town Council, as the Urban Sanitary Authority, to construct reservoirs, on the Llan Lliw and Blaenant Ddu streams, and for laying conduit and mains for conveying water to Swansea, was obtained in 1860. The Town Council thereupon determined to proceed, in the first instance, with the construction of the Lliw reservoir only, and contracts were entered into, and the works commenced in the month of March, 1862. The reservoirs are constructed in valleys of denudation in the coal measures, the strata consisting of alternating beds of rock and shale. The workable seams of coal beneath the reservoir site being at a depth of about 500 ft., the surface of the valley being covered with alluvium, but only to a moderate depth. Through the whole length of these valleys there are springs of water, some permanent, but others which only flow after long-continued rain, the surface-water entering fissures in the exposed joints of rock, and finding an outlet at lower points. The Lliw embankment has a base line in the direction of the valley of 425 feet, with a puddle trench in or about the centre, carried at the deepest part 99 ft., the lower portion being in rock. In this rock there were thin open joints and small springs of water, and on the outer half of the embankment seat other small springs exist, all of which were drained to a common outlet into a permanent drain cut in the rocks and covered with lime concrete. The bottom of the trench was also directed to be formed with concrete so as to prevent injurious action of the small springs on the bottom of the central puddle wall. The drain from the outer part of the embankment delivered a steady flow of clean water, increased after heavy rain, but unaffected by any head of water in the reservoir. The volume of water varied from 27,360 gallons per day to 54,720 gallons, after much rain. This water went to provide compensation. The contingency of springs of water in puddle trenches and beneath the outer portions of embankments is common to most reservoir embankments of considerable size, and these are usually provided for in some such way by drains as here indicated. There are, of course, springs of water within the puddle wall, that is, over the area covered by the inner half of the embankment as also that area covered by the impounded water. The Lliw Embankment was completed and the reservoir filled to overflowing in October, 1867, impounding about 300,000,000 gallons of water, the depth from the full water-line to the surface of the ground being 66 ft., and to the bottom of the puddle-trench 94 ft. The reservoir continued in work, and apparently water-tight up to February, 1873. In the spring of 1873, violent and heavy storms of rain occurred, and apparently water found its way by seams and fissures to the bottom of the puddle-trench, and ultimately to set up a small flow of water from the reservoir through the leak thus formed. That some action must have caused such leak was shown by the outflow of water from the embankment drain becoming turbid. When, by examination and continued observation, it was made evident that a leak had been sprung, the head of water within the reservoir was reduced, the action of the drain carefully watched, and the results duly recorded. It was noted that the action was intermittent; that is, the leak varied in turbidity from time to time, and the volume escaping increased as the head of water in the reservoir increased. About January, 1874, it was noted that visible subsidence in the embankment had commenced, when extra care was taken to reduce the head of water in the reservoir, and to watch the flow from the drain. It became evident that the leak was not likely to stop, and as water was necessary for Swansea, the Blaenant Ddu reservoir was commenced, and when completed, tested, and found to be sound; means were then at once ordered to be adopted to restore the Lliw to its original state. This work was commenced in June, 1879, and will be completed about the end of October next. The method adopted in repairing the embankment was as follows:—An open cutting was made transversely through the embankment 160 ft. wide at the top, and 50 ft. wide at the bottom, to a depth of 36 ft. below the top of the embankment. A trench 30 ft. long and 20 ft. wide was then sunk from the bottom of this cutting through the puddle wall to the rock, a depth of 70 ft., or a total depth of 106 ft. from the top of the embankment. In sinking this trench, indications were soon observed that the puddle wall was fractured. The fractures as at first discovered were small and branching, and were filled with sand formed by the washing of the selected material from the inside slope of the embankment. At a depth of 24 ft. in the trench, the puddle wall was found completely punched through, and this fissure (which was about 2 ft. wide) was filled up with the coarser parts of the selected material of the embankment. This fissure extended down to the face of the rock where a spring was discovered that had evidently, during the extraordinary rainfall in 1873, burst through the layer of concrete on the rock at the bottom of the puddle trench. The spring must then have acted directly upon the base of the clay puddle wall until it formed a passage across the bottom of the puddle-trench, thus allowing the water in the reservoir to find its way through the puddle-wall into the drains underneath the outer slope of the embankment, the outlet of which is at the base of the bank. This continual wearing and washing-away process of the clay-puddle caused it to settle down from time to time, resulting in the puddle becoming fractured, and the pressure of the water in the reservoir caused the material from the inside slope of the embankment to wash into and fill up these fractures in the clay wall. Having proved that the defect was confined well within the extent of the trench, it afterwards became necessary before commencing to refill the trench to make provision for relieving the pressure of water arising from the spring, and for this purpose the rock at the bottom of the trench was excavated to sufficient depth, and the drains were constructed over the several fissures conveying the water to one point, from which an iron pipe was laid, passing up the shaft to a height of 17 ft., and passing thence through a heading to the drains underneath the outer slope of the embankment. The brick drains and the whole area of the bottom of the shafts were then covered with a layer of Portland cement and afterwards with Portland cement concrete, which was carried up to the level of the old concrete. After this was completed, the drains and pipes were tested, when it was found that the spring water rose to a height of 17 ft. through the iron pipes, and then discharged itself into the old drains underneath the embankment without the slightest indication of any escape of water at the bottom of the shaft. The trench was then filled with fresh pugged clay puddle, and well rammed by means of hand rammers and a monkey, weighing 1¼ cwt., with a fall of about 6 ft. The new clay was put into the shaft with a very little admixture of water, in order to obviate as much as possible any subsequent settlement, and the new clay was well jagged in the face of the old clay at both ends of the trench. In sinking the trench it had to be timbered in a substantial manner, and in such a way that the timbers in refilling could be withdrawn in small sections, so as to prevent any settlement or movement in the remainder of the embankment, as had any settlement taken place in the old clay puddle during the progress of the work, it would have proved fatal to the success of the scheme. In carrying out these repairs, no indication of any settlement has shown itself at either end of the trench, and I have great confidence that the works having been so far carried on satisfactorily, will prove a success, and that the embankment will be made sound and watertight. The embankment of the reservoir is 80 ft. in height, having a water area of 32 acres, and containing, when full, 300,000,000 gallons. Mr. Robert Rawlinson, civil engineer, was engineer to the Corporation of Swansea during the first period of the works, as for the original surveys, the obtaining of the Act, and the partial completion of the embankment, Mr. Hugh Unsworth being resident engineer up to the completion of the Lliw Embankment. Mr. Rawlinson re-entered Government service before the embankment was fully completed, but by special leave of the then Home Secretary continued to act as consulting engineer to the completion of the works. For the repairs and restoration of the Lliw reservoir I have been the acting engineer, and Mr. Rawlinson, with the sanction of the president of the Local Government Board, the consulting engineer, as it was considered desirable by the Water Company of Swansea that the engineer who designed and executed the works which had given way should be responsible for their restoration.

INDUSTRIAL EXHIBITION AT THE ALEXANDRA PALACE.

THE Industrial Exhibition opened here on Saturday, the 4th inst., and to remain open until the 30th inst., by no means deserves the prefix "Great" which has been bestowed upon it by its promoters. The exhibition, which is arranged in the large banqueting-hall in the park, contains some good things, of course,—the best of these being, as is usually the case, the products of men working in their own special crafts,—but, on the whole, it does not strike us as being equal in interest and value to the exhibition (which, as we remarked at the time, had its shortcomings) lately held at Bow; and this notwithstanding the fact that a large number of the articles exhibited in the hall of the Bow and Bromley Institute have been transferred to Muswell-hill. While, however, the present collection falls far short of what we conceive to be the *beau idéal* of an industrial exhibition, we do not desire to convey the inference that nothing is to be learnt or gained by an inspection of its contents. The intelligent mechanic will be able to pick up a little practical information here and there; but those of our industrial classes, male and female, who have profited by the teaching of our schools of art, will be rendered uncomfortable when their eyes light upon such inanities as a drawing-room chair, full-size, made of "pure sugar" in different colours, and the Berlin-wool representations of the Oxford and Cambridge Boat-race and of a train on the Great Northern Railway,—the locomotive especially being "fearfully and wonderfully made." There is a great deal of very good and useful needlework; but even a brief glance at some of the patchwork quilts is very trying to the eyes of any who have the least notion of the right use of colour. The contents of the exhibition are divided into seven sections, viz.,—Mechanical; Artistic; General; Fabrics and Fancy Work; Miscellaneous; Drawings, &c.; and Work done by School Children. Each of these sections is subdivided into separate classes of exhibits, the total number of entries being 942. It is not quite easy to see why carved work in wood should be included in Class 2 of Section I., "Mechanical"; one would have looked for it under the head of "Artistic." However, there is some very good carved work shown, together with fretwork and the productions of the lathe. In Class 8 of this section there are some excellent models of steam-engines, and in Class 9 ("Mechanical Models and Inventions") there are one or two appliances intended to be of service in aiding the work of sanitary improvement. In Class 13, Mr. William Elliott, of Cumberland-street, Caledonian-road, exhibits (No. 186) a model of sash-windows opening inwards for cleaning; we have seen the same thing, if we mistake not, somewhere else. It is questionable whether sash-windows made on this principle would be sufficiently wind and water-tight. In Section II., "Artistic," there are some good specimens (Class 5) of modelling in clay and plaster. Class 7, "Water-Colours," contains specimens of better work than Class 6, "Oil-Painting." In Class 8, "Pen and Pencil Drawings," we note that Mr. Thomas G. Mansfield, described as a "medicine case maker," exhibits three drawings copied by him from illustrations that have lately appeared in the *Builder*. In Class 11,—"Designs, Architectural, Mechanical, &c.,"—we note that one or two working carpenters and joiners exhibit designs for school and other buildings. Class 12, "Decorative Painting on Glass, China, &c.," includes some good work. In connexion with this class of work, we note that Mr. T. Cox, of Southampton-row, Russel-square, exhibits a quantity of excellent stained glass, painted tiles and plaques, terra-cotta vases, and other decorative work, a great deal of which was shown by him at the Bow Exhibition. Class 14, "Graining and Marbling," includes some very good specimens of this imitative art. In Class 16 there are one or two well-executed specimens of wrought-iron work.

The rules and regulations for the manage-

ment of the Exhibition state that persons eligible to compete for prizes "must belong to the working classes, in the usual acceptation of the term, or as defined by the judges,"—whose names do not appear in the catalogue. Medals and other prizes to the value of 200*l.* are offered by the promoters, but if, in the opinion of the adjudicators, there shall not be sufficient merit in any of the exhibits, no prize will be awarded.

ONE HUNDRED AND SIXTY NEW HOUSES IN THE AUCTION MART.

THE UPTON PARK ESTATE.

A LARGE estate at West Ham, known as the Upton Park Estate, a short distance beyond Plaistow, on the London, Tilbury, and Southend Railway, has recently been laid out for building upon, and upwards of 800 small houses have already been erected upon it, whilst others of a like description are at present in progress. Several of the tenements are semi-detached, and to a certain extent built of concrete blocks, having spacious gardens front and back, each side of the several streets or roads being planted with trees in boulevard fashion. The builders or owners of a large number of these dwellings do not appear to have been commercially successful; for, on Friday, the 3rd instant, 160 of the houses were offered for sale at the Auction Mart, Tokenhouse-yard, by order of the mortgagees, the Everton and West Derby Building Society, Liverpool, who, it was stated, have advanced upwards of 20,000*l.* upon the property. The particulars state that the property was estimated to produce 3,072*l.* per annum at present rentals, and that about three-fourths of the entire number of houses were already let, the remaining portion being in hand. They were stated to be held on leases for an unexpired term of eighty-five years, at an aggregate ground-rent of 640*l.* a year, the rates and taxes paid by the landlord, amounting to about 570*l.* per annum, showing a net annual rental of 1,962*l.* It was stated that the property would, in the first instance, be offered in one lot, and this arrangement was carried out; but as no bids were made, it was next offered in twenty-six lots, each lot containing six, seven, and eight houses each, for which the offers ranged from 600*l.* up to 1,400*l.* each, or an aggregate of about 22,000*l.*, but they were all withdrawn, the offers not being considered equal to the value of the various lots. It was stated in the room that the minimum value placed upon the property was 25,000*l.* Mr. Hosking, the Building Society's secretary at Liverpool, was present at the sale, instructing Mr. W. V. May, the auctioneer.

A "NATIONAL" COFFEE PUBLIC-HOUSE IN FLEET-STREET.

UNDER the title of the "Caxton," the National Coffee Public-house Company are about to open one of their establishments in Fleet-street. The Company have purchased the premises at the corner of Fleet-street and Bouverie-street, and are now converting them for their intended future purpose, the internal portion of the building undergoing an entire re-construction. It contains four floors, besides the basement, the whole of which is intended to be appropriated to the business of the Company. Nearly the whole of the interior partition walls forming the apartments on the several floors have been removed, admitting of the construction of spacious coffee and dining rooms on each floor, upwards of 50 ft. in depth from the Fleet-street frontage. A special feature of the establishment consists of a large and handsomely-fitted billiard-room in the rear. This apartment is about 50 ft. square. The new staircases from the ground-floor to the upper part of the building are wide and commodious. The basement, which will be appropriated as the culinary department, is being fitted up with ranges and cooking apparatus, and there are hydraulic lifts to the upper floors. The portion of the second floor at the rear of the building in Bouverie-street contains the manager's apartments. The principal entrance to the establishment is in Fleet-street, but there are also two other entrances in Bouverie-street.

The re-construction of the building has been carried out under the superintendence of Messrs. Parr & Strong, architects, of Finsbury-square; Messrs. Mark Patrick, & Son, of Westminster Bridge-road, being the contractors.

HARVESTING MACHINES.

SIR,—By the turned-down page in the pamphlet I send by this post, you will perceive that you were amongst the first to encourage me in my labours to save the harvests of the country. I have sown my thousands, done my task, but up to this present date reaped nothing but excessive toil,—possibly this will be my only "crop"; but it is a satisfaction to know that one has done something, and that men like yourself approve the "doing."

Chingford, Essex. WM. A. GIBBS.

*** The evidence as to the value of the machines is so strong that it seems extraordinary that the company for constructing and letting them, which it was proposed to establish, has not been formed.—ED.

WHEELING THROUGH LIFE.

PAUSING on the level bit of road by the parish church, just at the foot of the bridge, sat two young men in a vehicle, on the like of which my eyes had not before rested. In the first bloom of youth, they might have been prize-men from some public school. But their courteous replies to a man senior to themselves rather gave the impression that they were Oxford freshmen. They asked some question as to an hotel, and readily replied to my inquiries as to their carriage. The morning was intensely hot, the time just about ten a.m. They had come, they said, from Sunbury (which was a distance of about sixteen miles), and had got over the ground at the rate of eight miles an hour. They did not look in any way distressed or fatigued. They were warm, but not warmer than any one might have been at the end of a mile's walk. After a little chat the vehicle noiselessly began to move. It ran backwards up the ascent of the bridge, turned round in half the width of the road, and then briskly ran up the steep pitch to the White Lion, at, I should say, nearer ten than eight miles per hour.

The vehicle was without a horse, and happily without a boiler. Was it propelled by electricity? Yes, by the electric force of the two young occupants. It was what, I suppose, would be called a quadricycle, made to carry two passengers. The pair sat side by side, between two large skeleton wheels; and one small central wheel in front, and a corresponding one behind, so arranged that the two would not touch the ground at the same moment, gave safety to the little spider-like car, and I conclude were of use in steering. The movement was given by treadles, and I observed that the two inner and the two outer legs of the drivers acted together. The facility and grace of the motion of the vehicle were admirable; nor was there any appearance of the strained and anxious look on the faces of the travellers which is characteristic of the rider on a bicycle.

It occurred to me that a more delightful vehicle for a summer excursion had been never designed. Conversation would be uninterrupted by the noise of wheels. A brisk movement through the air would be kept up with less expenditure, I should judge, of energy than that of the pedestrian, if measured by time, and of very far less if measured by distance. Of course, there may be drawbacks which do not appear at the first glance. But it seemed to me that the new vehicle was much more enjoyable than any single-horse carriage for such a purpose as a tour, and much more economical, and, indeed, manageable, than a pair-horse phaëton, or that pride of the ancient road, a curricle.

It struck me that some thankful notice should be taken of this visible embodiment of one of the ideas of an engineer to whom the world has, perhaps, not yet rendered his due,—General Sir Arthur Cotton. It is now five or six years since Sir Arthur proposed what I think he called a compound bicycle. His idea was to have a machine something like three or four bicycles combined in one, in which two footmen should propel their master, or their master and mistress. It appeared to me that the case was one in which it was not clear that twice two made four. The wonderful freedom of the bicycle seemed to me to depend very much on the singleness of the propelling wheel. Friction between the different parts of the carriage, and twist between the wheels, which together absorb no small portion of motive power, are avoided in the bicycle. It seemed to me probable that the base of the vehicle could not be extended, and the working parts complicated, without bringing back so much of the torsion and working friction as to render propulsion very hard work. The *rencontre* of this morning served to show me that I was wrong, and that Sir Arthur Cotton was right. At all events, I feel that I may be doing good service to many a tourist by calling attention to so sociable a conveyance. "Did you see that carriage go up the hill?" I asked of one of the town-councillors whom I met by the way. "Never saw anything like it before," was the reply. "How pleasant it would be to take out one's young lady in such a carriage!" C. E.

THE ARCHITECTURAL FITNESS OF PICTURES IN ITALIAN BUILDINGS.

My attention was first attracted to the above characteristic of Italian art when contemplating Leonardo's "Last Supper," in the refectory of the Monastery of Sta. Maria delle Grazie, at Milan.

No notion can be formed of the meaning of the architecture in this picture from the copies and engravings. To understand it one must visit the original; then it will be seen that the architecture of the painting is a continuation of the architecture of the room in which it is painted. The end wall is, as it were, painted away. The room is extended with windows, &c., of the same height and pattern, and at the end, on a dais, the table is set, and our Lord and the Twelve are partaking of the Last Supper.

How truly could the old monks understand as they sat at meat the idea the painter has brought out so finely, that they were disciples of the Lord, and eating with him.

No copy hanging in a frame can give the least notion of the feelings experienced in gazing on a scene going on in the same room with oneself: the very framing of the copy is fatal to it.

At Florence, too, in the Monastery of St. Marco, is a splendid painting of the Last Supper, to which the same remarks will apply. This is in the small refectory, and by Chirlandajo, and is in beautiful preservation (in this respect very different from Leonardo's). In this painting one feels that the light actually falls from the windows on to the forms in the painting, and the glasses on the table acquire a wonderful lustre, without detracting from the noble forms around the table.

In Giulio Romano's work, at the Palazzo del Te, the same treatment can be seen in almost every room. Each painting is treated as though it were a fact actually going on in the room, or seen through architectural spaces, the architecture being sometimes real and sometimes painted, but always forming part of the building. This is in contrast with our ideas of pictures hanging on the wall.

The Sala dei Giganti is a bold, but in many respects a vulgar performance. Here the giants are overthrown by Zeus, and a thunderbolt has struck the room itself, the walls come down in tottering masses on the spectators' heads; the giants are all around, some crushed by the fall, others still grasping pieces of rock: the whole place is a ruin, a few bricks still remaining to prop up the doorway. Rocks have fallen through in places, under which legs and arms of giants protrude, and heads half crushed, their eyes still gazing into the sky in terror, for there is seen the almighty hand of Zeus grasping a thunderbolt which will complete the destruction. The whole room is painted into this scene, walls, ceiling, and all, so that the spectator feels that he is in the centre of the general ruin, and that the next thunderbolt will be launched at him.

All through Italy frescoes by the best masters can be seen treated in this manner. Correggio's work at Parma, Raffaelle's at the Vatican, &c. The architecture is so beautifully shaded from the real lights in the room that it is with the greatest difficulty one discovers whether it is painted or real, and it is this that helps forward the reality of the paintings, for the painted architecture is so wonderfully blended with the real that one fails to look on these scenes as paintings, but feels that he is in the presence of realities.

My observations lead me to think that the old masters designed the architecture of their pictures to fit the architecture of the building they were painting, and the light and shade were made to fall naturally from the openings in the architecture.

I think there is much of the architecture one meets with in old paintings, and which often strikes one as being out of place and inconguous, cut, as it often is, from walls or ceilings, which, if seen in the light and in the place for which it was painted, would be not only understandable, but really beautiful.

OWEN GIBBONS.

MASTER AND SCHOLAR.

SIR,—In my paper on "Mural Decoration," read at the Liverpool meeting of the Social Science Association, I laid great stress on the importance of scholarship, as scholarship existed in the best days of Italian art,—for men practically acquainted with historical painting very well know that the teaching in the public building and the studio, such as Raffaelle's scholars had, is the very best of art-teaching. In the paper referred to, however, I took care not to confound cause and effect. Italian art was not primarily developed by the institution of scholarships, but by the great and continuous demand of the Church and the wealthy for painting, sculpture, and architecture, necessitating the employment of assistants or scholars by the master. I was myself against the question being entered on the list of questions of the Art Section of the Social Science Association in its present form, for I think that form is misleading. Art questions should, in my opinion, be put in an instructive form. The system of scholarships could not be forced into existence without a prospect of employment, for young men are not likely to go in for historical painting when historical painting does not pay. Moreover, the *atelier* of a master in which there should be no opportunities for practising the higher forms of art would be destitute of those advantages which made the system, as it existed of old time, so valuable. It is the necessity of adapting art in mural decoration to the conditions imposed by its architectural setting that develops mastery in design from the figure painter to the ornamentist.

The system of master and pupil, in a sort of jog-trot fashion, has always existed in England, without its leading to a school of historical painting. Portrait and *genre* painters have frequently had scholars who have been brought up to follow the same kinds of art as themselves. But even here the extent of scholarship is in a great measure regulated by the demand for these kinds of painting. The parent and the artist student calculate the chances of employment, of earning a living, by following in the footsteps of the artists to whom the pupils are about to be articled. But the taking of pupils is by no means a general practice in this country. Some of our most popular artists have unfortunately refused to have scholars.

In direct contravention of the procedure in the great art epochs, we have adopted a system of art-schools without any reference, without any co-ordination, to a demand; and Artists' Benevolent Societies will in a few years be utterly unable to respond to a tithe of the applications which will be made upon them for pecuniary assistance. In no country has there been such a repetition of lectures upon the history of art as in this. What the *dilettanti* heads expect from these lectures, goodness alone knows,—but we do know that they are advocates for every kind of measure for promoting art which is diametrically opposed to the teaching of such history.

The people must be told again and again that the art of this country firstly depends upon their own state of culture; that English art will always be up to, if not in advance, of their understanding. That its status depends upon the quality and the quantity of their demand for it, and upon the public money being directly spent upon the employment of the artist, and not on throwing it away upon all the paraphernalia of art-schools, museums, &c. These may be all very well in their way and to a certain extent. But the modern craze for the multiplication of such establishments is absolutely pernicious.

W. CAVE THOMAS.

Four Masons Drowned.—On Monday evening, while seven masons were at work in the pit of the Great Western Company's Colliery, near Maesteg, Glamorganshire, the guide siderope of the north shaft stage broke, and four of the seven men were thrown into the water below and drowned.

LIGHT AND AIR.

SIR,—The article in the *Builder* of August 28th "On some Points in the Law of Light and Air," reminds me that, some years ago, in reading the Bill then proposed and not yet passed for amending the "Metropolitan Buildings Act," it struck me that, taken together, the regulations seemed to imply that the law stands thus:—That, in the absence of prescriptive rights, an owner in building must depend for light and air entirely upon the area over his own ground, and over any adjoining public way; having no claim whatever in these respects to the area over the ground of an adjoining owner. The Bill contained sundry regulations as to heights of buildings, which secure to the building owner a certain amount of light and air, and prevent him from obstructing those on the opposite side.

It seemed rather a pity that the Bill did not distinctly state that an owner cannot, by infringing the implied law, establish in the course of time a right over the ground of an adjoining owner, which might inflict great hardship. A clause something like the following might perhaps answer the purpose:—"Within the limits of the metropolis, no claim for ancient light shall accrue on account of any light which was not an ancient light at the date of the passing of this Act."

The subject is worth discussing in your columns.

J. M.

MODEL ESTIMATING.

THE following is a list of tenders delivered for building a new wing and executing alterations, including all ironwork and verandah, to Thidy Villa, Underhill-road, Lordship-lane, for Mr. W. Howell. Mr. George Howell, architect. Quantities were not supplied:—

J. & S. Bowyer	£1,000	0	0
Watson & Dennett	665	0	0
Gammon	620	0	0
Edwards & Hayes	550	0	0
Cais & Beldom	530	0	0
Rice	483	0	0
Taylor	410	0	0
Hogan (accepted)	400	0	0
Buchan	380	0	0
Ayers	250	0	0

GRAINING AND MARBLING.

SIR,—Will you kindly use your powerful organ in assisting me to find out the cause of the decline in public favour of a now almost obsolete profession, viz., Graining and Marbling. It is well known to the trade that architects and the fashionable decorators have tried to stamp out graining whenever and wherever they can, so that they can introduce the system of colour-painting now so very fashionable, but a very poor substitute for art. I fear that without some assistance from you and your readers as to the actual cause of the decline of a once much-appreciated profession, there will be but little prospect of improvement. To be a good grainer requires the study of a lifetime, and in some cases great energy. I trust you will assist me in ventilating this argument.

A POOR GRAINER.

TO EVERY ONE HIS OWN.

SIR,—Some papers on quantity surveying written by me were published in one of your contemporaries in the years 1878 and 1879. Much of the matter and phraseology of the additional chapters of the third edition of Mr. Banister Fletcher's book, "Quantities," published by Mr. Batsford since my articles appeared, is identical with portions of those articles.

My papers (with additions) are shortly to be published by Messrs. Spon, and as I am anxious to guard myself against the suspicion of plagiarism, I shall be glad if you will allow me to make this statement through your paper.

JOHN LEANING.

Rowland Hill Memorial.—At the last meeting of the City Commission of Sewers, the Streets Committee brought up a report in regard to a communication from the Lord Mayor, as the chairman of the Rowland Hill Memorial Committee, asking the sanction of the Commission to the erection of a bronze statue of the late Sir Rowland Hill in the open space at the south-east corner of the Royal Exchange, facing Cornhill; the statue was about to be entrusted to a competent sculptor, and, as a work of art, would be worthy of the City of London. The committee had viewed the locality and found that the space available at the spot in question would admit of the erection of the statue without inconvenience to the public, and they recommended that, subject to their approval of the plan and models of the statue, the Court's permission to its erection at that site should be given. On Mr. Innes's motion, the committee's report was adopted.

GOOD NEWS.

THE BRISTOL VENTURERS.

SIR,—Two hundred guineas and upwards per week may be easily and safely earned by persons of either sex, without detriment to present employment, or previous knowledge of the business.

This assertion reads very like an advertisement which has haunted the daily papers for some years past, and which, from its longevity, one may suppose has worked wonders among Mr. Carlyle's "thirty millions, mostly fools." The only drawback attending this speculation (and it seems to be considered no inconsiderable one) is that it has been known, upon some rare occasions, to bring its enterprising projectors within reach of the proverbially strong arm of the law.

Perfectly free from any such vexatious amenity, and infinitely more lucrative, is the scheme devised by the Society of Merchant Venturers of Bristol for making capital out of the simple faith of their fellow-men,—a scheme which fully warrants the cheering announcement with which I commence my letter. The El Dorado discovered by these ingenious gentlemen is none other than the promotion of architectural competitions; and from what I can learn of the success of their first venture, they must be flattering themselves that, this time, they have indeed "struck ile."

A reference to the advertisement inserted by them in your paper, some weeks ago, will throw some light upon their exact method of procedure. It is headed "New Trades School, Bristol," and is somewhat discreetly worded; we are told that plans are required for this building, and that a premium of 100 guineas will be awarded to the author of the best design. There is no mention of the approximate cost of the work, nor are we told whether a professional referee is to be employed; the only further information we are vouchsafed is that all applications for particulars must be accompanied by one guinea. Prominent among the particulars so obtained will be found the fact that your guinea is gone from you for ever, the Society gently but firmly declining to return it under any circumstances whatever. You may further learn that they do not pledge themselves to build any Trades School at all, or if they do, to employ the architect whose design has been placed first,—the fact being that they do not bind themselves to anything beyond disgorging one hundred out of the three hundred guineas which they are likely to obtain from confiding members of our profession.

Let me pay my tribute of heartfelt admiration to the master-mind that put up this dowmost of downy dodges. Artemus Ward stored one when he "hogged the public" with a waterproof tent and a pea-green cow. A certain prominent member of the Stock Exchange, not long ago, exhibited some shiny tricks, which were very admirable in their simplicity. The confidence trick and the painted sparrow are plants which reflect much credit on their respective authors. But all these must pale their ineffectual fires before this last great light, who may fairly rank beside the intellectual Colossus who first conceived the idea of deriving an income from three thimbles and a little pea.

It is pitiful to think how many signers "this merry bond" is likely to find among the younger and poorer members of our profession.

LOUIS KNAPP.

NOTES FROM EDINBURGH.

The New Medical School Buildings.—The Anatomical Department of these buildings will be ready for occupation by the students of the School of Medicine at the beginning of the winter session, early next month. The buildings are ranged round two large quadrangular courts, which serve the double purpose of promoting ventilation and increasing the facilities for lighting. The north court, measuring 127 ft. by 85 ft., lies parallel to Teviot-row. The range of buildings on the north side of this court is intended chiefly for the departments of Materia Medica and Medical Jurisprudence; and in the comparatively short period since that contract was let, Messrs. Beattie & Sons have made good progress with the work. The east end of the south court (which measures 97 ft. by 53 ft.) is occupied by the anatomy class-room, measuring 58 ft. by 42 ft. Of the range forming the south side of the south court the whole upper floor, measuring 108 feet in length by 39 ft. in width, and 27 ft. in height, is set apart as the dissecting-room, the roof being formed in ridges glazed towards the north, so as to afford as much as possible of steady light. In some of the rooms ventilating-grates have been introduced, while in nearly all extraction-shafts have been erected for the purpose of carrying away the vitiated air to the tall brick column which recently formed the subject of some discussion in Edinburgh on the score of its alleged unsightliness. The stalk in question rests on a square base 18 ft. wide, and rises to a height of about 180 ft. Near the bottom the shaft is 50 ft. 6in. in circumference, while at the top it is contracted to 17 ft. 6 in. About 150 ft. from the base there are eight ornamental openings for the outlet of the vitiated air led into the shaft. Up the centre runs a chimney, made of malleable iron boiler-plate, 2 ft. 6in. in diameter, which will have its escape at the cone-shaped summit of the shaft, and which, by heating the air encircling it, is expected to produce an efficient draught for ventilating purposes. The contract for the southern division of the building, which is in the hands of the Brothers Meikle, of Ayr, does not expire till the 31st of August, 1881, so

that the anatomical department, with the exception of the museum, which is 112 ft. long and 40 ft. wide, and the principal entrance-hall from Park-place, has virtually been completed a year before the specified time.

The Calton Gaol.—A representation has been made to the Secretary of State by the County of Edinburgh Prison Board with reference to the claim of the Government against the county and burghs in respect of the alleged inadequacy of the Calton Jail. The Board represent that the sanitary state of the prison and the uniform health of the prisoners,—which is the best test of adequacy and fitness,—are pre-eminently good. Having pointed out that Sir Richard Cross had no hesitation in certifying that the east division was "unexceptionable," the memorial goes on to say that the west division, which was built in 1816, has been objected to on the alleged ground that "the cells are almost all of small cubic capacity, defective in ventilation and also in heating." It is stated that when rule 21 of the Rules for Prisons in Scotland was made in 1874, providing that for each prisoner there shall be not less than 800 cubic feet, the Board protested against its being applied to existing prisons, and especially to the prison of Edinburgh. The Board, therefore, express the opinion that to take down the west division would be a most unjustifiable waste of money. The number of cells in that division is 127, while in the east division and the civil prison there are 111, the total number being 238. The Board admit that the part of the prison called Bridewell, and which is used for female prisoners, is objectionable as a place of confinement,—not at all in a sanitary point of view, for they hold it is as healthy as the rest of the prison, nor because the accommodation is inadequate, but on account of its being, from its construction, unsuitable for proper discipline. The condition of the building itself is very good, the materials are valuable, and, perhaps, the Board suggest, it could be altered or even rebuilt at comparatively small expense. To this representation a reply has been received from the present Home Secretary, setting forth that, after consulting with the Lord Advocate on the subject, he finds that he cannot depart from the conditions laid down by his predecessor in office.

NEW WAREHOUSES IN SUNDERLAND.

AMONG the improvements indicated in a recent article in these columns, entitled "Progress in Sunderland," were certain new buildings in Union-street, on the west side of the Central Railway Station. These three blocks of premises are all to be applied to business purposes, and include the new warehouse of Messrs. Blacket & Son, drapers, that of Messrs. Pearman & Corder, wholesale grocers, and a new public market, which is being erected by private enterprise. The buildings are ornate in style, and of considerable dimensions. Messrs. Pearman & Corder's premises, which are now all but completed,—indeed, partially occupied by the firm,—are built mostly on the site of the old premises destroyed by fire over eighteen months ago. In commemoration of this fact, the firm has named its new warehouse "The Phœnix Buildings," and has adopted a representation of the fabled bird as a trade-mark. The new structure is erected after an Italian design. Its frontage includes a substantial tower, rising from the central pavilion roof. The tower is adorned with arches and pilasters with Corinthian capitals, and bears a dome of glass, glazed on Mr. Rendle's patent principle. In front, the building is divided into five spaces by a slight projection in the middle and at each end. The ground story is rusticated. The windows of the first floor are separated by pilasters of polished red granite, with Corinthian columns. Surmounting this is an enriched stone cornice, and extending the whole length of the façade. Above is a stone parapet supporting a French pavilion roof at either end and in the middle, the plain line of parapet opposite the principal roof-features being relieved by pedimented dormer windows executed in stone. Resting on the central pediment is a carved stone Phœnix. The stone front is continued round the corners of two side streets, about 22 ft. at each end, the counting-house being thus distinguished from the warehouse proper, which is a brick building of five stories, situated in the rear. The white freestone used in the construction of this, and for facing the adjoining building of Messrs. Blacket's, is from Denwick Quarry, near Alnwick, the property of the Duke of Northumberland. By the front entrance the counting-house is reached,—an apartment 60 ft. by 20 ft., exclusive of a retail shop, which will be let off, at either end. The interior of the counting-house is fitted up with mahogany, the floors laid with marble mosaic. But the main staircase, reached from the front entrance, is the most striking feature of the interior. It is constructed entirely of iron and glass, and rises in the tower to a height of five or six stories underneath the glass dome above mentioned. The different floors throughout the structure are composed of Portland cement concrete. In the large brick-built warehouse at the rear of Union-street, every facility has been provided for carrying on an extensive trade, the southern section being devoted to the grocery, and the northern to the provision department. Spiral staircases afford communication between the lower and upper portions of the building. In the bacon department there are complex appliances for washing and preparing the article after its arrival in huge boxes from America. With a view to maintain the required current of air, two long fans are fixed on the shaft from which the lifts are worked, which shaft runs the entire length of the building, and by the rapid revolution of the shaft the desired object will be effected. On the western side of the upper floor is a large tea-mill by R. Waygood & Co., engineers, London, workable by either steam or hand power, and capable of mixing 500 lb. of tea at a time. In a central chamber to the west, on the top floor, is an eight-horse power Otto gas-engine for working the central despatch-hoists, and two reception-hoists or lifts, as well as the tea-mixer, coffee-mill, &c. The coffee-roaster, also by Waygood & Co., is heated by a row of gas-jets, the gas being mixed with the air by means of a force-pump. When the coffee has been "done" it is dropped from the roaster into a shallow box-like apparatus, with double bottom, the one being perforated. A fan is then connected with the box, and at the rate of 4,000 revolutions per minute, the cool air is drawn through the coffee, the heat being conveyed through the wall into the street. The appliances for the delivery and despatch of goods are very complete. Telephonic communication will be established all over the building, while electric-bells will be hung in the private office of members of the firm. Mr. Frank Caws, of Sunderland, is the architect of the new building. The excavating, brickwork, and concrete flooring have been carried out by Mr. Robert Hudson, jun.; stone front and joiners' work by Messrs. John Hirst & Sons; and slating by Mr. J. E. Nelson, all of Sunderland.

GILCHRIST ENGINEERING SCHOLARSHIPS, UNIVERSITY COLLEGE.

THE regulations for prizes and scholarships at this college, just now issued, show how numerous are the opportunities there which offer themselves to young men of ability and energy. We wish, however, to call attention specially to the Gilchrist Engineering Scholarships, the gift of the Gilchrist trustees, and which are offered this year for the first time in connexion with the Engineering Department of the college. Two entrance scholarships, each of the value of 35*l.* per annum for two years, are offered for public competition, which is limited to those who have not previously been students of the college. Candidates must, on or before the 23rd of September in each year, send to the secretary written notice of their intention to compete.

Copies of these regulations, and of the prospectus of the college classes, can be had on application to the secretary of the college.

The Lincrusta - Walton Company, Limited.—Under this title a company is being formed for the purpose of acquiring and developing the English patents of Mr. Frederick Walton, of London, the inventor and patentee of linoleum, for the application of compounds of solidified oils to the manufacture of wall decorations in solid relief, and other articles specified, together with the machinery and apparatus employed in the various processes substantially as described in the said patents; also the goodwill and business connexions and the buildings and plant. The new fabric possesses qualities which for decorative and other purposes are unique. It seems to us a mistake giving up the original name.

WESTMINSTER OFFICES COMPETITION.

WE are informed that the report of the referee, Mr. Charles Barry, has this week been discussed by the committee to whom the matter was delegated, and that they have agreed upon their report, which will probably be taken into consideration at a meeting of the Vestry to be held on Tuesday, the 21st inst. In the meantime, the recommendations of the Committee will, it is understood, be kept secret.

PARLIAMENTARY JOTTINGS.

Compulsory Purchase of Land for Public Purposes.—In the House of Commons, Mr. Watkin Williams asked whether the Government would, in the recess, consider the propriety of amending the law so as to give facilities to the people to obtain land by compulsory purchase for public purposes, such as chapels, markets, and the like, by some speedier and less expensive process than by Act of Parliament. Mr. Dodson, in reply, said:—Great facilities are now given for the compulsory purchase of land for sanitary purposes, such as sewage-farms, water supply, the clearing of over-crowded areas in large towns, sites for hospitals and mortuaries, street improvements, cemeteries, &c., by means of provisional orders. Lands for markets may also be purchased by the same process, which, except where the confirming Bill is opposed in Parliament, is, as a rule, a very inexpensive process. Parliament has always reserved to itself the right of vetoing the compulsory purchase of private property, and at present there is no authority to which this power can properly be delegated. At the same time, there are cases to which the provisional order system may advantageously be extended, and I will not fail to consider the matter during the recess.

Leases Bill.—On the order of the day for going into Committee on this Bill, Mr. O. Morgan said that this was a question connected with land reform with which the Government would have to deal next year, and he hoped, therefore, the hon. member opposite would not persist in moving to go into committee.—Mr. Warton said he would not press the Bill against the wish of the Government, though he did not believe in their dealing with the question next year. The Bill was withdrawn.

City Lands (Thames Embankment) Bill.—On the motion for the second reading of this Bill (which was promoted by the Corporation of London to sanction certain arrangements with the Government as to the acquisition of a site for the proposed new Mint), an hon. member moved that the House be counted, and the House was counted out.

The Employers' Liability Bill.—The House of Commons, on the 2nd inst., considered the Lords' amendments to the Employers' Liability Bill. Most of them were agreed to, but the House disagreed with Lord Brabourne's amendment, omitting Sub-section 3 of Clause 1. On Lord Beaconsfield's new clause, limiting the Bill to the end of 1882, Mr. Dodson proposed to amend it further by substituting 1887 for 1882,—thus giving, as he explained, seven years' experience of the Bill, and throwing the onus of renewing or amending it on the next Parliament. This proposal was concurred in after a short debate, but a division was taken on Lord Beaconsfield's clause as thus amended, with the result that the House resolved to agree to it by 72 to 33.——The Bill again came before the House of Lords on the following evening, when the Lord Chancellor moved that their lordships would not insist upon their amendment omitting Sub-section 3, Clause 1.—Lord Brabourne said that after what had occurred in another place he had nothing to do but to retreat from the position he had taken up with what grace he might. It had been stated in the course of the discussion on the Bill that he had acted solely in the interest of the employers. It was true that he had moved the amendment in consequence of a resolution passed by employers of labour representing an immense amount of capital; but he would not have done so if he did not conscientiously believe that it was for the interest of the employed as well as of the employers. He believed still that it was for the best interest of the workmen to feel a community of interest with their employers. The Bill, he feared, would disturb that feeling, and plunge the workmen into litigation, so that the only persons who in the long run would benefit by it would be the lawyers. He had before stated

that he did not regard the Bill as a compromise, and that it would lead to fresh agitation, and he had only to call attention to the fact that the gentlemen who represented the Trade Unions, and had seats in the other House, had deliberately stated that when the Act expired the workmen were certain of getting an ulterior measure which would embody all their demands. He had only again to say that in taking the course he had adopted he had acted only for what he firmly believed to be the public interest. The motion was agreed to, as was also one agreeing to the Commons' amendment to the Lords' amendment extending the operation of the Bill from two to seven years. A message was agreed to be sent to the Commons accordingly, and the Royal Assent has since been given.

ART EXHIBITIONS.

Liverpool.—The private view of the Autumn Exhibition of pictures in the Walker Art Gallery took place on Saturday last. Several of the most prominent pictures from this year's Royal Academy Exhibition are on view. The exhibition promises to be one of the most attractive yet held in the city.

Kirkcaldy.—Last week the annual exhibition in connexion with the Fine Arts Association was formally opened to the public. On the present occasion space has been found in the galleries for 874 works in oil painting, water colour, and sculpture, as compared with 683 placed last year.

Birmingham.—An exhibition of paintings on china has been opened in the rooms of Mr. Thrupp, New-street.

CHURCH-BUILDING NEWS.

Aston.—The first section of the enlarged and restored parish church of Aston, Birmingham, has been formally opened. This portion consists of an extension of the nave and aisles in an eastward direction over the site of the old chancel. It was commenced rather more than a year ago, and the memorial-stone was laid by Lord Leigh on the 24th of September last year. The entire contract embraces the almost complete rebuilding of the church, with the exception of the tower, and its enlargement to nearly double its former dimensions, at a cost of about 10,000*l.* Originally the church was only capable of seating 800 persons, but when the works now in progress are completed, accommodation will be provided for an additional 500 persons. The work is being carried out under the direction and from the designs of Mr. J. A. Chatwin, architect, Birmingham. The portion of the work now completed has cost about 4,000*l.* The erection of the chancel, Erdington Chapel, and organ-chamber will next be proceeded with, and when the additional space thus obtained is secured, it is intended to restore the old portion of the nave and aisles, and to raise the clear-story to the height of the new work. The western entrance to the church will consist of a Perpendicular doorway, the arcade being in the Early English style. The inside of the church is faced with Sutton stone from the same quarry as that used in the erection of the tower and spire, and a much harder stone from Penkridge has been used for the external work. In the north aisle the altar tomb, the earliest monument of the Holte family, remains *in situ*. The monument represents William Holte, who died in 1514, and his wife Joanna. The other monuments of the Holte family have been refixed on the walls of the north aisle. In the south aisle, near their former position, have been placed the monuments of the Bagot family. The altar-tombs to the Ardens, Erdingtons, and Devereux, and other monuments formerly in the chancel, have been, we are told, "carefully packed up," and will, it is hoped, shortly be placed in their respective positions in the new chancel and Erdington Chapel. It is proposed to re-erect the pictorial window to Letitia Dearden, by Eggington, in the east end of the chancel aisle.

Frome.—St. Katherine's Church, Frome, has been re-opened. The chancel was restored about eleven years ago, and now the nave has been almost entirely rebuilt, as well as the south porch, leaving the tower to be restored at some future time. The whole of the new windows are of the Early Decorated style, and they are filled with cathedral glass of various tints. The floor of the nave and aisles is of encaustic tiles, and beneath the seats it is of blocks of wood arranged in what is known as herring-bone fashion. A new organ has also been added. The architect was Mr. J. L. Pearson, A.R.A., and the work has been executed by Messrs. F. P. & G. Brown, of Frome.

Walsall.—The memorial-stone of the south aisle of the Church of St. Michael and All Angels, Walsall, has been laid. The church is being built in sections as funds are obtained, the work commencing with the nave and chancel in 1868, and the north aisle following last year, and both being constructed by Mr. Lovatt, of Wolverhampton. The section now commenced is being carried out by Mr. Garlick, of the Saltley Works, and when it is finished there will still remain, to complete the design, the spire at the western and the organ-chamber and vestry at the eastern end. The church is in the Early English style, the materials used being Hammerwich stone for the walls and Bath stone for the dressings, with cathedral glass for the aisle and clearstory windows, and nave columns of Himley stone. Mr. J. Veall is the architect. The cost of the south aisle will be between 500*l.* and 600*l.*

Painswick.—Since the re-opening of Painswick Church, a year ago, many additional improvements have been effected. The stove, with its ugly and obtrusive appendages, has been superseded by Messrs. Haden's warming apparatus; and a stone pulpit has taken the place of the wooden structure; it is the gift of Mr. U. J. Davis, of the Court-house, and has been executed from designs by Messrs. Waller, architects, Gloucester, who superintended the restoration of the church. Before the restoration the pulpit stood on the south side of the chancel-arch; now it is placed on the north side of the same arch, in front of the curious "squint." The old east window has been pulled down, and the altar-piece, as it was termed, has been removed, and a new three-light painted window has been inserted. The subjects are,—North, our Saviour bearing the Cross; centre, the Crucifixion; south, the Entombment. This window is the gift of Mr. H. C. McCrea, father of the vicar, and is the work of Messrs. Dixon, London. A carved oak screen now divides the Chantry Chapel, which is used as the organ-chamber, from the nave. It was made by Mr. T. Guide, of Pitchcombe, who was contractor for the restoration of the church.

SCHOOL-BUILDING NEWS.

Exeter.—The new buildings of the Exeter Grammar School have been opened by the Bishop of Exeter. The new school is situated at Victoria Park. About nineteen acres of land were secured for 8,200*l.*, and the necessary buildings have been erected, except the chapel, which has yet to be built, on about two acres of this, at a cost of nearly 14,000*l.* The schools have been constructed of brick-work, with Box Ground stone dressings, by Messrs. Stephens & Bastow, of Bristol, from the designs of Mr. W. Butterfield. The style is described as "Modern Gothic." On the ground-floor of the main centre building is placed the large class-room, 30 ft. by 20 ft., and 13 ft. 3 in. in height. Adjoining are four smaller class-rooms, each 22 ft. by 20 ft., and 13 ft. high. The entrances to these apartments, which stretch along nearly the whole front of the building, are from a broad lofty corridor, on the opposite side of which are placed retiring and other rooms; on the left of this passage, entering from the front door, is situated the great dining-hall, 66 ft. by 22 ft. It has an open arched roof, is 25 ft. in height at the apex, and 15 ft. at the wall-plate, and is lighted on both sides by traceried windows filled with cathedral glass. The necessary domestic offices are situated at the north end, and the food will be brought up from the kitchen by means of a lift. At the extreme north-east corner of the building, facing the front, is situated the master's common-room, and in the rear are the domestic offices, which are entered by a door on the east side approached by a flight of steps leading from Victoria-road. Over the class-rooms are ranged on the first-floor nineteen studies for boys, 12 ft. by 7 ft. 9 in., and 8 ft. 6 in. high. Each study is ventilated into the long passage, which in turn is ventilated at both ends. On the same floor, at the north-east angle of the building, are situated two masters' sitting-rooms, one master's bedroom, and the matron's sitting-room. The approach to the boys' studies is by a flight of stairs leading from one end of the long passage on the ground-floor. This staircase is carried to the other apartments above, where the large dormitory is situated. The dormitory is 120 ft. by 20 ft. 6 in., and 15 ft. in height. At present it is fitted up with forty-two beds. It is ventilated by Sheringham's ventilator. In the turret portion of the edifice, at the north-east end, are placed the master's bed and sitting rooms, three bath-rooms, and a linen-room. On the third-floor of the higher part of the building are the matron's bedroom and a sick-room. The servants' rooms are in the attics, and over and above are water-tanks containing 1,000 gallons for use in case of fire. The class-room, boys' studies, dormitory, and dining-hall are heated by hot water, and the private rooms have open fireplaces. The heating-apparatus has been furnished by Messrs. Edwards & Son, of Marlborough-street, London, and Mr. Hunter, of Bristol, has done the plumbing. Mr. J. H. Newton has acted throughout as clerk of the works, and Mr. C. Hampton as foreman, and the building has been thus far completed without an accident.

Wolverhampton.—The trustees of the old Wolverhampton Blue-coat School have purchased a piece of land for the erection of new buildings, the Corporation requiring the old school buildings for improvements under the Artisans' Dwellings Act. Designs for the new buildings have been prepared by Mr. T. H. Fleeming, architect, Wolverhampton. The buildings consist of a centre block with two wings, in the form of the letter H. The main entrance to the building is in the centre block, whilst the wings on each side are for the respective accommodation of the children, schoolroom, master and mistress's department, storeroom, &c. The south wing contains on the ground-floor a schoolroom and classroom accommodating eighty children; and on the first floor, boys' dormitory for twelve inmates, lavatory, and storeroom. The north wing contains on the ground-floor the master's private rooms, and beyond these is the general kitchen department, over which is placed the girls' dormitory for ten inmates, with lavatory accommodation similar to that provided for the boys. In the centre block on the ground-floor are the dining-hall and dayrooms for the children, and immediately adjoining these are separate lavatories and cloakroom for the day scholars; also separate staircases to the boys' and girls' dormitories. The buildings, the elevations of which are of a simple character, will be erected in red brick, with moulded brick bands and strings, and the roof covered with brindled tiles. The work is being carried out by Mr. Lovatt, at a cost of about 3,500*l.*

Lewisham.—The memorial stone of the new Sunday Schools in connexion with and adjoining the Lewisham Congregational Church has been laid. There will be accommodation for about 500 children, with numerous class-rooms around the central space, also large room with gallery for infants. The opportunity is being taken to add a new and more commodious vestry for the use of the deacons. Mr. George Sherrin, of Broad-street-buildings, is the architect, and the work is being carried by Messrs. Staines & Son, of Great Eastern-street.

SCHOOL-BOARD SCHOOLS.

Buckingham.—The new buildings erected by the School Board in Well-street will accommodate 300 children, in two departments, arranged in a T form, viz., a schoolroom, 44 ft. long, fitted up with galleries and desks for 120 infants, and another for 140 boys and girls, 67 ft. long, with a class-room for forty children 20 ft. long attached, and both fitted with dual desks. All the rooms are of the same width (22 ft.) and height (14 ft. up to plate, and 28 ft to ridge), the roofs being of open timber description, with arched principals and plastering between the rafters. The walls are formed of hollow brickwork, and a course of gas-tar and slate has been put throughout them at the level of the ground. The red brickwork has been relieved by white bricks of both a plain and ornamental character, as well as other red ones of a deeper tone, and blue Staffordshire ones for the more exposed surfaces, such as water-tables to chimney-stacks and buttresses. The roofs are covered with brown and blue Broseley tiles and the ridges with Cooper's red ornamental crests. Each room is provided with a ventilating spirette, having rough plate-glass louvres finished by one of Macfarlane's iron terminals the one over the class-room being utilised for

the bell, provided by Mr. J. Barwell, of Birmingham. Elsley's patent ventilating-grates are adopted throughout. Separate porches, cloak-rooms, and lavatories, paved with Wehh's (Worcester) encaustic tiles, are provided for each sex. The works have been carried out by Messrs. Marshall & Boyse, of Buckingham (the cost heing 2,240*l.*), from the designs and under the superintendence of the architect, Mr. E. H. Lingen-Barker.

VARIORUM.

"THE Columnar Architecture of the Egyptians" is the general title of two essays by Waldo S. Pratt, of New York City, which have been reprinted from the "Proceedings of the American Academy of Arts and Sciences." The first of these is an examination of the well-known archæological question,—Was the Doric order imported into Greece from Egypt? in so far as that question is illumined by an investigation into the theoretic origin and development of the column and the pier as architectural members. The chronological, geographical, and politico-historical elements of the problem are for the time forgotten, and the attention fixed on the comparative artistic valne and significance of the so-called "proto-Doric" pillars in Egypt and the columns of the Doric style in Greece, as capable of bearing important testimony to the actual connexion between the two. In the present state of our knowledge, this method of attacking the question Mr. Pratt thinks the only one that leads to even measurably certain conclusions. It is an able essay, and the writer says in conclusion, "If I have succeeded in showing by this rather extended piece of argumentation how the Greek and Egyptian forms in question may have arrived at the similarity that they exhibit from entirely different starting-points; how it is probable, both from the general tendencies of architecture in the two countries and from the divergences of the forms themselves, that this difference of origin is real; and how this conclusion renders it altogether probahle that the Greek order is not an imitation or derivative of the Egyptian, I have attained my object." The second paper is "A Classification of Egyptian Columns."

——The current number of the *Nineteenth Century* includes, under the title, "A Real 'Saviour of Society,'" hy Sedley Taylor, an instructive account of the present position of the establishment founded by the Parisian house-decorator Leclaire, to a knowledge of which we were the first to introdnce English readers many years ago. Its present condition appears to he very satisfactory.——The twenty-second edition of "Black's Picturesque Tourist in Scotland" (Black, Edinhnrgh), now before us, calls for the warmest commendation. It is very fully illustrated with well-drawn views, plans, and maps, and shonld be obtained by all who are about to cross the Border. It is so arranged that reference to any part required is very easy.——*House and Home* is now the organ of the Working Men's Club movement. Its design is to elevate, and its editor is making efforts to carry ont this design.——Messrs. Dalziel, Brothers, have for many years been engaged on a series of Bible Illustrations from original drawings hy some of our most eminent British artists. An India paper edition, of limited number, will he issued as "Dalziel's Bible Gallery," and will contain drawings by Sir Frederick Leighton, P.R.A., E. J. Poynter, R.A., G. F. Watts, R.A., E. Burne Jones, F. Madox Brown, Holman Hunt, and others. The volume will be issued early in November, by Messrs. George Routledge & Sons.

Miscellanea.

Chapel of St. Columha's College, Dublin. A few days ago the Archbishop of Dublin opened the new chapel, dedicated to St. Mark, at St. Columba's College, near Dublin, which has been erected at a cost of nearly 7,000*l.*, from designs by Mr. W. Butterfield. The trnstees of the late Marshal Beresford's fund contributed the greater portion of the money. The chapel is 80 ft. in length, 28 ft. in width, and 40 ft. in height, and many of the fittings of the former chapel have been transferred to it. Rich marbles are used in the chancel, and several windows are filled with stained glass. The Earl of Erne, Mr. and Lady Mildred Beresford-Hope, Lady Helena Trench, and others, have given many of the ornaments.

The Electrical Railway.—Siemens's electrical railway is running constantly every day at the Brussels Exhibition, and earning a great deal of money. It runs under bridges, whisks round and over bridges at the speed of a fast trotting horse. The engine is no bigger than a tea-box, and the driver sits astride of it with the brake and contact lever in his hands. There are three carriages, each carrying six persons, seated back to back, after the manner of an Irish jaunting-car. The power being greatest when the current is let on and the coils of the locomotive are stationary, there is a sharp jerk on starting. In going uphill the driving current is also stronger than in going downhill, for the same reason, namely, that there is a greater difference between the velocity of the revolving coil in the stationary dynamo-electric machine, or generator, and that of the revolving coil in the moving machine or locomotive in the former case than in the latter. The electric railway is evidently quite a success, and we observe that an experimental line is being fitted up on the Camden and Amboy Railway in New Jersey, in order to test whether the system is applicable to the New York elevated railways.—*The Electrician.*

A New School of Art.—A building is about to be erected at Chiswick for nse as a school of art, in connexion with the Science and Art Department, and nnder the direction Mr. E. S. Burchett, of the South Kensington Schools, and Mr. F. Hamilton Jackson, late of the Slade School. The president is his Grace the Duke of Devonshire, and the committee consists chiefly of artists and architects resident in the locality. The course of instruction will comprehend the following subjects:—Freehand in all its branches, practical geometry and perspective; architectural and mechanical drawing; painting,—in oil, tempera, and water-colours,—of ornament, flowers, objects of still-life, &c.; the figure from the antique and the life; and the study of anatomy as applicable to art. The new building will be situated in the Bath-road, Bedford Park, and will be in harmony with the adjoining church and stores, the style chosen being "Old English," in red brick and rough-cast plaster work. Mr. Maurice B. Adams is the architect.

Pluckington Bank, Liverpool.—Mr. Hamilton Fulton, engineer, who has had largo experience in river improvements, has been appealed to to express his views respecting the removal of this serious obstruction to the Mersey navigation. His impression is that the proposed operation of sluicing would prove utterly abortive. He thinks the most effectual means of correcting the evil would he the erection of training walls of certain heights and lengths both on the eastern and western sides of the Mersey, and that this is a matter which ought to have been faced years ago, and that delay has been very pernicious.

The Tay Bridge Works.—For some time workmen have been engaged, under the direction of Mr. Barlow, C.E., in sinking an experimental cylinder at the west side of the Tay Bridge, for the purpose of ascertaining the nature of the strata of the bed of the river at a depth of from 20 ft. to 30 ft. Huge piles have been driven into the ground, and the staging was almost erected when, on Monday night, a south-westerly gale of great violence sprang up, and the whole of the staging was swept away, nothing being left save the bare piles. Fortunately, the workmen had ceased their labonrs before the gale began.

Leyland Local Board, Lancashire.—A general meeting of this Board was held on the 6th inst. for the purpose of considering the competitive schemes for the sewerage of the No. 1 District of Leyland. The schemes were four in number, and were submitted by Messrs. Addie & Sons, Preston,—estimated cost, 4,126*l.* 11s. 6d.; Messrs. Brierley & Holt, of Blackburn,—5,616*l.* 2s.; Mr. Charles Tomlison, of Rotherham,—3,750*l.*; and Mr. William Wrennall, of Castle-street, Liverpool,—5,000*l.* It was resolved to adopt the plans of Mr. Wm. Wrennall.

Fall of a Girder.—Last week a fatal accident occurred at the New Public Hall buildings, Perth. A large girder of 56 ft. span, and weighing 2½ tons, was being raised by means of a crane, and when nearly placed in its position on the tops of the walls, the ropes by which it was supported snapped, and it fell to the ground, a distance of 30 ft., taking with it a scaffold on which were several workmen. James Agen, jun., labourer, sustained severe internal injuries, from which he died in the infirmary.

TENDERS

For the erection of buildings at Cricklewood Farm, Edgware-road. Mr. Robert Hutchinson, architect:—

Gummow	£2,202 0 0
Cooke	2,155 0 0
Kearley	2,148 0 0
Rice	2,110 0 0
Angood	2,080 0 0
Van Camp	2,077 0 0
Beale	1,945 0 0
Doune	1,855 0 0
Parker	1,850 0 0
Newton	1,842 0 0
Gould & Brand	1,840 0 0
Blandford & Co.	1,829 0 0
Russell & Cowley	1,759 0 0
Willmott & Son	1,715 0 0
Bunting	1,644 0 0
Vaughan	1,588 0 0
Garrud	1,575 0 0
French	1,565 0 0
Wade	1,549 0 0

For the erection of a villa residence at "The Hyde," Hendon, Middlesex, for Mr. J. Hetherington. Mr. Robert Hutchinson, architect:—

Bird	£1,400 0 0
Kirby	1,345 0 0
Newton	1,289 0 0
Doune	1,244 0 0
Bunting	1,194 0 0

For alterations and additions to farm buildings, Bolnhurst, Beds. Mr. Robert Hutchinson, architect:—

Fisher	£530 0 0
Wade	389 0 0
Wildman	372 0 0
Francis	365 0 0
Mason	342 0 0

For making-up roads at Wanstead, Essex, for the Wanstead Local Board of Health. Mr. John T. Bressey, surveyor:—

	A.	B.	C.
Lawrence & Co.	£1,294	£104	£2,880
Cardus	856	69	1,620
Hawson	705	105	1,480
Porter	682	60	1,274
Bell	553	48	1,324
Pizzey	619	60	1,225
Jackson	550	90	1,100
Taylor	407	37	1,143
Impey*	330	46	1,159
Pelle & Sons†	401	59	810

* Accepted for A and B. † Accepted for C.

For erecting three villa residences, River-street, Islington. Mr. Wm. Smith, architect. Amended estimates:—

Mattock Bros.	£2,170 0 0
Steel Bros.	2,140 0 0
Harper	1,953 0 0
Shurmur (accepted)	1,845 0 0

For foundations, &c., of new building at No. 1, Monument-yard. Mr. William Smith, architect:—

Crabb (accepted)	£960 10 0

For erecting stables, &c., Holloway-road, Islington. Mr. William Smith, architect:—

Combes & Son	£836 0 0
Mattock Bros.	666 0 0
Shurmur	666 0 0
Harper	659 0 0
Carke & Son	614 0 0
Dunford & Langham	594 0 0
Steel Bros.	591 19 0

For the erection of additional vagrant wards at the Chesterfield Union Workhouse. Messrs. Robinson & Son, architects:—

Brown & Heath	£1,649 5 0
Shacklock	1,470 0 0
Stevenson	1,430 0 0
Cropper	1,355 0 0
Palfreyman	1,297 0 0
Wright	1,270 0 0
Gough	1,259 0 0
Glossop	1,250 0 0
G. & T. Margerrison, Barlow, near Chesterfield (accepted)	1,216 10 5
Brown	1,149 0 0
Knowles (withdrawn)	972 0 0

For warehouse, Little Queen-street, Holborn. Quantities supplied by Messrs. Williams & Gritten. Mr. Lewis Solomon, architect:—

Carter & Son	£2,599 0 0
Kirk & Randall	2,558 0 0
Mark	2,419 0 0
Larter & Son	2,385 0 0
Conder	2,292 0 0
Palmer	2,223 0 0
Patman & Fotheringham	2,185 0 0
Downs (accepted)	2,035 0 0

For alterations Gloncester-place, Portman-square. Mr. Lewis Solomon, architect:—

Verzall & Griffiths	£1,719 0 0
Years	1,549 10 0
Davey	1,539 0 0
Canning & Mullins	1,509 0 0
Downs (accepted)	1,378 0 0

For shops and offices to be erected upon the site of No. 42, Old Broad-street, for Mr. E. J. Cave. Mr. E. G. Wyatt, architect:—

Wrought and Cast Iron Work, including Fixing, &c.

McLaren & Co.	£1,100 0 0
Measures Bros.	1,076 0 0
Dawnay	1,075 0 0
Gardner & Co. (accepted)	937 15 0
Stanley, Hall, & Co. (too late).	

Portland, Bath, and Dumfries Stoneworks, including Carving.

Tildesley	£2,493 19 0
Lear	2,369 0 8
Outhwaite	2,156 15 0
Seale (accepted)	2,104 12 0

For the erection and completion of the new asylum for the borough of Kingston-upon-Hull. Messrs. Smith & Brodrick, architects:—

Barry, Scarborough	£58,523	14	1
Lovett, Wolverhampton	58,000	0	0
Ives & Son, Shipley	55,878	0	0
Howell & Son, Bristol	55,200	0	0
Brier, Sons, & Wilson, Dewsbury	55,200	0	0
Hughes & Stirling, Bootle	55,0 0	0	0
Musgrave, jun., Hull	54,200	0	0
Simpson & Malone, Hull	53,516	14	5
Horseman, Wolverhampton	53,500	0	0
Dennison & Son, York	52,930	0	0
Sergeant & Son, Hull	52,340	0	0
Garlick, Birmingham	51,899	0	0
Vidler, Chesterfield	50,951	0	0
Wilson & Son, Headingley	50,829	0	0
Riggal & Hewins, Grimsby	49,995	0	0
Hockney & Liggins, Hull	49,904	0	0
Holdsworth, Bradford	49,869	0	0
Wilson Bros., Hull	49 809	0	0
Jackson & Son, Hull (accepted)	43,652	10	0

The tenders of Messrs. Haden & Son, Trowbridge, for general engineering; Porter & Co., Lincoln, for gas-works; Bradford & Co., Manchester, for laundry fittings; and other minor contracts, being the lowest, were also accepted, amounting in all to the sum of 6,664*l.* 4s. 6d., making the total cost 49,716*l.* 14s. 6d.

For new Free Library, Science and Art Schools, and Museum, Cardiff. Messrs. James, Seward, & Thomas, architects:—

Lissaman, Leamington	£10,193	0	0
Stephens & Bastow, Bristol	9,699	0	0
Bowers, Hereford	9,500	0	0
Furnell & Fry, Cardiff	9,380	0	0
Brock & Bruce, Bristol	9,239	0	0
Webb & Co., Cardiff	9,140	0	0
Elliott, Cardiff (too late)	8,969	0	0
Shepton, Cardiff	8,750	0	0
Howell & Son, Bristol	8,695	0	0
Miles, Newport, Monmouthshire	8,595	0	0
Davies Cousins, Cardiff	8,550	0	0
Lock, Cardiff	8,540	0	0
Roberts, Cardiff (accepted)	7,934	0	0

For alterations to the town-hall buildings, Bilston. Messrs. Bidlake & Fleeming, architects:—

Bradney & Co.	£3,735	0	0
Higham Bros.	3,550	0	0
Sansom	3,540	0	0
Lovatt	3,500	0	0
Hunter	3,499	0	0
Jones & Sons	3,295	0	0
Ford	3,275	0	0
Nevett Bros.	3,190	0	0
Bedford	3,125	0	0
Nelson (accepted)	2,996	0	0
Trow	2,960	0	0

For manufactory, Camden-town, for the Anglo-Russian Iron and Tin Plate Company. Mr. Francis Butler, architect. Quantities by Mr. Lesning:—

Lathey Bros.	£16,100	0	0
Stephenson	14,780	0	0
Chappell	14,375	0	0
Patrick & Sons	14,158	0	0
Roberts	13,936	0	0
Shepherd	13,633	0	0
Nightingale	13,081	0	0
Tarrant & Son	12,863	0	0

For the erection of a school chapel, Laytonstone. Mr. J. Randall-Vining, architect:—

Bangs & Co., Stratford	£1,093	0	0
Boyce, Bow	1,093	0	0
Gentry, Stratford	995	0	0
Mansfield, Stratford (accepted)	978	5	0

For cleaning and painting works to interior of Wesleyan Chapel, Quax-road, Kilburn, for the Committee:—

Wright	£226	10	0
Pitman & Son	177	1	0
Hawtin (accepted)	133	0	0

For additions to St. Bartholomew's Parsonage, Sydenham. Mr. Cutts, architect. Quantities supplied:—

Bowyer	£825	0	0
Lathey Bros. (accepted)	820	0	0

For cleaning, painting, and paperhanging works at "Exford," Louis-road, Clapham, for Mr. E. Price. Mr. W. Newton Dunn, architect:—
Pitman & Son, accepted.

For the erection of stables, Farm-street, Berkeley-square, Mr. F. W. Hunt, architect:—
Downs & Co. accepted.

For proposed enlargement of the Clarkson-street Schools, for the West Ham School Board, to accommodate 309 children. Mr. J. T. Newman, architect. Quantities supplied by Messrs. Curtis & Sons:—

Catley	£2,450	0	0
Hosking	2,197	0	0
Boyce	2,165	0	0
Morter	2,073	0	0
Abrahams	2,064	0	0
North Bros.	1,998	0	0
Reed	1,997	0	0
Hearle & Son	1,953	0	0
Nightingale	1,921	0	0
Gentry (accepted)	1,890	0	0

For repairs and re-decoration of the King's Weigh-house Chapel, Fish-street-hill. Mr. J. E. Saunders, architect:—

Sabey & Son	£750	0	0
Dove Bros.	595	0	0
Colls & Sons	495	0	0
Greenwood	499	0	0
Staines & Son	384	0	0

For additions to No. 28, Avenue-road, Regent's Park. Mr. E. Hoole, architect. No quantities:—

Dove Bros.	£3,295	0	0
Williams & Son	3,065	0	0
Bywaters	2,853	0	0
Lathey Bros. (accepted)	2,834	0	0

For building three houses and stable at Tulse-hill, for Mr. Stevenson. Mr. C. W. Lovett, architect:—
Fisher Bros. (accepted) £1,540 0 0

For building a villa residence at Esher, for Messrs. Wells & Lemottee. Mr. C. W. Lovett, architect:—
Fisher Bros. (accepted) £490 0 0

For building a villa residence, Ballenden-road, Peckham. Mr. C. W. Lovett, architect:—
Batstone (accepted) £350 0 0

TO CORRESPONDENTS.

Norwich and the Architectural Association.—We shall let our readers hear something more on this head next week.

M. I. B. A (many thanks for kind expressions; letter would be out of place in the *Builder*).—E. G. W. (first list did not reach us).—W. S.—H. & J.—A. M.—A. J. B.—A. G. & Co.—Mr. G.—W. R. D.—J. R. V.—C. & Sons.—P. & Son.—C. F.—W. B. D.—T. C.—J. L.—W. & D.—S. R. & Son.—A. B.—G. C.—W. H.—R. H.—W. W.—L. S.—D. Bros.—S. & R.—W. C. B.—T. N.—H. S.—S. N.—H. W.—S. & S. rs.—L. Bros.—A. B. (received).—R. M. B. (next week)

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

The Builder.

Vol. XXXIX. No. 1963. Saturday, September 18, 1880.

ILLUSTRATIONS.

CONTENTS.

The Queen's Messages and the Protection of Human Life.

ENGLAND has heard, and English-speaking men and women throughout the world will hear, with an emotion that it is more easy to share than to describe, of the recent, or, we should rather say, the present efforts of Queen Victoria to protect her subjects against those fearful forms of sudden death,—more fatal than murder, or even than battle,—which have, of late, become so common and so distressing. "The Queen," it was announced in the morning newspapers of the 8th of September (a day which a large portion of her Majesty's subjects have been in the habit of especially associating with acts of protective grace), "the Queen has been much distressed by the accounts of the recent railway accidents, and her Majesty has been in frequent communication with the Government as to the means to be adopted to provide, as far as possible, for the safety of those who travel upon, or are connected with, the working of railways." The very day that informed her Majesty's subjects that, at the Queen's command, the servants of the crown were applying to practical science for a safeguard against preventible calamity, echoed a double cry of suffering. For the first time, as well as we can remember, since railways have been placed at the service of the coal-winner, have the black and ugly headings,—Serious Railway Accident! and Fearful Colliery Explosion!—appeared side by side in the same page of a morning newspaper. Of calamities thus associated in the time of their occurrence as well as in their unexpected and fatal nature, it is difficult for the moment to speak apart. At half-past two a.m. on the 8th of September, a terrible explosion occurred at Seaham Colliery, which killed, according to the accounts of the officers of the Miners' Permanent Relief Fund, 151 persons, although it is believed that as many as from 160 to 170 have perished. Applications to the fund for relief have been received from 121 persons, of whom 84 are widows, with an aggregate of 212 children. Sir Henry Ponsonby, by the Queen's command, at once telegraphed to the Marquis of Londonderry, the proprietor of Seaham Colliery, to ask how many lives had been saved, and what was the probable cause of the terrible explosion. The Queen asked the Marquis "to convey to the relatives of the missing men her sincere sympathy with them in their distress."

On the afternoon of the very same day, as the 4 p.m. Caledonian train from Glasgow was approaching Paisley, it ran, at full speed, into a mineral train which was standing on the line. The engine was broken to atoms, the following guard's van was crushed, and the four succeeding carriages were "telescoped." The guard and two passengers were killed on the spot, and eighteen passengers were injured, some of them very badly, one of whom has since died.

Serious as is the annual list of the number of persons killed and injured on our railways, it bears no proportion to the death-rate of the miners. The general report annually made to the Board of Trade upon the accidents which have occurred upon the railways of the United Kingdom is still liable to the just condemnation that it supplies full information only as to the casualties to passengers, and but scanty and ill-arranged information as to the greater number of casualties from which the servants of the companies have suffered. Taking passengers alone, the fatal injuries, which averaged 38 per annum from 1874 to 1877 inclusive, were reduced to 24 in 1878. In 1879 they had been only 2, up to the time of the Tay Bridge disaster, which added 73 to the list. From 1847 to 1849, one passenger out of 4½ millions of passenger journeys was killed from causes beyond his own control. The proportionate safety has since that time increased nearly five-fold. From 1856 to 1877 the death-rate has been about one in twelve millions of journeys. In 1878 it had sunk to one in twenty-three and a half millions. But for the Tay Bridge (which is not an ordinary working accident) the safety in 1879 would have been represented by the great ratio of one to two hundred and eighty millions. But 1880 has already shown a return to a less satisfactory relation.

In the mines of the United Kingdom, on the other hand, out of 523,870 persons employed in them in 1879, no fewer than 1,037 were killed in 843 different accidents. On the railways in the same year only 110 accidents were made subjects of inquiry, having involved the death of eleven persons, and injury to 589. But we apprehend that this does not include the deaths and injuries to servants of the companies other than those which arose from train accidents reported on by the officers of the Board of Trade. It will be seen that the death-rate in the mines is by very far the most alarming. We have before expressed the opinion that it is within the power of the engineer to prevent explosions by offering to the miner a lamp which he will have no temptation to open. But it must be remembered that the men killed by falls of the roof in mines are on the average twice as many as those killed by explosions. The essential importance of ample light in order to warn the miner against a fall is thus practically at least as great as the need for closing his lamp so as to prevent explosions.

In nine cases out of ten (and probably in many more) explosions are preventible. It is not so sure that they are absolutely preventible. The sudden disengagement of a large volume of gas is a phenomenon that almost mocks human care. We gave, some little time back, an account of one of these escapes of gas, which became lighted outside the pit, but communicated the flame to the workings. In another recent case a safety-lamp was found broken by a blow of a pick; but it did not appear whether this damage occurred before or even at the moment of the explosion. Ventilation is the great safeguard of the miner in fiery pits. This is not only well known to be the fact, but in most cases the ventilation is carefully and completely carried out.

The main point for the saving of human life in mines in which legislation can now be of much use, appears to us to be to insist that no mine should be worked from a single shaft. The Seaham explosion illustrates the value of this rule. It also suggests the question (which we put with due reserve to the mining engineer), whether it is not desirable that there should be a shaft of communication, totally independent of the main shafts, between the different seams or levels of the same mine? Such a shaft could be closed with trap-doors, so as in no way to interfere with the ventilation. It would be, in fact, a sort of back staircase, to be resorted to only in case of danger. We cannot but think that such an expedient would have probably saved a large proportion of the lives in the Seaham pit.

It will not fail to be remarked by those who have given attention to the subject that the collision at Paisley is a return to that class of accident, common some years back, which we had good reason to believe would be almost or altogether prevented by the block and interlocking systems. It is intimated by Messrs. Calcraft and Giffen, in their "General Report to the Board of Trade on the Railways of the United Kingdom" for 1879, that the introduction of the block system has occasioned a permanent increase in the working staff of railways which is represented by the cost of something like 1½d. per train mile. We say intimated, because those gentlemen, like ourselves, are unable to speak with precision as to any single item of railway cost so long as no return is made of the work done by the railway companies, stated in terms of definite weights conveyed for definite distances. Against this cost, however, Messrs. Calcraft and Giffen set the reduction in the item of compensation for personal injuries, and damages to goods. This saving, however, only amounts, on their own showing, to 0·21d. per train mile for the former, and 0·10d. for the latter, in 1879, as compared with 1874. We may add that in 1878,—which we fear we must rather take to be a normal year in this respect than 1879,—the cost of compensation was 0·42d. for passengers, and 0·39d. for goods, per train mile. In 1876 the figures were 0·53d. and 0·54d. respectively, and in 1877 0·47d. and 0·50d. Thus while there is a certain improvement, we find that the average cost of accidents has been only from ½d. to 1d. per train mile, so that if,—which we take leave to doubt,—the block system has really cost the companies 1½d. or thereabouts per train mile, there is no margin for recouping

them. All this, however, shows the urgent need of better accounts.

But the great lesson to be drawn from this late collision (which, even since the above was in the hands of the printer, has been followed by a fatal collision at Nine Elms), is, that we should not allow our attention to be drawn away from the main cause of railway catastrophes, viz., the carriage of passenger and mineral traffic over the same lines. That this is the real cause is shown by the almost absolute safety with which the enormous traffic of the Metropolitan Railway, being almost exclusively passenger or light goods, is carried on. It must be remembered that the short distance from station to station on this line, involving as it does frequent and sudden stoppages, is in itself a great and special element of danger. So is the darkness in which the trains travel. And yet the enormous number of 3¾ millions of passengers per mile of railway are safely carried on the line, being more than one hundred times the average of the railway passenger traffic in the United Kingdom! On the London and North-Western Railway the passengers carried are only 28,319 per mile of line; on the Great Northern, about the same; and on the Midland, 21,370. It is thus clear that an unmixed swift traffic can be carried on to an enormous extent with safety, while a mixed traffic certainly attains its maximum, consistently with safety, when it earns about 5,000*l.* per mile per annum. The Metropolitan earns 38,500*l.* per mile, or more than seven times as much as a mixed-traffic line (except in the case where the up and down traffic balances, which is never the case with coal-carrying lines) can earn, and that with regularity and safety.

Now, in the four serious railway accidents that occurred in the month of August, although not one was a case of direct collision with a mineral train, it must not be left out of sight that all arose from circumstances attendant on the conduct of a mixed traffic. The mode in which the rails are occupied by trains running on the line at very different rates of speed is so perplexing that every effort has to be made to save time. Thus instead of gradually stopping at the stations, a train is made to come up at full speed, being thrown on its haunches, as it were, by the brake. In the frequent, and, therefore, comparatively short, trains of the Metropolitan Railway, the powerful engine has the train in hand. Disproportionate cost, both of engine-power and of permanent-way expenditure, is caused by these rapid stoppages, but great danger is absent. For the long passenger and goods trains of the mixed lines, on the other hand, great brake-power is needed for any sudden stoppage. Our attention has been turned of late to the increase of this brake-power as a means of safety. But there are two sides to that question. First comes the question of the absolute durability, or reliability under any circumstance, of the brake. Second is the fact that the railway managers have now got into the habit of so timing their trains, in dependence on this brake-power, that if the slightest hitch occurs in the brake, accident is inevitable. This was the common cause of the four accidents of August last; so that these, indirectly, as much as the accident of the 8th current directly, are really attributable to the intermingling of the fast and slow traffic.

We earnestly trust that whatever be the steps taken by the Government in obedience to the commands of Her Majesty, such impartial and exhaustive investigation of the whole case will be made as will show first what is the cost in danger of the interference of fast and slow traffic, and, secondly, what is the gain—or, from our point of view, the loss—incurred by the adherence to a system which can only be compared to that of sending coals from Newcastle to London in post-chaises instead of in boats, if we revert in our memory to the state of our communications fifty years ago. This point, essential as it is to the protection of human life, has hitherto been persistently blinked. We trust that, under her Majesty's guidance, it will now be honestly looked in the face. The result of that investigation is one of greater national importance than we can now attempt to show.

Pictures at Brighton.—The seventh annual exhibition of modern pictures in oil at the Pavilion is now open. There was a private view last Wednesday.

IN AND ABOUT NORWICH, WITH THE ARCHITECTURAL ASSOCIATION.*

NORWICH has greatly improved its principal line of communication by the recent widening of London-street, the rather eccentric thoroughfare, as seen on the map, which connects the Market-place with the long sloping road leading to the Foundry Bridge and the Thorpe Railway Station, the station which practically does the work,—for the Victoria Station seems in the main an ornamental appendage. The curved line of the approach is in reality rather convenient for animals and wheeled vehicles,—for the Market-place is well above the level of the bottom of the Castle Meadow, where the new Post-office, formerly the Bank, makes a creditable show as the first public building brought well into view on entering;—the longer distance allows a flatter roadway. There is altogether much less of a feeling, of entering by the back door, than frequently happens in getting to the heart of an old town from the railway station. The Prince of Wales-road, now lined with a set of good-looking private dwellings, is, however, pretty certain to be metamorphosed and lined with shops before many years are over. The Market-place may remain one of the foci, but the figure, which is to include the best business part of the city, will apparently stretch itself more and more to the direct east of that noteworthy square,—which gets a natural picturesqueness from its situation on the hill-side and the varying ground level of the buildings that surround it, and has the chequered front of the Guildhall at its northern, and the bulk of St. Peter Mancroft towering above the houses at its south-western end. London-street might, however, run danger of being left altogether, if general topography came to the front; and that would be a pity,—for the new buildings erected on the south side are decidedly creditable,—tall shop-buildings of red Costessey brick, with part-in red Mansfield stone,—a thought heavy, perhaps, above the shop-fronts, and some details a little too evidently modelled on the fashionable type of what stands for early eighteenth-century architecture;—but noteworthy for bulk, for sobriety, and for purpose-like character. This public improvement is the one which makes the most considerable impression on the mind of a looker-out for recent changes. The transformation of the Chapel Field, now in progress,—adding grace and flower-beds to the grass and well-grown trees, which it has supplied so long to the high west of old Norwich, should serve as training for carrying out a greater scheme, whispered about at intervals,—which would convert Mousehold Heath into a park-like resort, reached by a new road cutting up the rising ground between the barracks and Bishopgate Bridge. Access by a back gate is at present too grandiloquent a way of describing any short cut from the heart of the city to the open Heath, which Crome taught us to delight in, and to use for looking out over the city and the Wensum valley. The back gate is locked, and it is necessary to climb over the top of it. Some more agreeable way, of approaching the Hampstead Heath of the capital of East Anglia, would be welcomed by the world, and, no doubt, by the inhabitants. When the ice has been thus broken, and a plunge into the various extensions of the city,—the modern buildings, businesses, and business aspects of the place might follow,—it would seem judicious to draw back, and be content with mentioning that there are such things in the busy and well-to-do modern city. We may turn towards considerations which are recognised by old custom as more suitable for expansive discourse,—appraising with suavity the performances of the predecessors of the present inhabitants, the good people of Norfolk, who in old times lived and worked in the little district submitted to an inspection in the course of this expedition. They were, to all seeming, not very inactive in any part of the time between remote antiquity to the seventeenth century, being well occupied in making paths and setting up landmarks,—for their own satisfaction, first of all, but not without thought also for the ungrateful posterity, which now dispenses with much impartiality, and not a little indifference, meed or blame,—taking to its inheritance with snorts and sniffs, and disposed to oscillate between weariness of the burdens, much admiration for their weight and costliness, and a desire for "wholesome clearing away of the rubbish accumulated in long periods of time, in consequence of the prevalence of an irrational passion for mere preservation."

Duly looked down upon from the castle and from the tops of towers,—from the site of St. Leonard's Priory, and from pleasant Mousehold,—looked at also from within in persistent wanderings through its winding streets, lanes, and alleys,—Norwich is found to retain a good deal of that happy power of keeping interest alive, which is a fairy gift rarely bestowed on a town, except in addition to a winding river, hills approaching it pretty closely, a longish history, and some considerable size; and sometimes withheld when all these are accorded. Mr. Evelyn wrote down, in cutting words, his views about the Wensum,—but then they were only parts of a larger argument involving advice in favour of a building scheme in London. The old palace of the dukes of Norfolk, which dazzled Macaulay when he imagined it by the aid of Edward Browne's Journal, January, 1663-64, also fared badly in Mr. Evelyn's note-book in September, 1671, as "a wretched old building, and that part of it newly built in brick is very ill understood . . . . and tho' neere a river, yet a very narrow muddy one, and without any extent." Nowadays a little too much fragrancy between St. Andrew's Hall and the Mill Dam does not prevent appreciation of good intentions, shown from the source at Fakenham along the devious course to Heigham, and through the city;—and does not secure favour for the Jacob, called the Yare, which, a little to the eastward of the remains of Carrow Priory, pours a tiny volume into the Wensum, and in doing so washes away its name. The rising ground, on the west and south of the river, albeit nothing to boast about when fully-developed hills are in question, does not fail to make itself felt, nor to do its part honestly enough in furnishing pictures which derive value, in some eyes, and do not lose it in others, from their accidental character. The great square block of castle on its mound fills in to advantage the end of a perspective of steep street, running up from the river side, near St. Andrew's. The row of churches, of which St. Andrew's, St. John's at Maddermarket, and St. Lawrence are three,—built on a line of streets nearly parallel to the river,—are looked up to from the north, and seen on the level on the south, and lanes of becoming steepness run down the slopes on the east and west of them, sometimes under parts of the actual fabrics. The bold tower of St. Giles's at the top of a street,—flanked and closed in by gabled houses,—is as happy a piece of accidental grouping as can be seen anywhere. The cathedral does not churlishly hold aloof from combinations and contrasts. Near upon 300 ft. of height enables the spire, although on the low ground, to do a manful part without fussy self-assertion, among the towers which are dotted about so plentifully on the slopes. Compared with the other English spires of the same rank—those at Salisbury and Chichester—that at Norwich comes poorly out of the contest. Filling out the outline of the octagon with small buttresses running up the angles, puzzling the eye at the same time by varying slopes, and by detached finials, is a workmanlike expedient,—but in carrying it out, as in applying the spire lights, the designer lacked the courage of his convictions, and the weakness is made all too manifest by juxtaposition with the bold work of the Norman tower,—a piece of vigorous and very individual design. The happy relation of tower and spire at Salisbury, and as rebuilt at Chichester, so that no one fancies things could have possibly been much different from what we see, are nice instances to prove, that the right mixture of imagination, knowledge, audacity, and good luck which brings about a great success in architecture, and sometimes in other things, may be found once and again, if properly sought for. People, who can pass by or forget all the archæologies, have maintained, in a spirit of paradox, that Bishop Herbert Lozinga should, in 1096, have recognised the claims of the Norwich of 1880, and placed the first stone of his cathedral near about the Chapel Field, or where St. Giles's Church now stands; and these impugners, of the selection of site over eight hundred years ago, are not to be silenced by talk of City boundaries and the wardship of the castle over the lands between it and the river. Mr. Gunn's contention that Herbert had in mind existing ecclesiastical buildings when he determined to remove the seat of the see from Thetford to Norwich, that the great new church was started just by a still more ancient one, looks so reason-

* See pp. 229, 259, *ante*.

able on the face of it, that the Bishop might be held justified at once by any one anxious to be convinced, and anxious to carry back the history of the dedication of the site to church purposes to pre-Conquestal times. The west wall of the cloisters has a very doubtful look. A simple flint wall, about 180 ft. long, could hardly be beyond the powers of the Saxon builders, and a thickness of under 3 ft. would accord more with their views, than with those of the layers of very heavy loads upon the earth who followed after them. The small circular openings, each about 1 ft. in diameter, with large splays outside and inside, and no freestone anywhere,—as they might be of almost any date, but are probably very early,—leave in agreeable suspense this little controversy, on which accident may some day throw light, when a bit of the facing in the cloister is taken down, or some of the personal belongings—of some one who worked at or watched its erection—are found in the upper wall. St. Peter's Mancroft claims, in all respects, the highest place among the parish churches. The view from the south-east,—from the Cattle Market,—requires to be taken with the south view from the Haymarket; and with the other view of this noble church from the Market-square, which surely recalls Wells Cathedral from the south-west, and various Continental scenes to the memory,—a view which has piqued the attention of many draughtsmen and painters who have felt the charm of tower, roof, windows, and turrets appearing above broken lines of house-roofs.

A longish connexion with human history can be laid claim to by the castle mound, if the British (pre-Roman) origin of the earthworks ought not to be doubted; and considerable size is only expressed in other words when it is mentioned that, in the last decade of the seventeenth century, the population was near upon 30,000. For the purpose of architectural notes it is rarely customary to pay anybody, after 1720, the compliment of acknowledging his existence, or it might be prophesied that the new census will find more than three times that number in the city, and that it would be difficult, except as a matter of mapping, to explain why a larger number still should not be reckoned in making up a gross total. The old civic and domestic work helps to give one an interest in the city which churches alone could not rouse. The outside of the Guildhall has met with evil fate; its southern flank and the eastern turret show a very different touch, from that which disposed so happily the main portion of the eastern front; but when the old chamber inside is reached, it is possible to forget the ills outside, and to view with special satisfaction this almost unaltered work of the sixteenth century,—of good proportion and general expression, and marked by much neatness and completeness of design. The carved panellings, and many of the animals which stand on the little pedestals, are very clever in idea and execution. This interior does not miss the praise which is its due. The less remarked but very interesting work at Charing-cross,—a little later in date, a rare thing in its way,—conserves also the memory of the sixteenth century; as do the buildings in back yards out of Surry-street. The good trees growing in the grounds of the large houses adjoining, and overshadowing these combinations of dormers and bracketed upper stories, tiled roofs, plaster and brick,—combinations prepared for painters by time and nature;—the surroundings of them altogether gently suggest that the day of doom is at hand, and that the west side of Surry-street will resemble Portland-place through all its length, and not tolerate longer these (1570) poor relations. The long lines of King-street and of spacious Ber-street show dormers, and timber and plaster, and show also how the seventeenth century glided into the eighteenth while this district was being moulded into the shape it now wears. Colegate-street, "over the water," affords in well-designed square-windowed houses, with handsome doorways, further evidences of seventeenth and eighteenth century comfortableness, and of the tendency of things now-a-days, when new warehouses are supplanting the old houses, and when the old houses are being altered to suit the needs of the Gresham-street of Norwich.

It is to be feared that Norwich, although she is already the subject of a very considerable mass of literature, might resent such slight notes anent her features and aspects if some touch of apology should not be introduced,—before casting a glance along the centuries from the eleventh to the seventeenth, and picking out notable works, as would become a disciple who had "sat in his corner," and learnt humbly from Mr. John Horner, of Mells, that there is much art in reaching what is best and choicest, and that it is well not to leave virtue without praise.

The prosperity of the later centuries led to the clearing away of a good deal of earlier work,—no doubt very meritorious,—which, if there had not been money enough and to spare, in the country of cloth and worsted, throughout the fourteenth and fifteenth centuries, might have remained for our delectation to-day. Of Norman the cathedral and the castle supply no stint, and there are fragments elsewhere. The naves of the cathedral, of Wymondham, and Binham, are linked together in one's imagination,—the treatment of the triforium and its relation to the ground-story being similar in each case. These naves met with diverse fates,—Wymondham is crowned by Perpendicular clearstories and covered with one of the noblest timber roofs ever designed. The nave at Norwich was covered by Bishop Lehart with stone vaulting in the middle of the fifteenth century, the wall-ribs starting at the level of the lowest caps, thus striking away part of its size from the Norman church. Binham was less fortunate than Wymondham, although that,—so far as the ground-story is concerned,—is sufficiently unhappy at present, the shafts being either cut away or buried in masses of accretion. At Binham, the aisles disappeared altogether from the plan, and clear-stories, triforia, and ground stories were all walled in; some windows in the ground-story affording the main lighting. Of the Transitional period, the antiquary with a hulimy for examples of that most interesting period of our art,—the period which Mr. Sharpe loved with such entire devotion,—must fain be content with mere morsels, such as the south doorway of the south aisle at Dereham, and the remains of the arcade not so long ago running along the Lower Close at Norwich,—now reduced to a column or two, but of much beauty, and brought to a red hue apparently by the action of fire on the stone. In the recent fire at Wells-by-the-Sea, the vestry doorway,—about the best thing in the church,—gained a peculiar red hue without being substantially injured. The beautiful, not-dissimilar colour of the very grand fifteenth-century Morley monument on the north of Hingham chancel suggests a similar origin, and might, indeed, justify an attempt to produce the colour artificially by the use of some moderate flame. To work in the manner of Ho-ti and Bo-ho would be too desperate an expedient,—with the sight of Wells in memory,—where all the woodwork was reduced to ashes, and the nave walls so shattered that complete rebuilding has been resorted to. The uncomely mouldings of badly-designed Perpendicular are being reproduced,—under compulsion,—by the architect, in every detail. The north transept at Bromholm Priory, an elegant design externally and internally, was really the most important work of Transitional date which came under notice,—work which has stood well for 700 years, and is clean and sharp in detail,—notwithstanding that the usage of it has not been too tender. Some protection for the tops of these walls, some reduction of the strong growths about the remains generally, would be well;—and a devotion of them all to mere existence apart from farmers' needs, might be urged upon Lord Kimberley, who owns them. The great gateway has a clever Late arch, with flint flushwork in the spandrels,—of course, a rarity in its way. Nor is Early English work plentiful. A country which holds West Walton, even in a corner of the Marshland, and a couple of miles from the border, must always stand its ground; and the detail at Binham is beyond cavil,—the lower stage of the west front being perfect,—except that there is no wall-space in it,—as indeed there is none anywhere in the façade. The refectory at Walsingham might well be joined with West Walton and Binham; but among the parish churches in this part of the country Early English work is as rare as Transitional.

Great Ellingham would be worth remark anywhere, as an example of pure Decorated work from end to end, and as an example of vigorous whitewashing of stone and wood work,—and Hingham and Old Walsingham would make up a very good series, running well on in the style. The Walsingham windows,—capital examples of flowing tracery,—are not the only parts of that sadly-neglected structure which fix it firmly in the memory; the arcades and tower arch are of fine bold design, also Curvilinear; and the church contains a most handsome array of rotting, mouldy, and dirty Perpendicular oak work, showing fertility and power in design, and a very noteworthy capacity of execution. Worstead, the most perfect of all the towers,—in general mass, in staging, in the proportion and detail of its openings, in the treatment of its buttresses, is Decorated, as the gentle reader knows well from his Brandon; and there are other portions of the church which belong to the time of change when tracery bars were beginning to stiffen into vertical lines. The wonderful modern angle pinnacles which, from near and far, do their best to destroy the outline of the tower, should be hauled off their posts forthwith, and their too liberal bulk reduced to comely proportions. The tower-top should be sought for a look-out over the well-cultivated and well-wooded district through which the Ant creeps, and towards the region of the Broads where the Bure loiters so lazily on his course. The little roadside chapel of Houghton-in-the-Dale would take its place near the Transition. Its blocked-up doorway, covered with auction bills,—a mullion of the three-light window missing, and all the signs of rude patching against wind and weather, hardly prepare one's mind for Murray's careful mention of "a richly-groined roof, lately restored." A rough floor, thrust in half-way up the walls, and a sight of the sky through displaced tiles on the battered timbers of the old roof, suggest satirical purpose in, or revelation from dreamland to, that painstaking writer.

When what Mr. Ruskin called so pleasantly (in the "Seven Lamps,"—but that was over five-and-twenty years ago,—perhaps he has reformed since then) "our detestable Perpendicular" is reached the difficulty is not to find examples, but to pick out a few churches from the crowd. Cawston, Salle, and St. Peter's Mancroft prevent anybody from feeling doubtful about the first three of them; a second three might be harder to pick out. These have fine dimensions, and there is nothing wanting in them,—no missing or uncompleted part externally or internally. This renders it unnecessary to look at once at the details, as so frequently happens where accident or mutilation has put unity, and the appearance of rounded completeness, out of the question. Sustained dignity at St. Peter's, spacious plan and varied outlines at Salle, are the first strong impressions, derived from looking round these churches,—not in a critical, but a purely receptive spirit;—which is, after all, the right way of getting at the result,—however necessary it may be to take thereafter a different course in order to penetrate the mystery, and know the means by which the result has been attained. At Cawston, it must be confessed, that the splendid nave roof is a little beyond its surroundings,—the majestic hammer-beam construction,—notable for its tier of winged angels standing on the ends of the much-projected beams,—would justify a more virile and a richer substructure. As, however, there are things about plans, continuous clear-stories, towers and their terminations, two-story porches and vestries, flint walling and flush work, roofs of all sorts, from tie-beamed to hammer-beamed (most of them in the "detestable" style), which have good right to be noted, the fact of the Cawston roof being "a feature" may pass with a caution. Of the chancel and tower screens, fonts and font-covers, stalls, benches, and desks, brasses, lecterns, and other metal work, and the decorative painting, it would also not be difficult to make recital; for notwithstanding the conscientious exertions of Dowsing in Norfolk, a perfectly clean sweep was not made of all the "scandalous" work out of the churches, and the worthy William Dowsing would have been shocked at the "angels and cherubims," the pictures and the covers of fonts which, if his active mind and hand had wrought reformation thereabouts would have been "taken down." In a well-known book catalogue our old friend "Dowsing (William) of Hull," and of "The Timber Merchant's and Builder's Companion," is thus localised in order that he may be clearly marked off as a different person from the "William Dowsing (of Stratford)," who, by the simple expedient of keeping a diary, has already won the affectionate esteem of four or five generations of his countrymen.

East Barsham, without Renaissance feeling, and Snoring, a very similar work, with the slightest touch of it, might stand for examples of good Tudor; and the remarkable structure on the south side of the nave, near the altar, at Wymondham, should be compared with the

tomb in the north aisle of the chancel of St. George's, Colegate, which may have been worked by the same workmen, who *may* have been Italian workmen employed at Ely (or elsewhere), as Mr. Petit suggested. The cenotaph, now in the south aisle of the nave at Blickling, a work of the later half of the sixteenth century, with much exquisite detail in it, might form a third example in this rare class. The Paston monument at North Walsham, the Suckling (father and mother of the poet) monuments at St. Andrew's, Norwich, the Sidney monument at New Walsingham, are all three fair bits of Stuart work,—the Suckling monument perhaps the most characteristic; but they are trifles when measured with Blickling. The north, east, and entrance sides of the moated, red-brick house look,—barring the clock-tower,—as if they had suffered no important changes since their completion at the end of the first quarter of the seventeenth century. The bold modelling of the façades, especially of the east front,—strong projections, well-marked horizontal lines, many gables, much piercing of wall surface, neutralised by the unpierced walls in the ogee-capped angle towers,—these are some of the features which, with others without and within, supply the examples we are seeking for,—examples of the application of the principles of our art in different times, and by widely different minds, but the principles themselves unchanged amid all changes of detail,—unchanged though the resulting expression may vary from severity, or even sternness, to the air of lettered ease, of smiling content, which makes Blickling so suitable to finish off with,—so pleasant a thing to see and to remember.

THE BRUSSELS EXHIBITION OF 1880.

Now that the fêtes by which Belgium has commemorated the fiftieth anniversary of her independence from Dutch rule are over, the flags being pulled down, the triumphal arches demolished, and the pretty garlands and wreaths ruthlessly torn down, Brussels is returning to its familiar aspect of sober industrious gaiety, and the visitors who still crowd the city at last have time to devote their attention more specially to the Exhibition, and the marvels it contains,—marvels truly, for in this small country have been exercised, as they still are, some of the most characteristic and most refined of the great industries of the past and the present, and there is gathered together in this Exhibition as complete a collection of these industries as it is possible to imagine. A purely national exhibition, it forms thus a marked contrast both in completeness and in unity, with the large and cumbersome world's shows to which we have been accustomed within the last generation.

The Exhibition buildings occupy the site of the old Champ de Mars, a dreary sandy waste some distance from the city, and which those who know Brussels will recollect rarely to have visited except on the occasion of a review or the annual races; here the Exhibition has been skilfully laid out, and surrounded with a belt of greenery and artificial water. Needless to describe the excellent plan of the Exhibition, to which a notice has already been devoted in these pages, together with a view of the section occupied by the Art Industries of the past and one of the central portico.* This pavilion is situated on the left of that erected in honour of the Industrial Arts, on the right of which lies the pavilion of the modern art industries, and behind all this stretches the larger portion of the Exhibition, the machinery in motion and the general agglomeration of industries which always form so important a feature in modern exhibitions.

For the first time, the industrious little kingdom of Belgium, with a population which barely surpasses that of our own gigantic metropolis, shows to the world in a really complete manner the true character of the modern national industries which have succeeded to the busy activity of its past commercial fame. Unlike Italy, whose Middle-age and Renaissance history and commercial development close for it the period of its prosperity, in Belgium the glowing traditions of the past are still alive, and promise a brilliant future. Side by side may be seen here the productions of its artists and its workmen in the days gone by and in the present; and few countries, if any, can stand this comparison so satisfactorily as Belgium. If it has not now the equals of the great artists who have enriched with their names the golden book of the history of art, she has more than one honest workman whose name merits to be placed alongside of that too long list of unknown, unappreciated labourers who toiled so sturdily to build up the edifice of our modern civilisation and its thousand traditions dead and living.

A peculiarly interesting and instructive feature of this exhibition is the essentially national character of the whole show, a feature carried out as far as possible in the exhibits which fill the large section devoted to the Retrospective Industrial Arts. In this pavilion, to which we will first devote our attention, has been gathered together such a collection of national productions as probably no other country, save Italy,—that still unexhausted though so well worked mine of artistic marvels,—could hope to show to the world. Bewildering in the richness, the rarity, and, above all, in the number of the exhibits that fill the nave and the side aisles of this position, it is calculated somewhat to daunt one's descriptive powers to mention even a tithe of what meets the eye in a rapid walk through this section. More lengthy inspection reveals a still larger number of treasures, the enumeration of the more important of which would suffice to fill more space than is at our disposal.

From the opening years of the Christian era down to the close of the last century, the whole history of industrial art may be traced with ease; for Belgium, let it be remembered, entered early into the field of artistic production; and throughout the numerous vicissitudes that this interesting corner of Europe,—so constantly the battle-field of rival nations that it has not unjustly been termed "the cock-pit of Enrope,"—has passed, this early precedence has stamped indelibly with a special character the art productions of Belgium, and this character the excellent means adopted by the Government in their modern system of industrial and art education promises still to favour.

With all these treasures, to be counted literally by thousands, gathered around us, one is lost in amazement at the consciousness of the many thousand others that exist no longer, that are scattered over the world, that are reposing in the various museums throughout the country or in the hands of other private collectors than those who have helped so liberally to form this Exhibition; but it is not alone these that have come forward,—the churches and religious establishments, the various archæological societies of Belgium, and the corporations and educational establishments, have all aided. Those who remember the Manchester Exhibition of 1857, to which the various colleges and corporations contributed so generously their treasures, will have some conception of the nature of the collection which the Pavilion of Retrospective Art shows to the public.

It was a happy idea this, the religious communities and the corporations coming forward to make known the artistic glory of the country; for it remains one of the reasons for the exceptional interest and splendour of the Belgian art industries of the past, the patronage afforded by the Church, and especially by the corporations, to the famous artists, and less known, but no less artistic, workmen who found in the Court, the cloister, and the town-hall that encouragement without which could never have been produced the marvels that time has transmitted so jealously to our care.

The wonderful productions of the Flemish looms that in the past were prized so highly are displayed here in a gorgeous collection of tapestry of every style and period. Nearly two hundred important pieces ornament, in their decorative, sober brilliancy and speaking suggestiveness, the walls and rooms of the Retrospective Art Section, each piece a history in itself, and which might afford matter for columns of instructive inquiry. These products of the Flemish looms stand, of course, foremost among the great art-industries of Belgium.

Among the tapestries, those lent by the King of Spain possess a special interest, not alone for their beauty, but for the historical associations with which they are connected. These royal treasures, five in number, woven in silk and gold from cartoons in the school of Roger van der Weyden, were, tradition states, purchased early in the sixteenth century by the aunt of Charles V., Marguerite of Austria, from Pierre de Pannemacker, the renowned tapestry-weaver, and often must the worthy Princess have visited the old workman's home at Brussels, in the Craenstraat, to watch the slow but certain progress of the work on the loom, as one by one the numberless figures which tell each its Biblical tale, were created under the hand of the skilful weaver. Well may these pieces of tapestry he preserved and regarded at Madrid as the pearl of the Spanish treasury. Time has respected their beauty and toned them with a loving hand which has enhanced their brilliant sobriety. But, in the midst of numerous other marvels of the Brussels and Flemish looms, even these "pearls" lose a portion of their interest, surrounded as they are by so many other works of the fifteenth, sixteenth, and succeeding centuries, not alone contributed by Belgium, but by foreign collections, among which let us not forget to mention the numerous loans on the part of the English ambassador, Sir J. Savile Lumley,* and the South Kensington Museum,—authorities who, in addition to several choice specimens of tapestry, have filled a whole room with well-chosen objects made in, or relating to, the Low Countries.

Here, in lines, hang tapestry after tapestry,—tapestries by Karel van Mander, tapestries by Jan Raes, the younger; tapestries by Jan de Kuipper, by Marc de Vas, by the Leyniers, of Brussels, by De Pannemacker, Van Leefdael, by Van den Hecke, from their now silent looms in the old Rue Haute; by Van der Borght, by Christoffel de Roveere, from designs by Raffaelle, by Rubens, by Teniers, and many other artists; from the busy workshops of Brussels, of Arras, of Tournai, of Ypres, of Antwerp, of Oudenarde, of Ghent, of Bruges, of St. Trond, and Enghien; subjects religious historical, mythological, allegorical, and symbolic, in *haute-lisse* and *basse-lisse*,† suggestive of lengthy description, and worthy the closest attention. Each of the 184 tapestries exhibited is a history in itself,—an open book for all to read,—telling of morality, of patience, of honest work, of past manners, past costume, and past traditions. Belgium is the land of tapestry, and here are shown some of the marvels of her world-famed looms, closed only in the last century, when fashion, with its inexorable laws, ceased to demand, for decorative purposes, the suggestive aid of tapestry. The last of the Van der Borghts died in 1794, and with him is closed the history of the honest artisans who bore so high the reputation of the Low Countries. The art, thanks to the efforts of a few people of taste, as can be seen here, promises to be revived, but never can we hope to see again produced such splendours as those of the busy looms in the days gone by.

But thousands literally of other treasures await a mention, though collective mention alone can be accorded them. Wonders of the patient embroiderer's lovely art, pictures painted with the needle, as the Classics termed embroidery,—works produced in days before the art had become a trade; gorgeous chasubles and religious vestments thick with gold thread and delicate coloured silks, brilliant as the pages of an illuminated missal, but toned down by age; brought forth from the safe-keeping of generations in the silent sacristies of the cathedrals and the churches for which, four and five centuries ago, they were designed and executed so lovingly by patient fingers and the minute point of the needle.

Specimens of the metal-worker's art by thousands, in gold, in silver, in iron, in pewter, in copper, and in brass, executed for the princely corporations which ruled Belgium in the past; vast hanaps and loving-cups, goblets innumerable, and solid candlesticks, which decorated so effectively their monumental "dressers" and sideboards, and their solid banqueting-tables, too stout to groan even under the weight of viands and of plate crowded on their generous expanse; maces, badges of office, "collars" and every species of insignia worn by the officials and servants on state occasions;—all are shown here in profusion, from many a famous city of the Low Countries, whose history stands noted in the great struggles which Motley has described so glowingly.

Such is the wealth and completeness of the show that it is possible with care to examine each branch of industry that was exercised in the industrious provinces of this little country.

Particularly in the metal-worker's art the

* See *Builder*, vol. xxxviii., p. 777.

* Whose "Teniers" tapestries are similar to the splendid series owned by Mr. Beresford Hope, and which adorn his drawing-room at Bedgbury.

† See *Builder*, 1876. Exhibition, Union Centrale, *haute* and *basse lisse* described.

Belgians have shown that they take a very high place. What the treasuriee of the cathedrals and churches of Europe owe to the Flemish goldsmithe is incalculable, and rich and rare are the specimens contributed here by the cathedral churches for which so many centuries ago these works were produced. Shelf after shelf exhibits chalices of the choicest kind, fashioned with a depth of religious faith that betokens strangely the difference of the spirit that animated the workmen of the past and of the present; such work as that of Brother Hugo, exquisite in that delicacy and beauty so peculiar to the early portion of the thirteenth century. More than one work by that perfect artist is here exhibited; particularly two reliquaries, parcel-gilt and enamelled, and a choicer treasure still, the cover of an evangelary, gorgeous in its glow of finely-wrought metal and *niello*, and scarcely less precious stones, among which, as usual, it is easy to distinguish more than one production of pagan art. What other treasures are exhibited in the shape of croziers, pyxes, reliquaries, shrines, crosses, monstrances, diptychs, triptychs, episcopal rings, "baisere de paix," holy-water pots, altar-bells and candlesticks, lanterns, basins, &c., may be more easily collectively mentioned than described as they each and all merit. From the earliest and choicest periods down to the more familiar Renaissance there are to be seen here specimens of the religious metal-worker's art, contributed by numerous collectors, and not a few of the recent gems from the cathedrals and monastic establishments for which they were designed. The chiselers of Flanders merit, indeed, the reputation they long have borne not alone as artists, but as honest workmen.

In a more homely branch of the metal-worker's art, the superiority of the Flemish casters and chiseliers in brass and copper is even more widely known; and to what varied uses this effective art was carried may be judged by the very large number of specimens of this work that may be seen here. Baptismal fonts, altar-railings, lecterns,—a number of these latter belonging to the fifteenth century, forming a conspicuous feature in the chief aisle of the Exhibition,—lamps, chandeliers, chafing-dishes, *couvres feu*, or curfews, mortars, for domestic and chemical uses, and of which there are here several hundred choice specimens of all sizes, and *raffraichissoirs*, those very characteristic wine-coolers that in the Flemish feasting-pictures of the seventeenth century form so conspicuous a feature in the foreground, and which we see used, if we are not mistaken, in Hogarth's drinking scene at the Rose tavern. This work has received, from the industrious town the head-quarters of the industry, Dinant, on the Meuse,—one of Turner's sketches shows us a charming view of the old place with Vauban's fortifications on the heights above,—the name, familiar to all collectors of "Dinanderies," signifying objects in brass or copper, cast or punched with the hammer (*repoussé*). How old this interesting branch of trade is may be judged from the fact that mention is made of it in the eleventh century, but there now remain few objects of an earlier date than the fifteenth century, when the destruction of the industrial rival of Dinant, the town of Bouvignes, gave a fresh impetus to an essentially useful branch of trade; work produced before this period is known to exist, and the names of more than one skilful artisan are now placed beyond the possibility of that oblivion that has overtaken too many of the art-workers of the past.

Nor is Belgium behind other countries in the production of objects in pewter, a base metal which the work of the Renaissance artists has made almost worth its weight in gold; and numerous are the delicate ewers and plates, corporation cups, and cast and chiselled plaques that are exhibited here, and which completes a beauty the exquisite work produced contemporaneously in France by François Briot, with whom Gaspar Enderlein may be fairly compared.

What noble metal-workers the Flemings of the past were is admirably shown in this Exhibition, and almost countless are the specimens of the productions of the united aid of the anvil and the file,—a useful, but dangerous tool that in the hands of the unskilful workman does so much injury,—confined not to the coarse objects familiar in other countries, but to the most delicate usages of refined existence; exquisite little boxes, locks, keys, hinges, knockers, fire-dogs, fire-plates, weather-cocks, railings, and what not, in which last somewhat vague category may be mentioned a frame for a Venetian mirror; here it is not alone the wonderful foliage and flowers and scrolls which the seventeenth and eighteenth centuries have left to surprise us, but thirteenth, fourteenth, fifteenth, and sixteenth century work, far bolder, freer, and nobler in design, and more deserving the imitative or rather emulative admiration of the modern workman than what the French and English at present too often take as models. As we shall see, in considering the modern industrial art section, the Belgians have not yet lost the secrets of the metal-workers' art.

As wood-carvers the Flemings have long borne a high reputation, which is well enforced by the collection of works exhibited here. It is always interesting to see the wonderful minuteness of the altar-screens, with their numerous figures so carefully costumed, which the carvers of the fifteenth and sixteenth centuries produced; the statues, the crucifixes, the credence-tables, the rood-screens, the "dressers," cabinets, coffers, trunks, tables, seats, and innumerable other pieces of civil and religious furniture, small architectural marvels, which, during the Middle Ages and the Renaissance, were untiringly produced in every town throughout Flanders and Brabant. This, again, is a branch of industry which is still far from being extinct in Belgium.

As for the Belgian sculptors, with whom the wood-carvers were so closely connected, their names stand written in golden letters on the scroll of the history of art, in which they have taken so conspicuous a place. To enumerate their names would occupy more space than is at present at our disposal; but by the thoughtful foresight of the Government, a superb collection of photographs of all these great works of Belgian sculptors scattered over Europe is shown in a series of turning cases, while full-sized casts of some of the more famous serve to effectively adorn the central aisle of the pavilion, in the centre of which rises conspicuously, more than 50 ft. in the air, the tabernacle of Léau. A puzzle of superposed niches and statuettes, it is one of those marvellous works of the Renaissance which, in the midst of their apparent confusion and prodigality of ornament, still preserve the character of grandeur which so frequently will be found to be wanting when the same effect is sought in more modern work. Truly Cornelius de Vriendt,—the brother of the better-known painter, Frans Floris,—surpassed himself in this beautiful tabernacle, which the Government have done well to place in the centre of the Retrospective Art Section; but recognition has been long in coming to the worthy Cornelius. A generation ago, if we mistake not, the name of the artist of this wonderful tabernacle was unknown, and local antiquaries attributed the work to some Italian artist.

Together with this superb monument there are a number of other casts; but none, unfortunately, catalogued or labelled, a fault, by the way, to be found with very much that is exposed here. In the Retrospective Art Section only a comparatively small portion of the objects has been as yet catalogued, while none are labelled; and without a catalogue even the experienced expert resembles not a little the competent captain at sea without chart, sextant, or chronometer. He may, by the aid of his log and compass, steer his way to land, but only under severe disadvantages. Why should it not be obligatory that owners should label every object they lend to exhibitions? They would then take upon themselves entirely that responsibility which the authorities are always so careful to have transferred from their shoulders, the public would gain immensely, and let it be remarked that the sale of the catalogues would not suffer, as such catalogues as these are purchased quite as much as books for future reference as *vade-mecums* during the exhibition. The want of a complete catalogue a few weeks before the close of the exhibition is an inexcusable omission.

This want in the case of such objects as casts of well-known monuments is, of course, with the initiated, but little felt, and it is easy to recognise such familiar works as the "Cheminée du Franc" at Bruges, the altar-screen of Hœckendover, and such superb works as the tombs of Charles the Rash and Marie of Burgundy from the church of Notre Dame at Bruges, or the stalls at Vilvorde, with several others equally famous, here to be seen; but among the smaller objects the absence of catalogue or label is deplorable, the more so as, in the extraordinary variety of the objects exhibited, no rigorous order has been observed. All is well arranged, it is true, but not with that methodical exactness that makes the museum of the Porte de Halle one of the gems of Brussels, a perfect encyclopædia of the art of the past. The general effect is certainly admirable, the tapestries lining the upper walls of the central aisle, itself occupied by the furniture and larger exhibits, and in the central portion of which stands a pavilion, where is shown as choice a collection of lace as perhaps, since the South Kensington Exhibition of a few years ago, has ever been gathered together. It would require, indeed, the learning of a Mrs. Bury Palliser to guide one's way, unaided as one is by catalogue or label, through the cases of Point de Flandres, of Alençon, "point" from Lille, from Brussels, from Dinant, from Bruges, from Mechlin, from Antwerp, and all the other "points" for which Flanders and Brabant are so famed, and with which our own Honiton or Bedfordshire, Lyme Regis or Devonshire, lace, some specimens of which are to be seen here, would find it difficult to compete in beauty. All the laces are here,—Italian guipure, lace from Valenciennes, from Paris, from Venice, from Holland, from Spain, from Zante, from Sweden, and from many a quiet hive of industry which the uninitiated wot not of. The cases containing a collection of embroidery, which are in this same lace pavilion, are even more bewildering in their beauty; while the various other cases, containing a priceless number of knick-knacks, snuff-boxes, watches, chains, charms, brooches, &c., all aid in transporting the spectator back, in illusion, to the strange days in which all this refined beauty was produced, and in use contemporaneously with a style of existence from which even the poorest of the present day would revolt.

Flanking the principal aisle of the Retrospective Art Pavilion are the side-aisles, from which branch out a number of recesses,—side-chapels, to continue the figure,—in each of which the cases contain the smaller objects and choice collections; musical instruments, continued by a still choicer collection of national pottery, porcelain, and faïence from Brussels, from Tervueren, from Bruges, and from Antwerp, and of which so little as yet is known; an interesting gathering of costumes, chiefly, however, of the last century; a collection of specimens of "Grès de Flandres," and the various other exhibits to which we have already devoted a collective notice, but among which we have neglected several features.

Foremost among these comes the enameller's art, which is here, perhaps, as richly represented as it has ever been before. From the early days when the artists and the workmen still came from the East and Byzantium, through the times when the art is purely national, down to its decadence, the choice art of the enameller can be traced. Among the other as yet unmentioned art-industries, let us not forget the glass, the productions in which might easily be, as they have often been, confounded with the finest works of Murano, and the existence of the manufacture of which in Belgium was, till within a short time since, entirely unknown. As for the stained glass, this hurried mention must suffice.

But not here does the simple enumeration stop. The numismatist will find a bewildering collection of coins from all the towns of Belgium, tokens, and medals, among which the work of Jonghelinck, of Conrad Bloc, of Varin, of Duvivier, and the Rottiers show how high Belgium has stood in this noble branch of art, the tradition of which she keeps alive in the work of the Wieners. A rare collection of several hundred fans range their butterfly-like coloured wings in a serious of cases that would excite the admiration of the sternest puritan, as it would the cupidity of the most honest dealer to see the choice collection of silver plate, so much of which is in the purest "Queen Anne" style, and worth a trifle more than the regulation 4s. 6d. an ounce.

The bibliophile has his eyes and mind feasted with a collection of the choicest printed books which Belgium has produced since the learned philologist Thierri Martens, the friend of Erasmus and of More, published at Alost, in 1473,—that is, about thirty years after the invention of printing, — his *Speculum Conversionis*; while among the MSS. will be found some of the rarest monuments of the caligraphist's and the illuminator's delicate art, in which Belgium, in the days that preceded printing, excelled. The libraries of the kingdom have been laid heavily

under roqnisition, and the collection of MSS. is one of the most complete,—as a national collection,—that has perhaps ever heen made. Here from a sheet of parchment, twelve hundred years old,—portion, doubtless, of an evangel written hy one of the earliest missionaries in the country, or one of the first Christians in the north of Ganl,—down to the last expiring efforts of the illuminator's art, which died a slow death, through the various periods of its existence, where it is diffionlt to say in which it most excelled, whether in the Dark Ages, in the thirteenth century, or the Renaissance, can he traced the whole history of the manuscript which led the way so nobly to the introduction of the art of painting and the invention of printing, and opened thns the great era of modern history and modern art.

MORE LIGHT ON THE LAW OF LIGHT AND AIR.

In commenting the other day on the case of The Ecclesiastical Commissioners *v.* Kino, which, as our readers may remember, was a case of much importance in regard to this question, we observed that perhaps no subject was so prolific of litigation as this. That within a short time of our remarks on the decision in The Ecclesiastical Commissioners *v.* Kino we should again have to touch on another important case shows once more how fruitful this subject is of lawsuits, and how carefully those who are interested in it should take note of the important decisions which from time to time are given in the courts of law. The name of the case, which again throws more light on the law of light and air, is that of Fowler *v.* Walker (49 *Law Journal*, Chancery Division, p. 598), and is a decision of Vice-Chancellor Bacon.

We suppose we may fairly assume that our readers are aware that when an ancient light is proved to have existed the opening a new window or the enlargement of an old one in the wall of the honse does not take away the right to the light which has been gained hy grant or prescription. In other words, the right to the entry of light into a window of a certain size is not lost hy that window being enlarged. That is a proposition which was once and for all settled hy the case of Aynsley *v.* Glover (44 *Law Journal* Reports, Chancery, p. 523) decided hy the Court of Appeal, or the Lords Justices as they were then termed, in the spring of the year 1875. Taking this hasis as settled, we now come to an important practical point which is a necessary conseqnence of this decision, and that is that when a new building is erected npon the site of that which coutained the ancient lights, the positiou of those lights must be proved in the most clear and undoubted manner hefore a court of law will give any relief to a man who claims the right to have such lights. This is, in effect, the result of the case of Fowler *v.* Walker, one which, we think, may fairly be considered of much use in showing that nothing less than clear evidence of position can assist a person who wishes to restrain anotber from building on the grouud that be is injuring ancient lights which are incorporated in a new building. At the present day, too, the simple point is one of perhaps unusnal importance, because not only in London, but in all our large provincial towns, old buildings are being continually replaced hy new ones. For years to come this change of structure is certain to continue.

By describing very shortly the facts of the present case, the example will be most noticeahle and usefnl.

It is sufficient to say that the buildings of the plaintiff were warehouses and offices in Liverpool, and that prior to 1868 the site of these premises was occupied by three cottages, ahout 25 ft. high, each cottage having three stories, each story having one small window, which was admitted to be an ancient light. Various improvements went on near tbese premises, until the defeudants came to pulling down some old buildings close to the site of the plaintiffs' warehouses and building thereon a new structure, the erection of which the plaintiffs claimed to restrain. The allegation of the plaintiffs in support of their claim was that their new wiudows were in part coincidental with the old windows in the cottages. This, as we have seen from the basis which we have assnmed, was a perfectly good claim, if, and if only, it was showu by clear evidence that the position of the ancient lights remained intact. Let ns see, then, how the plaintiffs supported their contention,—a part of the subject of great practical importance, as we have already said. According to a plan prepared by a surveyor, it appeared that the new wiudows contained parts of the old windows. The plan, however, was only made from the recollection of the snrveyor who superintended the pulling-down of the cottages and the erection of the new buildings in 1868, and from such information as he could get from persons who were acquainted with the place. This evidence was somewhat roughly dealt with in the judgment; for, said the Vice-Chancellor, "the surveyor and architect who pulled down the house and built a new one says that he has no knowledge of it (the ancient light), except a vague recollection; but he has invented a drawing, describing the position of the façade as it now stands, and he has described the particular positiou of the windows which he says were there; and his reason for saying that is, that he has collected the information from persons who could tell him where they were." Then the judge goes on to commeut on the other evidence in words which are perhaps best transcribed *literatim et verbatim* from the judgment, as they are not wholly without humour. "The other evidence npon the subject is that of three old women who were some of the inhabitants of those cottages, one or two of whom had made waistcoats or practised as a seamstress, and one of whom said that there was light enough in the windows as they existed to enable her to make waistcoats or sew something else. That is the way this case is hronght forward, and that is what I have to deal with, and I am without a particle of evidence as to the position of those windows." Then he proceeds to say that he cannot rely on the imaginary plan, and that the evidence of the tbree old women was quite insufficient.

Therefore the rule may be deduced from this judgment that the position and the existence of ancient lights in a former building must be proved hy evidence of the clearest kind. It may be said that if the right claimed in this present case actually existed, it was a hardship on the olaimant that he did not obtain the relief which he sought. But, on the other hand, it is clear that if persons actually possess valuable rights, they shonld take care in any change of structure to keep something of a memorial of their existence. As Vice-Chancellor Bacon pertinently remarked, "What reason, I have asked myself several times, could induce the plaintiffs when they acquired the site upon which those cottages stood, and had in contemplation the building of a very large structure in place of them, not to preserve evidence of this most important fact? Why did they not take some means of preserving them?" The moral to be drawu farther from these remarks of the judge, as well as from the facts of the case, plainly is, that when a building in which are ancient lights is demolished, plans and views of it should he made in which the position of these lights is clearly apparent. Then it is possible to place the windows of the new building so that they can without any donbt at all take the place of tbe old lights. And if litigation should unfortunately occur in reference to the new structure, the architect and his plan of the old building can show the position of the former lights, which can, of course, be compared with the new structure. In fact, the surveyor in the present instance locked the door after the horse was stolen, as the saying goes; for, if instead of making a drawing some years after the cottages were pulled down, and in view of the approaching trial, he had made a plan when the cottages were demolished, it might have had a very material effect on the trial. This case of Fowler *v.* Walker should, therefore, he laid to heart by every architect and surveyor in the kingdom.

The Proposed New Bridge at Battersea. The question of the most suitable site for the new hridge which is to replace the present dilapidated structure at Battersea is being discussed hy the local authorities on both sides of the river. It is believed that Sir Joseph Bazalgette at present intends to recommend the erection of the new bridge by the side of the old one, and to take down some forty houses on the Surrey side to open up an approach; hut the Battersea Commercial Club (representing the tradesmen and ratepayers of Old Battersea) has resolved npon memoralising the Metropolitan Board of Works in favour of a site higher up the river, in a line with Cremorne on one side and with Battersea-square on the otber. A new steam-boat pier is about to be erected here at this point in the river.

ON THE EDUCATION OF THE PERCEPTIVE FACULTIES IN ART.

Startling as it is to be told of a newly remarked, or a neglected faculty, a serious study of which "is one of the many pressing *desiderata* in the new science of edncation," the remark comes from a source which deserves at least respectful attention. There are few writers or thinkers who have attempted more systematically to carry tbe methods of exact science beyond the limits of that which is commonly known thau Mr. Francis Galton. If it he said that such matters as "Statistics of mental imagery," or "visualised nnmbers," or "psychometric experiments," are matters that come rather within the domain of fancy than within that of fact, it must be replied that it is on the fringe or border-land of solid fact that the chief advance of humau knowledge is to be anticipated. The engineer who, by imparting a judicious direction to the known action of flood and river drainage, wins a new province from the sea, may be said to be always paddling in marshes. But swampy and subject to constant overflow as was the area of his labours when he commenced them, he has handed it over to the farmer, as arable land, at their close. Hence the fact that a writer bas been the first to treat what was regarded as shadowy and vague with a method yielding precise results must make him to be regarded as one of the most valuable pioneers of the march of knowledge.

We cannot speak of the new observations submitted by Mr. Galton to the British Association, and referred to, rather than stated, in the September number of a monthly magazine, with all the distinctness that we could wish, in the absence of any account of the questions put, the replies collected, or the general hasis of facts, on the collection of which the writer relies. With much that Mr. Galton remarks we fully concur. And if we fail to do so with the paper as a whole, it may probably be due to the fact of his having introduced it to the world in the ephemeral condition fitted for the pages of a magazine, instead of in that more serious literary form which its importance may prove to deserve.

The subject of which the paper treats is the mode in which some persons "perceive past scenes with a distinctness and an appearance of reality that differ little from actnal vision." But connected with this faculty or habit (which alone is of great interest to observers) is mentioned something very different. "Others," says Mr. Galton, "have a complete mastery over these mental images. They can call up the figure of a friend, and make it sit on a chair or stand np at will; they can make it turn round and attitudinise in any way, as hy mounting it on a hycicle or compelling it to perform gymnastic feats on a trapeze." And yet, a little further on, we are told, "It is a mistake to suppose that a powerful exercise of the will can vivify a faint image." A little further consideration will probably explain statements which at the first hlush are thus contradictory.

The fact is, that the phenomena referred to by Mr. Galton are of two, or rather of three, distinct genera, however closely they may be allied. The first, as to which alone the paper at its outset proposed to treat, are acts of the memory. This faculty is of especial service to the artist. We see the outcome in art hy the constant repetition of the same type to represent the same idea. Thus one modern artist whom we might name appears to have made his first acquaintance with certain animal forms in museums. Whenever these animals occur in his compositions they seem to he stuffed. Other animals, probably first known by him as alive, display all the variety proper to life and motion.

This power of memory is not confined to the sight. It appertains to every sense. In proportion as one or other sense is more fully developed, its memory will be more vivid. And early impressions, especially those of childhood, will generally he most vivid. This is naturally to be expected, first because of the greater impressibility of the sensorium in yonth; secondly because of the comparatively few impressions produced in earlier years; thirdly, because of the repeated strengthening of the particular memories by repeated recalls to the attention. No doubt this vividness of memory, which differs to an extraordinary degree in different persons, is susceptible of culture. No douht, on the other hand, that the usual course of educatiou, and also the advance of life, apart froce special education, tend to dim the force of

the impression. And especially when aide to memory, ench as writing or drawing, are nsed, the hold of the mind on the past is relaxed, and forgetfulness ensues.

It ie thus quite intelligible how it is the case tbat in savage life, or among nncnltivated people, the vivid presentation of the memory, wbether of form, of colour, of sound, of sequence, or of any other pbenomenal relation, may have a reality which, to the ordinarily tanght member of a highly-civilised community, is almost inconceivable.

Quite different from this faculty of memory are "tbe visions and hallucinations that flasb into view without any connexion with the subject of conscious thought." On this branch of the question Mr. Geltou defers remark. It is one, however, of perhaps even more direct interest to the artist than the power to recall picturee of tbe past, from which it is totally distinct. As far as our own acquaintance with thie faculty goes, its action is capricious and unaccounttable. Excepting in early childhood, ite most vivid ocourrence (as far as our testimony bears ns out) is when the body is jnst sinking into sleep. Quiet and composed, and yet, ae one would say, broad awake, the recipient of tbese visione is only made aware thet sleep is at hand by the opening of the theatre of the imagination. Landscapes, faces, figures, gronps, never before seen or imagined, then pass before the perception with the reality of objective vision. This subject has been but little studied, but in the study there appears to us to lie the clue to discoveries of no slight importance.

Distinct, agein, from this fleeting and unconscious vision, ie the rare power of calling up visione at will. It is probable that the latter is a more advanced, or perhaps a cultivated, form of the former faculty. But the command is more or less imperfect. The most remarkahle instance of tbe possession of such a power of which we have any acoount is that of the painter Blake. He saw things invisible to other eyes. To him an angel on a tree was as visible as the tree itself. How far he was the master and how far the servant of this imeginative vision we are unaware. The power of compelling visions of thie nature is akin to that possessed by some persons of recalling or continuing a dream. In fact, the whole of tbese phenomena are so akin to those of true dreaming, that the term "waking dreems" is very properly applied to them.

With regard to the cultivation of the imaginetive faculty, from whicb Mr. Galton expects eo much, we do not doubt that it is possible. But we hold that, to any merked extent, it is only possible at the expense of some other faculty of the mind. If we take the case of a well-developed and healthy child, there is a certain unknown maximum of power to which it is possible that, under the most favonrable circumstances, that child might attain in body and mind. But tbe conditions oau never be altogether the most favourable. The education will never, in the present state of the world, be perfectly and evenly balanced. The more vigorous faculties will naturally grow at the expense of the less vigorous. Aud if special attention be given to the education of one, it will probably he effected at more than a compensatory starving of otbers. Thus a cereful and studied development of tbe "visualising faculties" would be likely to tend to what is called wool-gathering.

In tbe method of M. Lecoq de Boisbeudren, for the education of the picturesque, or rather of the pictorial memory, cited hy Mr. Galton, we think this danger ie avoided. The method of the teacher is that of strengthening the perceptive power, and thus implicitly strengthening the memory. He teacbes his pupils how to observe, aud then repeats the observation till the image is photographed on the hrain. It may be the case that what Mr. Galton calls the muscular memory comes in aid, bnt tbat is, to our view, a minor consideration. If a pupil is made to define in the air tbe outline of a figure, by bringing the point of tbe peucil, at a given stretch of arm, along the outline as seen by one eye—the other being closed—he will have a more distinct conception of the figure than if he has not thus successively noted each detail. If this operation be repeated, his conception of the figure will become more accnrate and more vivid. So, more or less, will be his memory. If this process be repeated from several points of view, a stereoscopic conception will be formed, and a stereoscopic image will be presented to bis imagination. Tbe education of the memory is here not directly attempted, but will be a necessary result of the education of the perceptive attention.

We hope that Mr. Galton will give the world tbe benefit of his observations and deductions therefrom in a complete and permanent form. Witbout attempting now to offer any opinion on the long-vexed question of distinct faculties of the mind (ae contrasted with distinct operations of the whole mind) we think that there can be no heeitation in admitting the fact tbat the strength of memory in any particular person is proportioned to the power and exercise of attention. When one person has a memory for form and anotber for colour, the first sees the forms and the second the colonrs more distinctly than the other, either beoause snch is the natural bent and balance of hie unconscious observation, or beceuse he takes more pleasure in one order of phenomena than in the other. For cultivating the visual memory, the first thing, then, is to cultivate the power of perception, and this is to be done by some snch methods as that of M. de Boisbaudran. The second rule we take to be not to commit tbe sketch to paper. It is true that the act of sketching may be a fresh exercise of the perception. Bnt we think there is no doubt that memory relaxes her hold from the moment that the mind is aware of the committal of observation to record.

THE GREAT HOSPITAL, MADRID.

CHURRIGUERESQUE ARCHITECTURE.

An enthusiastic young student (long may his enthsiasm last, for it will lighten and brighten while it endnres) who expresses his obligations to the *Builder* in language so fresh and unguarded that it ie quite delightful, asks us to tell him what Cburrigueresque Arohitecture ie. As a rule we do not answer questions that may at once be replied to by turning to a book. And, in this case, if the ardent querist had consulted Ford's "Handbook of Spain," part ii., or teken down the ever-useful Fergusson, and looked at his chapter on Spanish architecture, in the fourtb volume of the "History," his thirst for knowledge on this particular point would at once have been appeased. It happens, however, that we have ready for nse a view of a very well-known building in Madrid, which is an example of this awkwardly-called style, the façade of the San Fernando Hospital, and this we pnblish in onr present issue. We have, in recent volumes, given illustretions of some of the splendid Mediæval buildings whicb are to be found in little-visited Spain,—illnstrations which appear to have afforded infinite pleasure to, at any rate, a section of our readers, and it is desirable thet they should eee what sbape architecture took in that country when the Renaissance ran wild. The earlier works of this period were for the most part cold and academic, but in the seventeenth century reactiou took place, and the utmost extravagance in design was indulged in. From the name of the chief architect of the period,—some call him the chief culprit,—these works fell under the title "Churrigneresque," and may be said to be included between the years 1650 and 1750. The architect of tbe façade we have illustrated was, we believe, Pedro Ribera (abont 1726), who did many extravagant things, but few more so than this. Still, it bas its teachings.

Workmen's Diseasee.—As a set-off against the wealth which tbe sheep brings us with its golden fleece and golden hoof, must be placed a mysterious disease which but a short time ago was unknown in this or any other country. *Capital and Labour* says,—"It is called the 'woolsorter's disease'; aud the germs of the disease are believed to be contained in tbe unwashed foreign wool which arrives in this country tbe colour of ink, and, for reasons partly to be explained and partly inexplicable, as poisouous as the growing Upas tree. The woolsorter goes to bis work at the warehouse, be it in Bradford, Leeds, or elsewhere; he sorts his wool, and the next, perhaps, that is heard of him is tbat he is dead, struck down by this mysterious stealthy disease. . . . . If masters and men confront the new and subtle destroyer witb the determination to conquer, the arch-enemy in this his latest form will be 'laid,' as many a pestilence of greater magnitude has been 'laid' by means of prompt, calm, and sensible action."

CONCERNING SOUTHWELL MINSTER.

We printed a communication the otber day (p. 215, *ante*) in relation to the excursion of the Archæological Institute to Southwell Minster, now in course of partial restoration under the direction of Mr. Ewan Christian. Some further remarks on the building, and what is being done in it, may be of interest to some of our readers.

Southwell is a great name among lovers of English Mediæval architecture, yet there are perhaps a good many still who know the place only by illustrations, which are not very many or very good. Southwell is one of those troublesome places which is on a small branch line, and can only be got at by local trains. Certain details of the Early English foliage work bave been popularised by drawings and photographs,—the foliage decoration in the external arcb of the chapter-house door, for example; and hence many persons think of Southwell habitnally ae a chnrch characterised especially by rich decoration. It is so in one or two portions, exceptionally so, but the first view of the Minster is the view of a grand, eolid, bare Romanesque nave and Norman tower. We apply the term Romanesque to the nave, since it presents, more than is ofteu the case in English work, characteristics common to Romanesque architecture of a certain period all over Europe, and tbere is a very German look about tbe exterior, suggestive of the early churches of the Rhine land, in the straight lines of the western towers, the flatness of tbe buttresses, and the plain circular windows of the clearstory. Tbis German appearance would probably have been still more marked when the western towers had their square slated spires, which have been wanting for fifty years or so, and are now being replaced by the restoring architect. This foreign relationship of the architecture ie traceable, as we shall see, in one or two other points, in eo marked a manner thet one would be curious to know whether the history of the building furnished recorde of any specially foreign influence presiding over its inauguration and constrnction; but documentary evidence in regard to Southwell is, we believe, of the sligbtest.

The west front of Southwell, theu, is a perfectly simple, flatly-treated front, witb a Norman doorway, of the usnal charactor of decoration, and of no very great richness or elaboration, in the centre, and rising into two nearly similar square towers. One slight point of dissimilarity in the detail of the towers is, however, of interest. Tbe northern tower has, about two-tbirds of ite height, the form of decorative wall arcade so common in rather advanced Normen work, formed with round arches intersecting one another. The arcade in the same position on the other tower has a pointed arcade of exactly tho same design in other respects, the intersecting portion of the arches heing omitted. This looke really like giving some countenance to the old and, as we most of ns now think, exploded idea that the pointed arcb arose from the intersection of round arcbes. That it did so in this instance there can be no doubt; but this merely ornamental use of it does not invalidate the conclusions as to its structural origin when used on a large scale and as part of the constrnction of a building. The original masonry of the tower finishes with an oversailing corbel cornice, as does also the centre tower, and from these cornices sprang originally the lines of the timber spire of tbe west towers. The centre tower, we have little doubt, was originally roofed with a somewhat similar square timber spire, of mucb lower pitch, a pyramidal roof rather tban a spire. In all the tbree towers the later parapets and pinnacles have been built flush with the main wall-face, or nearly so, leaving the corbel-table projecting idly from the wall, wbere it, of course, looks particularly had in the angle view. The angle turrets of the west towers, of which those on the north-west tower were still standing at the time of our visit, are at first sight rather a puzzle. The spires were standing (a second edition of them probably) early in this centnry, so that the pinnacles could only have been added in recent times, but they are quite unlike anything that we are accustomed to find built at that time. The explanation seems to be furnished by the centre tower, the roof of which had gone long before, and which was furbished up with pinnacles apparently of late Elizabethan or Jacobean date, two of them had imitations of Gothic, two of them very like Elizabethan chimneys. When the western spires went, the west

towers were finished to match the centre one, with similar debased Gothic and chimney-pot terminations. These, which are of little historical and no architectural value, being imitations of imitations, are being removed, and the new spires will spring from their proper footing on the corbel-table. Of the propriety of thus replacing the spires we have no doubt whatever. The front is incomplete without them, and they have been in existence nearly within the memory of living men [they are shown in a view in Dickenson's "Southwell," 1819], so that to replace them is, in fact, merely to repair a catastrophe, and to substitute a fitting architectural termination to the towers in place of a piece of egregious bungling, for the present finish of the towers is no better than that. The framework of the southern spire is in its place now. As it appears, from something that was said at the visit of the Archæological Institute, that question has been made as to the towers being safe for the weight of the spires, we may add, for the benefit of "weak brethren," that any fear on that point is absurd: the towers would carry twice the weight with safety. As a question of appearance, however, we did not like the way in which it was apparently proposed to bring down the spire on the corbel-table, with a cant outwards at the foot; a completely straight line from the eaves would be more in keeping with the character of the architecture.

The stern character of the architecture is continued round the exterior of the nave and transepts; the fronts of the transepts have an almost barbaric appearance with the large rude cable-moulds to the windows, and the incised ornament of zigzags and small circles filling up the heads of the low-pitched gables; and the change is the more remarkable from this rude architecture to the beautiful Early English work of the eastern transept chapels and the choir, and the rather later and richer work of the chapter-house. The chapels were a rebuilding of the usual eastern apsidal chapels of the Norman church, parts of the Norman work of the original opening into the chapel from the transept being preserved in the interior wall. In the south transept the chapels have been removed without rebuilding, and in the north transept the communication with the church is cut off, and the former chapel is now the library. The chapter-house externally recalls a little, in the treatment of the buttresses especially, the York chapter-house, but on a smaller scale. Going round to the east portion of the choir, we are reminded still more of another cathedral,—Lincoln. The architecture here is in the purest and most refined Early English style; very reticent of ornament, but with an almost Greek refinement and delicacy in the design of the buttresses and the general composition of the lines; and in general effect, and in the detail of the buttress-heads, the base-course, and other points, is so similar to the work of the nave and south transept of Lincoln that one cannot but think some of the same hands were employed on both. A peculiarity, and not a very fortunate one, in the east end is an arrangement of an even number of windows (four), with the pier in the centre; it is interesting as a peculiarity, but does not look well. The Norman north porch to the nave is interesting for its wagon-vault or ceiling, plastered originally, no doubt, and which might be susceptible of decorative treatment in colour.

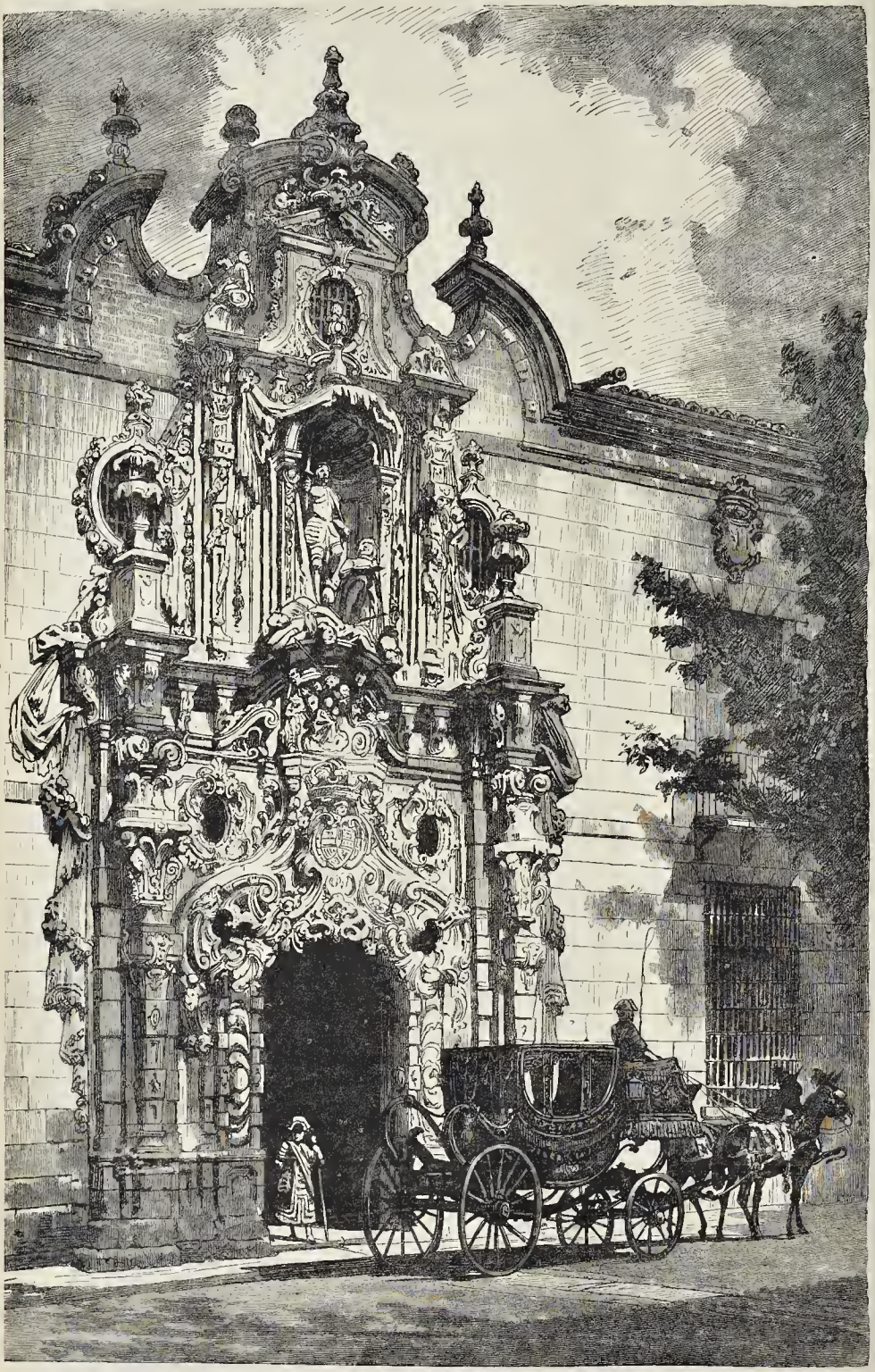
It is proposed to restore the original high-pitched external roof to the chapter-house, and this will be a manifest architectural improvement, the present roof being neither one thing nor another, and looking as if it had accidentally dropped within the walls; and the chapter-house is such a perfect bit of architectural design of its kind that it is worth while to bring it back into harmony of proportion in regard to its roof. Whether it was worth while, or even desirable, to raise the nave roof to the high pitch belonging to the late period, is another question. It has now been done, and the roof, internally, is a capital piece of solid and simple carpentry, framed with curved braces so as to form nearly the effect of a wagon-vault when seen in perspective, the bays being marked only by a strong tie-beam with chamfered edges from pier to pier: the general effect is quite in keeping architecturally, though not archæologically, with the remainder of the interior. But as the flat ceiling is to be retained in the transepts, there would have been more unity of internal effect if the nave also had a flat or perhaps a canted ceiling: and externally there is just the same objection to the high-pitched nave roof in this case as in the case of St. Alban's; the high roof of the nave abutting against the centre tower seems absolutely to require roofs of similar pitch over the transepts, in order to preserve the balance of composition of the whole. As it is done, it is useless to remonstrate, but we do not consider the game was worth the candle in this case.

Internally the nave at Southwell is a grand specimen of Norman architecture, with the characteristic that, in place of the ordinary triforium gallery, there is what is in fact a double-storied aisle, as in the great churches in Caen, the large triforium arcade opening, not on a narrow gallery in the thickness of the wall, but on a floor the complete width of the aisle, and resting on the lower aisle-vaulting. This two-storied aisle is again much more a Continental than an English feature; one or two fine specimens of its employment in German churches have been illustrated in our columns. The upper aisle is lighted by very small low windows, which form a feature in the exterior, close under the corbel-table of the eaves, the corbels being half interrupted or cut short over the window-heads to give more room. The lower aisles, or aisles proper, are covered by a simple heavy quadripartite vault, the transverse arches very much stilted, and, in fact, almost horseshoe in shape. In the transepts a singular incident is the irregular and incorrect cutting of the cable-moulds over the windows, which show that some one had blundered over his work, or had not been properly overlooked. From the north transept access is gained to the library, which, as before mentioned, is part of the former Early English chapel which was originally open to the church, and which also had, by a rather unusual arrangement, a floor several steps below the level of the church floor; probably the object of this was to gain sufficient height for the chapel without rendering the chamber over it too high up for convenient access. Mr. Christian proposes, as was observed in our former report, to lower the floor (which, for convenience of use has been raised to the level of the church) to its former level, and to re-open the chapel into the church, and restore it to its use as a chapel (placing the library above). Architecturally speaking, this will be, no doubt, a great gain to this corner of the church, and will restore to light details which are now unnecessarily hidden beneath the floor, or built up in mere walls of enclosure.

In the choir-screen we have one of the latest pieces of work in the church, Late Decorated, and very rich and beautiful in detail. The mimic vault which covers the entrance to the choir is peculiar in more ways than one; in the fact that it has vaulting ribs flying quite free of the vaulting surface (or what would be the vaulting surface if it were a genuine built vault), and still more in the fact that there is here found a decided and pronounced example of the German trick of interpenetration of mouldings; another example of this occurs also, though less marked, in the aisle vaulting at the south-east angle of the choir. To find thus an essentially Continental detail again, after a lapse of nearly three centuries, in a church which shows Continental features in its main design at an early period, is an odd coincidence, though, of course, a purely accidental one; and the example of interpenetration, elaborate as it is, may have been merely a casual experiment, or possibly due to the employment of a foreign mason on the work. There is something unusual in other details of the work, as, for instance, in the wall diaper work on the inner side of the screen, where we find a minute design dividing the wall surface, as usual in wall-diaper of this date, into small squares, but in which every square is differently treated,—a by no means usual refinement. This, again, looks as if some foreign hands had been employed on this screen, who gave their own interpretation and treatment to the orthodox English Gothic details of the period. The idea of moving the screen (for purposes of ritual), which seems to have been at least discussed, seems preposterous; it is far too delicate work to be safely pulled about, nor is there any practical reason, in regard to space, for such an alteration: the choir is quite large enough, we take it, for all the demands made upon it as a church for worship.

The interior of the choir is a very fine specimen of Early English work, worthy of the exterior, and in remarkably good preservation; indeed, both the interior and exterior of the choir show in their present state how carefully the stone must have been selected, and how well the whole has been built. Much of the external detail is nearly as sharp and clean as if new, and internally it has hardly been necessary to do anything more than scrape off the whitewash. A curious point in the interior architecture is the random treatment of the caps in the triforium arcade, some of which are carved with fine foliage in the usual style of the period, others (in the same bay) moulded only. At first, the impression is that there has been a definite intention of giving the choir a richer appearance looking eastward than westward, by carving the eastern capitals in each bay, which are of course most prominently seen when looking eastward (and such a treatment would be quite in accordance with Mediæval æsthetics); but though the easternmost bays suggest this idea, in other places the position of carved and uncarved capitals is reversed, so that it would appear to have been mere whim. From a door in the north aisle of the choir we get access to the chapter-house, which here, as in nearly all establishments of the "secular" clergy, is octagonal. The chapter-house is approached by a passage, part of which has formed an open cloister along the side of a small open court left between the chapter-house and the north-east angle of the crossing. In this little cloister we see again evidence of foreign influence. The arcade which separates it from the open court is carried by double shafts placed well apart and with a cross lintel bearing from the inner to the outer shaft, from which the arch springs; the whole having a peculiarly un-English look. The cross-lintels are carved on each face with beautifully delicate naturalistic foliage, in low relief, and mostly in excellent preservation. The beauty, however, of this little bit of architecture is at present much marred by the fact that the space between the shafts has been built up with a plain stone wall up to the level of the caps, and the space in the head of the arch filled up with glazing. This has no doubt been done for the sake of warmth during the time when the chapter-house was still in constant practical use by people who did not like draughts on their way to it; but by this proceeding the beautiful effect of the coupled columns is of course lost, and the whole thing spoilt. There can surely be no practical objection to removing this wall and opening out the little arcade again, and thus enabling us to realise the effect of a peculiarly elegant and, in an English cathedral, unusual bit of architectural composition. As the restoration work in the choir is supposed to be complete, we were surprised to find this had not been done; it would be as righteous a bit of work as a restorer could do, being simply the removal of the raw material of walling from a place where it never should have encroached.

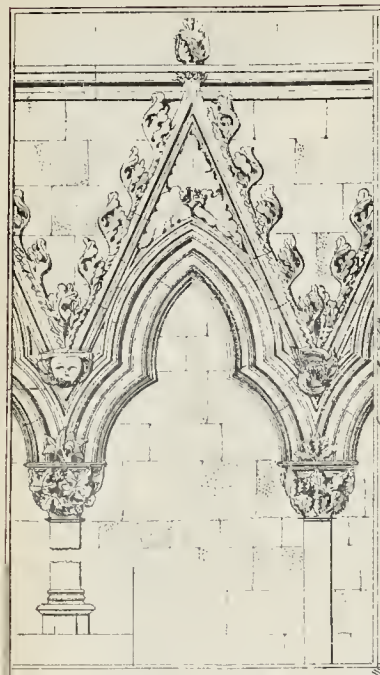
This bit of cloister, with its peculiar treatment, confirms the idea which the chapter-house suggests, that there was unusual and possibly foreign influence at work over this beautiful addition to the building. The chapter-house dates just about the zenith of the Early Decorated or Geometrical period, while the style still retained, with the richer decoration then coming into fashion, the chastened beauty of line and the constructive truthfulness and simplicity of the Early English style. Much of the carving in the chapter-house would convey in itself the notion of a later date, for a large proportion of it is as naturalistic as the carver could make it; but it is evident that there was an original genius at work here, who would not run in the accepted paths of conventionalism, and who, by his own individuality and love of nature, anticipated by a considerable period the style of naturalism which was afterwards to develop in English architectural carving, and not only anticipated it, but surpassed it beforehand. For in the fully-developed period of decorated carving it is very seldom that we find naturalism which, as naturalism, is as fine and as complete as this, and, at the same time, as artistically treated. We give a page of sketches, showing the character of the arcading which surrounds the walls of the chapter-house and some of the details of the carving. The two capitals are specimens out of a number which are all completely distinct in character, all exhibiting the most spirited representation of natural foliage, and all deeply undercut, in some instances so boldly that they seem almost to stand entirely free of the bell of the capital. Considering how delicate the work is, their state of preservation is remarkable. The bases seem to have gone a great deal more than the caps; at least, it appears to have been thought

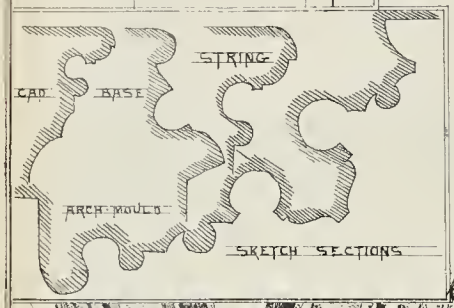


FAÇADE OF THE GREAT HOSPITAL, MADRID.—Churrigueresque : Eighteenth Century.

SOUTHWELL MINSTER.

DETAILS FROM WALL-ARCADE, CHAPTER-HOUSE.





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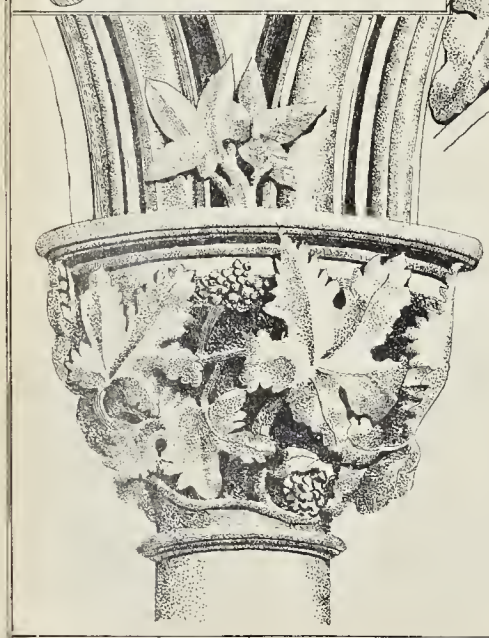

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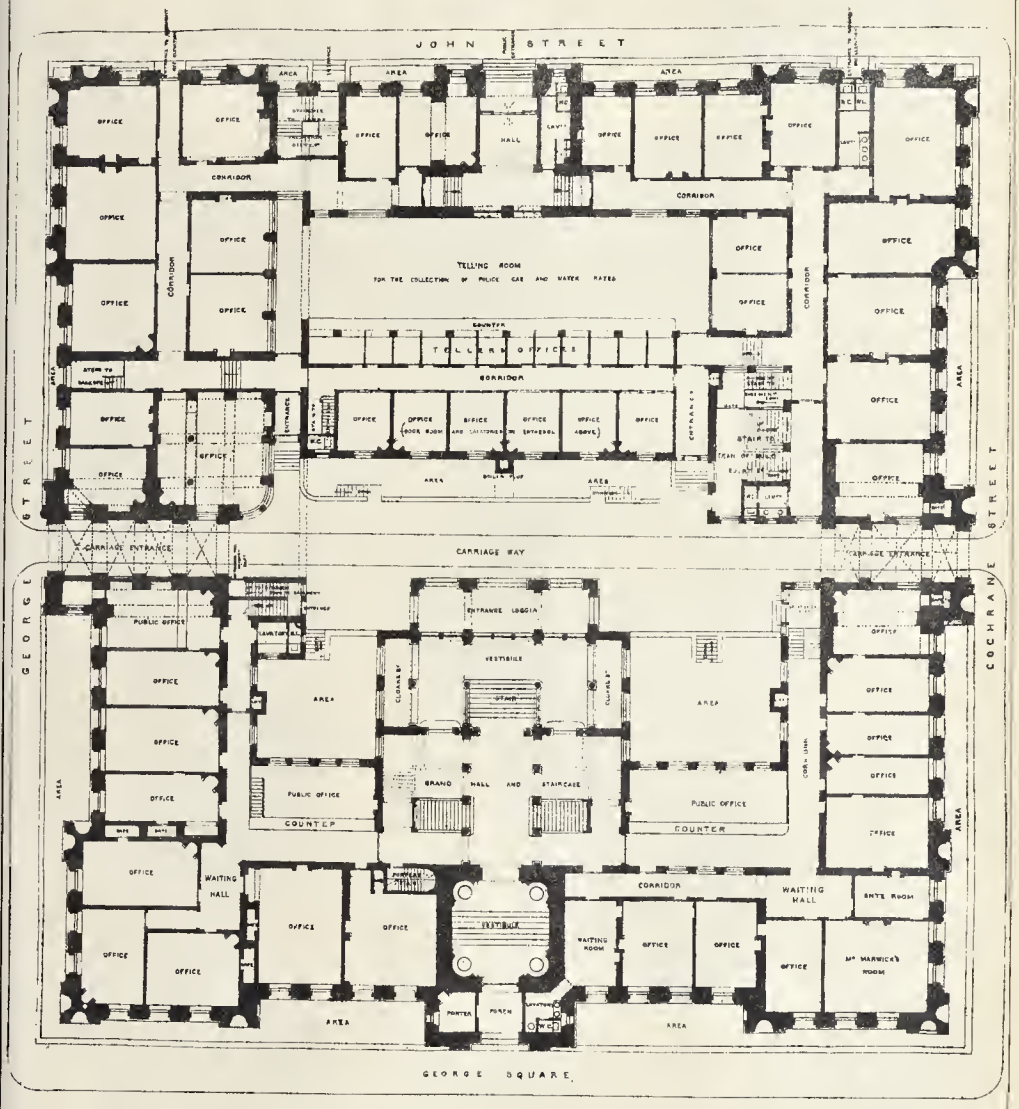
GLASGOW MUNICIPAL BUILDINGS: DESIGN TO WHICH FIRST PREMIUM WAS AWARDED



GLASGOW MUNICIPAL BUILDINGS.—*Plan of Ground Floor.*

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ST. PETER'S CHURCH, UPPER HOLLOWAY.—Mr. C. L. Luck, Architect.

necessary to restore them all except one, which is tolerably perfect, and has been left as a sample of the rest. However, that is comparatively mechanical work, and so long as the capitals are not tampered with, we need not be inconsolable about the bases. The triangular spandrels above each arch of the arcade are treated with the same variety as the capitals, and are all obviously taken direct from nature, with the exception of some where grotesque animals or heads are introduced. The little sprays of foliage over each capital, concealing an awkwardness in the mitring of the mouldings, form a pretty feature in the work; these, again, are all varied and nearly all studiously naturalistic. The crockets over the gablets are treated with more conventionalism and more similarity, by a true instinct of taste, since great variety in these would have given too irregular and rugged an outline to the boundary-lines of the arcade design. There are two types of them, one derived apparently from oak-leaf, the other from some foliage with longer, thinner, and more numerous laminæ. They present the same general outline, but have sufficient variety in character and shadow effect. The crockets, though so bold in profile, are kept rather thin and sharp in section, in order to keep them well clear of the wall, and leave a space for shadow behind them; and the effective way in which the two lower ones are made to overlap in the angle of the gablets, will be noticed in the illustration. Besides this beautiful and rich arcading, there are many fine capitals and spandrel carvings in the upper portion of the chapter-house, which in fact constitutes quite a school of naturalistic architectural carving, and is worthy of the fullest and most detailed illustration.

Those who visit Southwell should not omit to go into the small open court before mentioned, adjoining the cloister leading to the chapter-house. From the north-east corner of the small court there is a most picturesque view of the parts of the building visible from thence, especially if seen, as we had the good luck to see it, on a day of bright sunshine and cloudless sky,—nothing visible but the picturesque and time-tinted walls of the choir and cloister, interspersed with beautiful bits of detail; and above, the grand mass of the central tower relieved against the blue sky.

Two remarks we may add as to custodianship of the building. The system (now happily obsolete in many of our cathedrals) still obtains at Southwell, of leaving the most interesting parts of the building under the lock and key of an official who expects a fee, proportioned to the munificence of the visitor, for showing them. This we have always protested against. The verger at Southwell is, in the matter of intelligence, a favourable specimen of his class, and has more knowledge of the building which he "ciceronises" than we have found in many cases; but it is a radically wrong principle that buildings which, artistically speaking, are national property, should be under the thumb of a person who tells you that he makes his living by showing the building. Far better to make a certain fixed charge to every one, "for the expenses of the fabric" (as a check on mere idlers), and leave the visitor free to go over it alone or attended as he pleases. The other point we may mention is that residents in the neighbourhood who take an interest in the church have an impression that too much latitude is allowed to the contractor for the restoration to do a good deal what he pleases in small matters, in the absence of the architect. It is impossible in a mere day's visit to form any independent opinion as to how much ground there is for the criticism, but we feel it a duty to give it publicity,—*sous toutes réserves*, as the French journalists say.

Tamworth.—The committee for the restoration of Tamworth parish church have received a report from Mr. Basil Champneys, architect, London, suggesting the mode in which the work may, in his opinion, best be carried out. The total cost would be 1,300*l.* As to the nave clearstory, the four eastern bays are in almost as precarious a state as those on the north side of the clearstory, and would require encasing in the same manner. The probable cost would be 400*l.* The six western bays were renewed some years since, but with a total disregard of all the final detail of the original work. Though this part of the building is not in need of immediate substantial repair, it would have to be considerably reformed to bring it into harmony with the new restoration. The probable cost would be 360*l.*

PROPOSED MUNICIPAL BUILDINGS, GLASGOW.

WE give an outline of the principal elevation of the design selected for the first premium and the plan of the ground-floor. The author, Mr. Corson, says that, in considering what particular form of Classic architecture would be most suitable for a building devoted to municipal purposes, he had to choose one of three varieties, which he distinguishes for his purpose, as Fenestral, Roman, and Palladian. After giving some reasons against the first two, he says,—The third variety, Palladian, he has adopted as the most suitable for a civic structure of many stories and varied uses. "There are many examples of this style in Italy, France, and England. The Library at Venice and many of the palaces there, the Hôtel de Ville (destroyed by the Commune) at Paris, the Banqueting House at Whitehall, and the Carlton Club in London may be cited. In this style the columns never rise through the height of two stories, but each story has its own complete order of columns with the windows between them, and the columns and pilasters are usually attached to the wall. This style has great dignity of character, is much more varied and lively than the Roman, and expresses admirably the character of a building which includes large apartments for civic hospitality as well as for civic business."

The heights of the stories, floor to floor, are as follow:—basement floor, 13 ft.; ground floor, 22 ft.; first floor, 17 ft.; and the second floor varies in height according as the rooms rise into the roof or have other rooms over them.

The principal entrance is in the centre of the George-square front, the entrance to the telling-room in the centre of the John-street front, and the two carriage-entrances are in the centres of the two other fronts in a line with each other.

The front entrance is by a lofty archway, 11 ft. wide by 20 ft. high. The porters' room is on the left, and passing through swing-doors in a glass screen the vestibule is entered. This is 25 ft. square, with large domed niches in the angles, and statuary on pedestals in each niche. As the tower stands over this vestibule the walls are made of a solidity and thickness calculated to give the necessary support. Ascending the steps, the hall and staircase are entered by another archway. The carriage entrance in the court is by an open loggia or covered arcade, 45 ft. by 12 ft., which gives admittance by numerous doors to a vestibule 60 ft. by 23 ft., in which, on the right hand and on the left, are recesses for the reception of cloaks and umbrellas. An easy flight of nine steps leads up to the grand staircase, meeting on a level the approach from George-square.

The grand hall and staircase, 62 ft. by 34 ft., contains two stairs, right and left of the hall, which is divided from them by screens of columns and arches. These lead up to the first floor, and are so arranged that the landing forms an upper hall, 34 ft. by 17 ft., with the council-chamber at one end and the reception-room at the other. The council-chamber, which is over the vestibule and loggia, is 45 ft. by 37 ft., and is arranged with semicircular ranges of seats rising from the centre table. The principal entrance to it is from the centre of the principal landing. The reception-room, saloons, and town-hall are arranged *en suite* on this upper floor.

The reception-room is entered from the grand staircase, and has also an entrance from the Lord Provost's room. The saloons would form a handsome approach to the town-hall, 30 ft. wide throughout, expanding at the angle into a square of 42 ft. The town-hall has a narrow gallery at the sides, forming on one side a series of boxes, and at the west end a deeper gallery, communicating with the upper saloons.

The cost is estimated by the author at 150,432*l.* The referee, Mr. Barry, places it at 220,000*l.*

We have received several letters condemning in strong terms the award of the referee. Considering that the one point on which a large body of the profession have agreed to insist before entering upon any competition is the employment of a professional referee, it seems unfortunate, to use no other expression, that competitors should be led to take this course on the present occasion. That the report presents an apparent inconsistency we are not bound to deny, but we will suppose that the referee could explain it away if he found occasion to do so. Some further observations will be found at p. 366.

ST. PETER'S CHURCH, UPPER HOLLOWAY.

THE new church is built at the foot of Highgate-hill, near the Archway Tavern, and the new district is formed by appropriating a portion of the parish of St. John, Holloway.

The walls of the church are built entirely of concrete, formed with Portland cement and burnt ballast, and are faced externally with red Chylton bricks, 4½ in. thick, and internally with yellow stocks, with red brick bands and arches. The facings are bonded every four courses with a row of headers.

The church is 105 ft. long, the nave is 32 ft. 6 in. wide, and the aisles are 10 ft. wide. In consequence of the width of the nave there is no chancel arch, but the nave roof runs unbroken from east to west. The aisles are 18 ft. 3 in. high to the roof-plate, and the nave is 36 ft. to roof-plate, and 61 ft. from floor to top of ridge. The clearstory walls are strengthened by buttresses, which are supported by flying arches connecting the nave and aisle walls together, and thus relieving the nave piers of some of the weight that would otherwise rest upon them. It has an open-timber roof, and the timbers are left unstained. The church is lighted by means of coronæ hanging from the crown of the nave arches, and the chancel is lighted by two massive standards, fixed at the end of the choir seats. The lighting was carried out by Messrs. Potter, of South Moulton-street. The church is heated by Grundy's apparatus. The cost of the church, including lighting and warming, will be a little under 8,000*l.* It seats about 700. The architect is Mr. C. L. Luck, of Carlton-chambers, Regent-street, and the builders are Messrs. Hook & Oldrey. Mr. J. Kaberry is clerk of the works.

APPRENTICESHIP, OR THE OLD AND NEW WORKMAN.

THE thought has occurred, and is still occurring to many reflective minds, how it comes about that, notwithstanding the great spread of artistic and scientific knowledge, and the sundry facilities now available on the part of the workman, the general mass of our artisans should understand so little, comparatively, of the principles of their respective arts.

Technical education, for the last decade at least, has been a loud cry on all sides, but it is to be feared that in several directions it is a "great cry and little wool." Technical manuals and treatises on various trade subjects are numerous, and they are also cheap; but while some are good, many others are bad, or otherwise very indifferent, or unsuited for the aims and objects the writers or publishers have in view. We are glad to know that some of our technical manuals can be and are studied with advantage by a number of our young workmen, but, generally speaking, they are unsought, and of course unstudied, by the great army of our young operatives. We need not go far to seek for this cause of the lack of interest on the part of many young workmen in matters that one would suppose intimately concern their future prospects. If the same condition that governed our skilled trades for centuries back, and down to the earlier part of the present century still existed, and was conformed to, the value of our technical literature of the day would be duly apparent, and where found useful would be pretty generally made use of by our workmen. With the changed condition of society and the greatly multiplied subdivisions of all sorts of skilled labour which have taken place, the workmen in many of our trades are reduced to little better than mere ciphers. They are no longer, as were their grandfathers in the same or similar trades, complete workmen or masters of their craft, but makers of parts. To the decline of the old apprenticeship system is directly attributable much of our inefficient workmanship, and our large body (still yearly growing larger) of indifferent and inexperienced workmen. Where one man formerly set out and finished a certain piece of work which he operated on from beginning to end, there are in some cases now a dozen hands employed. The part-workman in our large workshops has not the same inducements or stimulus to study a treatise or master the principles of his art as his predecessors had a few years ago. In rare instances he may endeavour to know all that he ought to know, or that is useful for him to know, but the general

When this is satisfactorily accomplished, the question will, in many cases, occur, "Why use the horse at all?" The animal is an admirable motor power for steady and continued motion on a level road. He is distressed,—and thus becomes a costly motor,—on hilly roads, as is seen in Edinburgh. He is also distressed, to a smaller extent, by the effort needed to start. We are, therefore, busily engaged in designing mechanical motors for hilly roads, and mechanical means for aiding the horse to start, and when we have succeeded in perfecting these two objects, the natural sequel will be to release the horse from the tramway altogether.

The recent half-yearly meeting of the North Metropolitan Tramways Company affords an example of what is doing in this minor industry of transport. The length of line worked by the company we make out from the report to be between 21 and 22 miles. The capital expended we also make out to be 735,000*l.*; so that the capital cost is about 3,420*l.* per mile. The report does not enable us to apportion this between road, plant, and live stock; but it mentions that the stud consists of 2,094 horses. The gross receipts for the half-year amounted to 137,736*l.*, which, as the receipts are stated to be at the ratio of 14·44d. per mile run, gives a mileage of nearly 23,000 miles, or rather less than 42 miles per horse per week. This fairly fits with the old rules of the best coachmasters, with the exception that from 40 to 50 miles per horse per week was maintained on the road at the rate of from 8 to 10 miles per hour, while the tramway can hardly be rated at half that speed. We thus have, then, a means of measuring the cost of the loss of power in stoppage and slacking, which is equal to at least that of the difference between the two velocities. In other words, it consumes considerably more than half the power of the animals. This, again, points in the direction of the economy to be obtained by the use of mechanical motor power.

The total expenditure was 111,767*l.*, or eighty-one per cent. upon the revenue. Out of this a dividend at the rate of seven per cent. per annum is fairly divisible. The relaying of the line with steel rails is charged to revenue, so that a reduced cost of maintenance may be anticipated. It would be interesting to have the accounts in more detail, so as to be able to compare more exactly the cost of mechanical and animal power. But the figures as herein given seem to indicate a satisfactory condition of this minor, but not unimportant, carrying company.

Within a day or two of the declaration of the 7 per cent. dividend of the Tramway Company, the London General Omnibus Company declared a dividend at the rate of 12 per cent. The accounts are not published in sufficient detail to allow of such an analysis as might prove highly instructive. But it should be remembered that the roadway is in one case provided, or, at all events, maintained, by the company, and in the other case by the public. The difference in the cost of locomotive power, that is to say in the value, keep, and management of the stud, may thus be but trivial. As compared with the Tramway Company, the Omnibus Company has one main item of capital provided, on which no interest is charged to working cost. If other things are alike, this item is worth five per cent. on the gross income of the traffic.

AN OPENING FOR CAPITAL, SCIENCE, AND SKILL.

In the twelve months ending August 31, 1880, the import of wheat into the United Kingdom reached 59,815,691 cwt., equal to 13,803,621 qrs., and when we add to this the import of wheat flour, which amounted to 10,131,726 cwt., or 2,980,493 qrs., we find that we received from abroad no fewer than 70,247,417 cwt., or 16,784,114 qrs., of wheat and wheat flour. In the twelvemonth ending August 31, 1878, the amount was 62,255,125 cwt., or 14,808,966 qrs., and in the twelvemonth ending August 31, 1879, it was 60,849,823 cwt., or 14,543,607 qrs. If we add oats, Indian corn, and barley, the gross total in 1879–80 reached 34,500,000 qrs. It is easy to calculate how many millions of pounds sterling sent out of this country this means.

Is nothing to be done with our waste lands and idle hands to make us a little less dependent on the foreigner for our daily bread,—not to speak of the desirability of giving work in their own country to some who cannot now get it? Scientific farming and improved machinery must be looked to to bring it about.

THE HITTITES AND ANTIQUE ART.

We have received from Mr. W. St. Chad Boscawen the following *resumé* of his paper read before the Anthropological Section of the British Association at Swansea. The paper dealt with the civilisation and history of the tribes of North Syria. Mr. Boscawen commenced by pointing out the important aid which the Assyrian and Egyptian records furnished to the student of Oriental history in the task of reconstructing the ethnographical and geographical divisions of Western Asia. From the hieroglyphic and cuneiform records we learn that the whole of the northern portion of Syria was occupied by a powerful confederation of tribes, who formed no mean factor in the political complications which, thirty centuries ago, agitated the then known world. In the Egyptian inscriptions these people were known as the Kheta, and in the Assyrian tents we find them called the Kattai, while we may identify them with the Khittim, or Hittites, of the Scriptures. Strange as it may seem, these people, who, more than 3,000 years ago were able to hold their own against all the hosts of Egypt, who defied Assyria for more than six centuries, and only yielded at last to a species of compromise, were, until very recent years, quite an unknown race. The name was known to us from our Bibles and from the inscriptions, but no record could be identified as the memorial of the people whose name was thus brought before us; but things are now changed. No longer is the Hittite empire a mere name. It lives in its recovered monuments, and it will, we hope, shortly speak to us by its inscribed records, and yield, as have its conquerors, Egypt and Assyria, the secrets of the bygone past.

We first find the Hittites mentioned in the inscriptions from the ancient cities of Chaldea, even before the time when Abraham left his home in Ur of the Chaldees,—when they were the opponents of the kings whose armies penetrated into Syria. We find them again at a later period, extending their rule as far south as Hebron, and it will be remembered that Abraham bought the cave-sepulchre of Machpellah from Ephron the Hittite. The fragment of history preserved in the fourteenth chapter of Genesis is one of the most valuable records extant. From it we learn that at the period of the Abramic migration, which we may certainly place at least 2000 B.C., the commercial code current in Babylon had penetrated into Syria, and was known not only to Abram, the native of Ur, but also to Ephron the Hittite. Mr. Boscawen remarked that the record given of the purchase of the field and cave of Machpellah was in almost exact agreement with the technicalities of a Babylonian contract, such as we find in the British Museum. Mr. Boscawen then proceeded to trace the various relations, warlike and peaceful, between the Kheta, or Hittites, and the kings of Egypt, as they are recorded in the hieroglyphic inscription. We find them warring against Thothmes III., Seti I., and Rameses II., the Sesostris of the Greek writers. From these inscriptions Mr. Boscawen was able to trace out the geographical position of most of the Hittite tribes who were engaged in these wars, among whom we may note of special interest to Bible students the Anaka, the Anakim of the Bible, the Katu or Kitu, the Hebrew Kittim or people of Cyprus, the Phœnicians, and the people of Hamath. One of the most interesting and valuable documents relating to this period of Oriental history was a hieroglyphic copy of a treaty made between the king of the Hittites and Rameses II., the ruler of Egypt. In this treaty we find an offensive and defensive alliance entered into, and, moreover, an agreement made to extradite all offenders from either land. This document is extremely valuable, as it furnishes many names of Hittite kings, princes, and divinities, and thus gives an insight into Hittite civilisation. The great battle fought near the city of Kadesh on the Orontes broke the power of the Syrians for some time, and induced them to enter into friendly relations with Egypt. After thus tracing the various points of contact between the Hittites and the Egyptians, Mr. Boscawen passed to consider the evidences, monumental and other, which we have of the Hittite civilisation. He then described the site of the great Hittite city of Carchemish, on the Euphrates, which he had visited and explored during his recent tour in the East. The great mound which formed the citadel, the walls, gates, and quays bordering on the river, were described, and many points of interest regarding the architectural and military knowledge of the Hittites were deduced. Mr. Boscawen next described at some length the various sculptures and inscriptions found on the site. Chief among these was a fine sculpture representing the goddess Astarte or Ashtaroth, the Syrian Venus. This work was of the greatest importance to archæology and to Biblical studies, because it furnished us with an early representation, probably of about the date of Solomon, of the goddess whose worship extended from Babylon all through the west of Asia. The goddess whose worship is described by the prophet Baruch as being one of the most abominable in Babylon, the Ashtaroth, the abomination of the Sidonians, and the Ephesian Artemis or Diana, were all forms of the same nature goddess commonly called the Asiatic goddess.

From the Assyrian inscriptions Mr. Boscawen pointed out evidence that the Greek legends of Hercules and of the Amazons were all derived from stories or religious legends which had been transmitted from Babylon to Carchemish, and thence to Ephesus and even to Troy. The next subject treated of was one of great importance, namely, the influence which the Hittite empire had exercised in the westward spread of the civilisation and art of Babylon and Nineveh. Mr. Boscawen then proceeded to show how many relics of this people were in existence in Mysia, Lycia, Phrygia, and Galatia, and in the regions of the old Lydian empire, all showing that it was to these tribes of North Syria, and not to the Phœnicians, that the Greeks owed much of their culture. The religion inherited by the Hittites from contact with Babylon had supplied the Greeks with much on which to found beautiful legends and poems, the art engendered in Carchemish had spread to Ephesus, Sardis, and even to Troy, as shown by the relics discovered by Dr. Schliemann. From Troy to Mycenæ and thence to Athens, Rome, and the far west, were all steps in that pathway of culture and civilisation which ran from east to west. After referring to the curious hieroglyphic inscriptions which had been discovered on the site of Carchemish and other Hittite cities, Mr. Boscawen concluded his paper by directing the attention of all students of Oriental history to this new factor in the problem of Asiatic history. To the Biblical student it explains much that before was obscure; to the Egyptologist, Assyriologist, as well as classical student, it is a ray of light which penetrates many dark and obscure corners in the labyrinth of Oriental mythology and art.

A WORTHY EFFORT.

Mr. Mitchell Henry, M.P., who has given notice of a motion for next session for the appointment of an Industrial Commission to aid in the development of the resources of Ireland, writes to explain that the objects contemplated are, amongst others,—

1. The reclamation of waste and semiwaste lands by the agency of labourers who would be paid weekly wages for a year, when the first crop would be reaped, and the outgoings be reduced by the food-supply obtained. Afterwards families would be settled on these lands at rents calculated on the capitalised outlay of purchase and wages, and the local congestion of the most barren and crowded parts of Ireland would be relieved.

2. The experiment of tapping some of the large, deep bogs of Ireland by the process of tunnelling at the base or outlet of the dry water-courses always found in bogs.

3. The formation of light railways as feeders to the main trunks, with which Ireland is already tolerably supplied. These would often make a difference of 25 per cent. in the value of the produce of farms now remote from railway accommodation. And lastly, the development of the fishing industries by the construction of harbours and piers. The majority of these works would be remunerative, and entail no loss to the State; but there are certain drainage operations which would require an outlay of public money.

We quite agree with him that if the idea is once grasped by the country that Ireland is an undeveloped estate, requiring only moderate and systematised outlay to make it productive, the further idea will speedily follow that the best form of national insurance will be to relieve a large part of its population from periodical famine, and its inevitable accompaniment political turmoil.

WESTMINSTER OFFICES COMPETITION.

THE Building Committee have refused to adopt the report of their referee, Mr. Barry, and the whole matter is referred to a meeting of the Vestry. While pretending to exclude the press, and making official requests that no information should be given, individual members of the Vestry are said to have assisted in making matters public. The whole affair is becoming a muddle, and one of our correspondents, "A Ratepayer," calls it something worse.

THE DONATELLO SOCIETY, IN FLORENCE.

ON Monday, the 13th, at 9.30 a.m., the exhibition of modern pictures under the protection of the Donatello Society was opened in Florence by the King of Italy in person, accompanied by his brother, Prince Amadeo, and a select body of the nobility, artists, and others. The military manœuvres near and the grand review had brought royalty to Florence, and the committee thought it expedient to anticipate the day of opening, to have the presence of the King to give greater prestige to the undertaking. Count Serristori had most generously offered a suite of rooms in his palace for the exhibition, and in great haste the pictures that had arrived were hung, and a goodly array of art presented itself to the visitors. The English and Dutch pictures have not yet arrived; rooms are arranged for their reception. The half of the pictures at present on the walls are French. Many have already been hung on the walls of the *Salon*. The object of the society is to incite Florentine artists to better work,—to raise the tone by competition with artists of other countries. If the best of each country is hung here the consequences cannot be doubted, but they must be the best, and not the refuse of *Salons*, or the aim of the society will be defeated. Many good names figure in the catalogue. Works by Meissonier and others are on the road, and some fine works, full of thought and high talent, to incite the Florentine artists to better work than of yore in their yearly exhibitions, are already hung. So with example and perseverance much may be gained by this spirited movement in aid of Italian art. The exhibition of old tapestries and other articles will be opened in October, in the large *Salle* of the Refectory in the cloisters of Santa Croce. The third, of art applicable to industry, also in the month of October. Sufficient publicity has not been given to the undertaking. We believe we were the first out of Italy to make known this Society, which has for its object the attempt to restore to artistic Florence some of the grand character it bore in days gone by as the centre for all that was highest in artistic talent.

The King takes real interest in the attempt, and examined with minute attention each work; and if good wishes can procure success, his hearty desires, expressed in cordial terms, will bring great good to Florence.

TRADE UNIONS CONGRESS IN DUBLIN.

THE thirteenth annual congress of the Trade Unions of Great Britain commenced in Dublin on Monday. About 120 delegates were present. Among the larger societies represented are the Amalgamated Society of Engineers, the Miners' National Union, the Miners' (Durham) Association, the London Trades Council, the Liverpool Trades Council, the Edinburgh Trades Council, the Glasgow Trades Council, and the North-east Lancashire Power Loom Weavers' Association. The congress also includes female representatives of the National Union of Working Women (Miss Merrick), the Bingley Weavers' Union (Miss Cordigen), the Yorkshire Heavy Woollen Weavers' Association (Mrs. Ann Ellise), the Upholstresses' Trade Society (Miss J. G. Wilkinson), The Tailoresses' Society (Miss Yeary), and the Bookbinders' Society (Mrs. E. Patterson and Miss E. Whyte).

Mr. Henry Slatter, chairman of the Parliamentary Committee, secretary of the Typographical Association of England, took the chair, and in opening the proceedings said it was satisfactory to know that the success of the present Congress would not be a falling off from that which had attended former meetings, and that this, the first meeting on Irish soil, would be memorable, not only for the largeness of the gathering, but from the importance of the discussions they should engage in. He hoped, also, it would be found successful in furthering the interests of the great cause they had at heart. Some trades had felt the long pressure of bad trade, and even the small expense of sending a delegate was found too great for them to bear. A great portion of the important work to be done would come before them in the proceedings of the Parliamentary Committee, which would be referred to in detail in the report which would be read, and from which they would find that shortly after the last Congress at Edinburgh,—shortly after it had separated,—a dissolution of Parliament was announced, and the consequence of that was to entirely disarrange the plans of the Parliamentary Committee, and the work which they had prepared for the coming session had to be abandoned then, and resumed after the new Parliament assembled. He thought there was no election which more absorbed their attention or caused them more anxiety than the one at Stoke-upon-Trent. He thought he might say for every working man and woman in the United Kingdom that they owed a debt of gratitude to the electors of Stoke-upon-Trent for returning to the House of Commons Mr. Broadhurst, who was not only known to them as their valued secretary, but who had been able to render most valuable assistance in the debates upon the Employers' Liability Bill. That measure, as they were aware, was the subject of considerable criticism when it came before the House. Introduced by an independent member, it attracted very little attention, and hostile capitalists could afford to treat it with indifference; but when it became a Government measure, all the forces which could possibly be brought to bear against it were used, with, he thought he might say, great unscrupulousness, in order to defeat it. It was now, however, passed. Probably it was in many respects less perfect than they would wish to see it, but still it was an important advance on anything that existed previously, if it recognised that the workmen had some claim against reckless and unscrupulous employers. A great part of the employers were not, he was happy to say, men of that class, and they would have little to fear from the operation of the Act, which had now been enrolled upon the statute-book, but some of the employers were of this class, and it was satisfactory to be in a position to be able to deal with them through the Act which had been passed.

On the motion of Mr. Galvin, seconded by Mr. Morrissy, Mr. J. Murphy, of Dublin, one of the representatives of the ironfounders of England, Ireland and Wales, was elected chairman; Messrs. Jones (Bristol), Shorrocks (Manchester), and Davis (Birmingham) were nominated for the vice-chairmanship. The highest number of votes being in favour of Mr. Shorrocks, that gentleman was elected.

On the motion of Mr. Salmon, seconded by Mr. White, Mr. J. Ward, of Dublin, was elected secretary of the Standing Orders Committee; Messrs. Battersby (Glasgow), Abrahams (Dublin), Smith (London), Clark (Liverpool), and Davis (Birmingham) were elected members of this committee. Messrs. Smith (Dublin) and M'Lean (Edinburgh) were elected auditors.

Mr. Slatter then vacated the chair in favour of Mr. Murphy.

The report of the Parliamentary Committee was then submitted by Mr. Broadhurst, M.P., Referring to the Employers' Liability Bill, it says:—The effect of the Bill as it left the House of Commons is shortly as follows: A workman (or his family in case of his death) is to have the same right of action against the employers for injury by negligence as a mere stranger would have, with the following exceptions—namely, 1. The employer is not to be liable unless the injury is caused by the negligence of the employer, or of some person in a position of superintendence, including signalmen, &c., on railways, or by improper byelaws or rules, or is partly attributable to the workman's own neglect including neglect to give information of danger, &c. 2. The compensation recoverable cannot exceed three years' wages. 3. Actions must be brought in the county courts, or sheriffs', or civil bail court, and within a limited time notice of the injury must be given to the employer within six weeks, and the action begun within six months of the injury or death. We have no desire to over-estimate the value of this Act. It cannot, however, fail to be of great value as a preventive against many of the accidents that now occur. If it has this effect it will mainly accomplish our purpose. We are not seeking money compensation from employers, as our chief object is to secure the preservation of the health and life of the bread-winners of the family. While we express our regret that the Government did not legislate on the lines of Mr. Macdonald's Bill, we must not forget that they have travelled as fast as public opinion would have seemed to warrant them. Many of those who now profess their preference for our original proposal were but recently quite opposed to any legislation on the question. The effect of this law will be that the defence of common employment will be swept away in a few years. The battle has been fought over this Act. Time and opportunity only are wanting for the completion of the work. In the Lords the Bill received most severe treatment. On the motion of Lord Brabourne section 3 of Clause 1 was struck out of the Bill. By a vote of a large majority of that House, and on the motion of Lord Beaconsfield, the Act was limited to two years. The Lord Chancellor amended Clause 4, by extending the time for bringing an action in case of death from injury from six to twelve months. The Lord Chancellor also omitted the words "Stock-in-trade" in section 1, Clause 1. With these amendments the Bill came back to the Commons on September 2. In the meantime your committee held a meeting, and passed a resolution appealing to the Government not to agree to the omissions of sub-section 3 of Clause 1, urging that it would be better to abandon the Bill for that session than to accept such a mutilated measure; and we have the satisfaction to report that the Government restored the lost section, and extended the limit of the Bill to seven years instead of two. This firm determination of the Government to maintain the principle of the Bill had its effect in the Lords, and on the following night the Bill passed through the House of Lords as again amended in the Commons without debate. The limitation of the Act to seven years does not at all interfere with the principle of the Bill. The limit, as every one knows, means no limitation in fact, and can even be amended at any time before the expiration of seven years. This paragraph, written at the last moment before going to press, is placed before you in order to show that the Act, as described above, is not altered in principle or scope from its power as it left the Commons after the third reading. It comes into force on Jan. 1, 1881.

We may notice some of the subsequent proceedings of the Congress in our next.

THE *DAILY TELEGRAPH* NEW OFFICES IN FLEET STREET.

THE costly new buildings rising in Fleet-street include premises for the *Daily Telegraph*. They are on the south side of that thoroughfare, a short distance west of Salisbury-court, and immediately adjoining the recently-erected, handsome, red-brick and granite block now used as the offices of the *Daily Chronicle*. The new structure is occupied as the advertisement and general business offices of the *Daily Telegraph*. It is upwards of 70 ft. in height, and has a frontage to Fleet-street of about 30 ft. The main face of the elevation is in Portland stone, red and grey polished granite, being freely introduced for ornamentation. The building contains four lofty stories and attic with dormers. At the east and west sides of the ground-floor portion of the frontage, there are rusticated piers, double-arched windows, having red granite columns, with ornamentally-carved capitals, occupying, with a uniform entrance at the west side, the rest of the frontage. A balustrade above is carried across the elevation. At each side of the first floor, which has arched windows, the head of which is filled in with carved work, there are double red granite pilasters, whilst at the angles of the second floor there are panels faced with polished grey granite. The third floor has a range of four arched windows, divided by red granite shafts and capitals. Above is a bold cornice, the elevation being surmounted by three dormers, and an ornamental iron cresting.

The whole of the old block of buildings on the north side of Fleet-street, forming Peterborough-court, which has formed the publishing and editorial offices of the *Daily Telegraph* for some years past, is intended to be taken down, and an entirely new block of buildings erected on its site. The buildings will have a frontage to Fleet-street of about 60 ft., rising to a

height of between 70 ft. and 80 ft., and when completed will form one of the most prominent features in the thoroughfare. At the west side of the frontage in Fleet-street, there will be a private carriage-entrance. The building is to extend to a depth of about 100 ft. southwards, the printing and publishing departments occupying an extensive area in the rear.

Messrs. Arding, Bond, & Buzzard, of Surrey-street, Strand, are the architects, and Mr. W. Herne, of Bayswater, is the builder.

OBITUARY.

Mr. Stephen Shute, for a number of years managing foreman for Mr. Harry Hems, of Exeter, died on the 3rd inst., of cholera. Mr. Shute was well known over a wide area, not only for his great personal skill, but also for a peculiar amount of quiet tact and unassuming good judgment, which won for him the respect and esteem everywhere of all classes amongst whom he was thrown. Mr. Shute returned home from Belgium a fortnight prior to his decease in the best of health, and succumbed after a few days' illness at the early age of 42, leaving a widow near her confinement, and nine children to mourn his loss. His funeral was attended by many hundreds of members of the various building trades and others, and he was carried the whole distance to Whipton Cemetery (two miles) by those amongst whom he had toiled.

Hermann Anschutz.—The death is announced, at Munich, of this veteran German artist, who had just completed his 78th year. He was one of the pupils of Cornelius. Having studied under Hartmann, in Dresden, and Cornelius, at Dusseldorf, he gave as the first specimen of his talent the picture for the ceiling of the Odéon, at Munich, representing the Judgment of Midas, painted when he was only twenty-eight years of age. The King of Bavaria, Louis I., was so pleased with this that he sent the young artist to Italy to study the remains of ancient painting in the Museo Borbonico, and at Herculaneum and Pompeii. Returning to Munich, Anschutz executed a series of frescos and encaustic pictures in the Royal Palace in the ancient style, after designs by Leo von Klenze and Zimmerman. In this work he was partly assisted by Nilson and Hiltensperger. He subsequently resumed oil painting. Forty years ago he was made Professor of Painting in the Munich Academy of Arts, a post which he resigned in 1872, on account of enfeebled health.

COMPETITIONS.

Broadstairs Drainage.—At the last meeting of the Broadstairs Local Board, it was reported that a number of plans and estimates had been received for the proposed drainage works. The chairman (Mr. Clark) suggested the appointment of a competent engineer to examine the plans and advise the Board as to the best scheme to be adopted. Mr. Kidd (a member of the Board) said he had a scheme, submitted before he knew he was going to be a member of the Board, and wished the plans to be inspected by the Board before deciding to consult an engineer, and moved that the plans be received and submitted to a committee with instructions to consider and report at a future meeting, such committee, if necessary, to be a committee of the whole Board. This motion was seconded and carried. Specifications and plans were sent in by the following firms, viz., Russ & Minns, London (estimated cost 6,440*l.*); Jas. Lumley & Co., Bradford (8,390*l.* 5s.); Winship & Harrison, London (11,400*l.*); Le Fevere & Co., Budge-row, London (26,000*l.*); T. Hennell, London (9,820*l.*); Rowell & Harding, London (12,000*l.*); Gotto & Beesley, London (7,560*l.*); Dudley & De Salis, London (5,515*l.*); T. Taylor, London (mains 5,874*l.*, branches 1,727*l.*, total 7,601*l.*); H. Parker (8,500*l.*),—to run it into sea at North Foreland, 6,500*l.*; Benjamin Nichols & Co., Birmingham (8,540*l.*); J. G. Clow, Dartford (22,608*l.* 13s. 8d.); Saunders & Collard, London (4,994*l.*); E. F. Griffith, London (7,900*l.*); J. Kidd, St. Peter's (6,500*l.*). Ultimately, it was resolved that the plans should be referred to a committee of the whole Board for consideration. "One who wants to know" writes to *Keble's Gazette*,—"Is it not an anomaly that a gentleman who has submitted a plan for the drainage of Broadstairs and St. Peter's, should accept a seat on the Local Board just at the time that that Board has to discuss his and other plans, and should still allow his plan to remain in competition? And is it advisable for a body of gentlemen, who are not engineers, to go into committee to discuss the merits of some fifteen elaborate plans for the drainage of this district, without the assistance of an unbiassed professional man?" To his first question we would reply in the affirmative, and to the second we would say,—Decidedly not; if the members of the Local Board take this course, the inhabitant ratepayers will very likely rue the day.

Competition for a Villa Residence. — The *Staffordshire Advertiser* says that of twenty-six sets of plans that were submitted in competition for a proposed new villa at Swansea, those of Mr. J. P. Mumford, architect and surveyor, of Rugeley, were accepted. Sad work!

GLASGOW MUNICIPAL BUILDINGS.

LETTER FROM MR. CORSON.

MR. GEORGE CORSON, of Leeds, who will receive the first premium for his design for the new municipal buildings at Glasgow, has written to the Glasgow Town Council a letter, in which he refers at considerable length to the style and cost of the new buildings. As estimated by himself and Mr. Barry respectively, he says it is evident that Mr. Barry has taken his London experience and London prices in forming his calculation of the expense. Glasgow prices are, if anything, under those of Leeds; and he has taken the cost of the Leeds Municipal Buildings, which he is now erecting, as a guide in forming an estimate of the Glasgow buildings, and as a result of one of his calculations he has added 20 per cent. to the rate per cubic foot. Thus, while the Leeds buildings are to cost 10d., the Glasgow structure would be 1s. per cubic foot. In this average he includes domes and towers.

In concluding his letter Mr. Corson says:—

"I may mention that the late Mr. Cockerell, architect, of London, who was the referee in the Leeds competition, reported in favour of my design, but also said that none of the designs could in his opinion be carried out for less than 1s. a foot. The result of the estimates accepted proved he was wrong, and that my estimate was ample. The total area covered by the Leeds buildings is 3,054 yards. The Leeds Town-hall, which cost 120,000*l.*, including land and fittings, has an area of 5,800 yards, entirely covered by buildings. The total area covered by the Glasgow buildings is 5,608 yards. In each case the area of the courtyard or quadrangle is deducted. Assuming that the above facts prove the correctness of my estimate, I venture to submit that I have fulfilled all the conditions of the competition, and that it would be manifestly unfair to select for execution, in preference to mine, any of the designs that have broken the condition as to cost. If I had thought it right to take a margin of another 100,000*l.*, I venture to think that my design would have stood first absolutely, as Mr. Barry has placed it first of such designs as adhered to the restricted cost."

The designs, still on view in the Corporation galleries, are attracting a considerable amount of attention; and before the Corporation concludes an arrangement with any architect, some exciting scenes will be witnessed in the Council chamber. Indeed, one of the daily newspapers advises the abandonment of the scheme on account of the expense, and the necessity there is for adopting a sewage scheme.

TRAMWAYS.

Southwark and Deptford.—The permanent way of the Southwark and Deptford tramway is being rapidly laid between Deptford Lower-road and the Spa-road railway station, Bermondsey, about 200 yards being, on the average, completed each week. The stabling for the company's horses and the sheds for the cars will soon be completed, and the cars are nearly ready for delivery, so that it is expected a portion of the line, between Deptford Lower-road, near the crossing of the Brighton Railway, and the Spa-road station of the South-Eastern Railway, will be opened for traffic in a few weeks.

Oldham.—It was stated on the 9th inst., at the meeting of the Oldham surveyor's committee, by the borough surveyor, that the Oldham tramway line, which has been in course of construction about nine months, is now completed. A communication has been received from General Hutchinson, who will inspect the line on behalf of the Local Government Board. The Failsworth tramway is to be inspected at the same time. The Oldham line of tramway has cost between 25,000*l.* and 30,000*l.*, and has been let to the Manchester Carriage Company, who will therefore have in their hands the through tram-line from Manchester to Oldham.

RENTAL AND SANITARY REFORM.

ON Sunday last, what is described as a crowded meeting, convened by the "Local Rights Association for Rental and Sanitary Reform," was held at the Democratic Club, Rose-street, Soho, to take into consideration the best means of advancing the objects of the Society, and to receive reports from members who had visited certain premises which it was alleged were in an unsanitary condition, and for which excessive rents were charged by the house-farmers.

The chair was taken by Mr. Duggan, who stated that the Association had appointed a commissioner to inspect the localities in which houses, and the tenements in them, were in an unsanitary state, and that morning reports would be submitted of the wretched condition in which numbers of the working classes are obliged to live. Last Saturday he visited a district, not far from where they were now met, and was invited to inspect a man's house. He did so, and, on going up the stairs, found it necessary to take two and even three steps at a time, in such a dilapidated state were the stairs. The working man lived at the top of the house, but there was not what could be called a roof on the habitation. The floor was full of holes, and the man,—it being Saturday,—was drying his clothes in the room in which he lived and slept, and for which he was paying 4s. 6d. a week. Now, that plainly showed that if the inspectors of nuisances did their duty, such a state of things could not exist. He went to another house in the neighbourhood of Holborn, and there, in a wretched hovel, he found a man suffering from English cholera, his wife having been previously afflicted with the same epidemic,—in fact, in the whole place the inhabitants had been "down" with diarrhœa and cholera, and no wonder, such were the unsanitary conditions under which the poor people lived. It was, indeed, high time that some association took these scandalous matters in hand.

Mr. E. Dunn (hon. secretary) said cases like those reported by the chairman, with scores of others, would be embodied in a comprehensive report for presentation to the Secretary of State, Sir William Vernon Harcourt, M.P., and also to the Metropolitan Board of Works. In the report no delicacy as to concealing the actual addresses of the unsanitary houses need be observed. He had during the week visited six different washhouses in the neighbourhood of Edgware-road, and in all of them there was that peculiar effluvia arising from the drains not being properly trapped. Many of the poor working classes were compelled to live near the aristocracy, because they had to work for them, and must live either in these old "shanties," or in "model" dwellings. As to the public baths and washhouses, how could women, who must bring their children with them, use these, which were filled with steam?

Other speakers addressed the meeting, which was adjourned, after a resolution in support of the objects of the association was passed.

DRAINAGE AND SEWERAGE WORKS.

Dorchester.—The Town Council (acting as the Local Board) have passed a resolution requesting the surveyor (Mr. Thomas) to prepare plans of works for the treatment of the sewerage of the town. A committee appointed by the Council had previously reported adversely to placing the works in the hands of the Native Guano Company ("A. B. C." process) or the Rivers Purification Association, on the score of expense, and recommending, at the same time, that the work should be placed in the hands of the surveyor.

Loughborough.—At a recent meeting of the Loughborough Board of Guardians (acting as the Rural Sanitary Authority) the Clerk stated that he had received a letter from the Local Government Board containing Major Tulloch's report upon the sewerage works. It appears that some months ago a dispute occurred between the Sanitary Authority and their engineer, and that in consequence the Local Government Board were appealed to to send down one of their engineering inspectors. The Sanitary Authority alleged that their engineer had selected ground altogether unsuitable for a sewage farm, the greater portion of it being above the outfall, and that the scheme had not been carried out in accordance with the plan approved by them. The letter stated that the

Local Government Board had received from their inspector, Major Tulloch, a report upon his conference with the Rural Sanitary Authority with regard to the works of sewerage and sewage disposal for the village of Sheepshed, and had learnt from Major Tulloch that the land for the purification of the sewage has not been judiciously selected, as, with the exception of eight acres, it lay too high to allow of the sewage flowing on to it unless the sewers are worked under pressure. Major Tulloch stated that he recommended the Sanitary Authority to exchange the unsuitable land for some more available, or, if this should be impracticable, to purify the sewage on the eight acres. The Board also found that the sewers had been so laid as to work under pressure, although Major Tulloch had brought under the notice of the engineer the serious objection to this being done. It being the opinion of the Guardians that it was not desirable to entrust Mr. Stephens with the carrying out of the works suggested by the inspector, it was unanimously resolved to retain Mr. George Hodson, C.E., of Loughborough, and the clerk was directed to instruct him to consider the suggestions, inspect the outfall and land leased by the Authority, and ascertain what land suitable for irrigation could be obtained in exchange for the land leased, and to report fully thereon at the next meeting.

MASTERS AND MEN.

Wages in the Pottery Trade.—At a meeting of the Staffordshire Potteries Arbitration Board at Hanley, last week, it was stated that every branch of workmen in the pottery trade had resolved to give notice to the employers for an increase of wages to the same level as they were before. Lord Hatherley, as umpire to the board, gave the award reducing the wages eight per cent. in November last. Most of the men have expressed their willingness to submit the matter to arbitration, but the men in three important branches of the trade have not yet decided to accept arbitration. Mr. Brassey, M.P., will sit as umpire in October, preparatory to the annual revision of the wages list in November.

Weston-Super-Mare. — A misunderstanding exists between employer and employed in the building trade, and the Society men are out on strike. The masters rely on filling any vacancies in their staff with men from Bristol, where, it is stated, there are many able and willing to work with but little to do.

HOW SUBURBAN DWELLINGS ARE BUILT.

HEAVY PENALTIES.

At the Edmonton Petty Sessions, on Monday last before Messrs. Abbiss and Howard, divisional justices Mr. George Preedy, builder, of 69, Mayfield-road, Dalston appeared to answer four summonses obtained at the instance of the Edmonton Local Board, which charged him with infringing the bye-laws of the said Board, which provided that the walls of new buildings "shall be efficiently and solidly bonded and put together with mortar or cement."

Mr. Moulder, solicitor and clerk to the Board, conducted the proceedings, and having briefly mentioned the facts, called

Mr. Johnson, assistant-surveyor, who deposed that in the course of his duties he visited certain houses which were being erected by the defendant at Jeremy's-green, Lower Edmonton. He noticed a heap of substance containing about 32 yards, covered with sand. He obtained a spade, and dug into the heap, and found that, with the exception of a slight coating of sand, it was common mould. He called the attention of defendant to it, who said he had purchased the heap as it stood. Witness told him that it must not be used for building purposes, and he asked to be allowed to scrape off the sand, promising not to use the soil. Witness visited the place the next day, and found that it was not being used. On a subsequent visit witness noticed that the heap had been removed from the spot where he first discovered it to another place about five yards off. He went again the next day, and found that the mould had been covered with sand as before, simply as a blind. Witness remonstrated, and defendant said it had been covered by mistake. He warned the defendant that the material must not on any account be used as mortar, and he said it should not be. On the 23rd of August witness found the mould and sand being screened together; on the 24th being mixed; and on the 25th being used as mortar in the construction of four dwelling-houses.

Samples of the material were produced, and were easily reduced to dust between the fingers.

Mr. Moulder.—Can walls be solidly bonded together with that stuff?

Witness.—No. I could easily knock all the work down with my hand.

Mr. Moulder.—What do you say that stuff consists of?

Witness.—Of about eight parts of mould to one of sand, and very little lime.

Other evidence having been given,—

Defendant said, as soon as his attention was called to the bad material he pulled the work down and built it up with better stuff.

Mr. Abbiss.—Pulling down the work under such circumstances is no answer to the charge. You should have used proper material at first. You were cautioned more than once, but you went on notwithstanding. You knew you were doing wrong.

Defendant called a witness, who said he was employed to manage the brickwork, and he had used worse material on larger jobs.

Mr. Abbiss said the case had been fully made out, and that the Local Board were simply doing their duty in seeing that houses were built that would be safe and sound. Defendant must pay the full penalty of 5*l.* in respect of each house,—20*l.* altogether,—with 1*l.* 12*s.* costs, and in default a distress warrant would issue.

PITCH-PINE WOOD FOR WINDOW-CILLS.

SIR,—I cannot agree with all the remarks that were made in the *Builder* two weeks ago, by "An Old Carpenter," respecting the use of pitch-pine wood for window-cills. Having had a large experience in the use of that wood, I have come to the conclusion that if the stuff is thoroughly well seasoned, it comes next in order of merit to English oak. Fifteen years ago I introduced pitch-pine for window-cills on a large estate, where 5 0 or 600 houses have been built, and since then nothing else has been used there for that purpose. As far as my general observation goes, these cills are all now as sound as when they were first fixed. I am in a position to say this as my business calls me into one or another of the houses daily.

This to me is sufficient proof that pitch-pine is a first-rate material for window-cills, and I should certainly prefer using it at any time to inferior oak. H. S.

EXTERNAL COLOUR.

SIR,—Some speculations and discussions that have lately appeared on the artistic colouring of houses, joined to the bare unrelieved appearance of those done in Portland cement, have suggested to me that the latter would be improved by the quoins or corners being finished with raised work done in cement of a considerably darker colour,—say, a dun-brown,—the jambs of the hall-door being made to match.

Other colours might suit different tastes; the colour of dark red sandstone for instance, or of limestone. A. BOYLE.

CHURCH-BUILDING NEWS.

Nunnington.—The restoration of All Saints' Church, Nunnington, near Helmsley, North Yorkshire, is about to be undertaken. This church was built about 600 years ago, and was partially rebuilt in 1671. It is now in a most dilapidated condition; in fact, it was condemned as thoroughly unsound thirty years ago. The proposition was first to pull it down completely, but now a thorough restoration has been determined on; and Mr. Ewan Christian, the architect of the Ecclesiastical Commissioners, has been entrusted with the work, which will include the removal of the low white-washed ceiling of the chancel and nave, the formation of a new side aisle, but putting back the north wall; building of new open roofs, rebuilding of vestry and porch, adding an organ-chamber and new organ, opening out the tower and facing the unfinished west arch, the provision of open seats and new reading-desk, and the introduction of a system of warming and ventilation. Thirty-six additional sittings will be gained in the aisle, and eighteen more in the tower, by the alterations, which, it is estimated, will cost 2,200*l.* Mrs. Rutson, of Newby Wiske, has already offered 800*l.* and some stone, and Mr. John Rutson gifts of 300*l.* value towards the restoration.

Kirkdale.—The parish church of Kirkdale, near Kirbymoorside, is now in course of restoration. A new roof, of oak, and slated, will replace the old flat one, and will be 12 ft. higher than it. A new three-light east window is to be inserted, and also one in the south wall of the chancel. The old painted seats in the chancel are being removed. A system of drainage of the churchyard will be put in, the chancel floor laid with concrete, and then covered with polished flags. In removing the old roof the supporting beams were found to be quite rotten, and other portions were very much decayed. In removing the soil near the altar the workmen came upon three lead coffins, the outer coverings of which had mouldered away. The restoration is in the hands of Mr. S. Crowther, architect, of Manchester, and the contract will be carried out by Mr. Mark Foggett, builder, of the same city.

Llawr-y-Glyn (near Llanidloes).—The foundation-stone of a new church at Llawr-y-Glyn, which is about six miles from Llanidloes, has been laid. Mr. N. Bennett Owen gave the site, which is in the valley of the Trannon. The building will be erected of grey stone, in the Gothic style, from the designs of Messrs. Jones & Park. It is to accommodate 150 worshippers, and its cost, exclusive of bells, will be 900*l.*

Noss.—On the 10th inst. was laid the corner-stone of a new church at Noss, a growing village on the banks of the river Yealm, in the parish of Revelstoke. The building is to cost about 3,000*l.*, and will be erected from the designs of Mr. J. Piers St. Aubyn, architect. His plans show a church, in the Perpendicular style, for the accommodation of 250 persons. It will consist of a tower, nave, north and south aisles, with two entrances,—a south porch, with doorway under the tower. The vestry will be under the north aisle, and approached by a flight of granite steps. The structure will be built of local stone, with granite dressings, with an oaken roof. The clerk of the works is Mr. Crosbie, and the building will be put up by workmen in the employ of Mr. Edward C. Baring (lord of the manor, who is erecting the church at his own expense.)

Old Deer (N.B.).—The foundation-stone of a tower to the church of Old Deer has been laid. The tower, which is being erected at the south-east corner of the church, is of Aikey Brae granite, from a design by Mr. Raeburn, architect, Edinburgh, and will rise to a height of 73 ft. Above the tower will be a slated spire, rising to an additional height of about 30 ft. The tower has a room for a library on the basement floor, and a bell-tower and clock above.

SCHOOL-BUILDING NEWS.

Ardwick, Manchester. — A new Wesleyan Sunday-school which has been erected in Chancery-lane, Ardwick, was formally opened on the 9th inst. The building occupies the site of the old Chancery-lane School, erected in 1817, and externally is of red brick, with terra cotta and Hollington stone dressings, the style being Gothic. The building is three stories in height, and has two entrances — one for boys, in Chancery-lane, and the other for girls, in York-street. On the ground-floor, there is a large room 60 ft. by 40 ft., and a room which has been set apart for infants, 30 ft. by 20 ft. There are also on this floor four class-rooms and a library and rooms for the librarian and secretary. The infants' school will afford accommodation for about 200 children. On the first floor, which is reached by a stone staircase, is a lecture-hall, with large vestries and class-rooms. There are eighteen class-rooms, and altogether school accommodation is provided for about 1,300 children. The total cost of the premises, inclusive of the site, has been about 8,000*l.* The work has been carried out by Messrs. R. Neill & Sons, contractors, Manchester, from designs furnished by Mr. Stevens, architect, Manchester. The entrances, it may be stated, are paved with Craven's encaustic tiles, glazed bricks forming dados to the walls on each story.

Monton (Manchester).—The Countess of Ellesmere has just laid the foundation-stone of a new school-room for the district of St. Andrew's, Eccles. The whole scheme is not yet in hand, only one school-room (48 ft. by 30 ft.) and two class-rooms being now in course of erection, but it is intended ultimately to make fuller provision for the wants of that portion of St. Andrew's district, with day and Sunday schools for both boys and girls. The site of the new building is the gift of the Bridgewater trustees, who have presented about one-third of an acre of land off Slack-lane, Monton, nearly opposite Partington-street. Mr. Lord, of John Dalton-street, is the architect, and accommodation will be afforded for about 240 children, at an estimated cost—for the completed and furnished school-room—of 1,420*l.*

VARIORUM.

THE sixth volume of "Proceedings of the Association of Municipal and Sanitary Engineers and Surveyors," recently published by E. & F. Spon (Charing-cross), contains a number of useful papers, many of which received notice in our pages at the time of delivery. The volume is edited by Mr. Graham Smith.——"The Visitors' Handbook to Gloucester Cathedral," by J. H. Billett just now published (Billing, Gloucester), is clearly and sensibly written. It includes a full account of the stalls and other wood carvings.——The very interesting paper on "Samuel Prout, Artist," by Mr. J. Hine, F.R.I.B.A., read before the Plymouth Institution in March last, has been reprinted in a separate form from the Transactions of that Society.

Miscellanea.

The Dignity of Labour.—The annual report of the Howard Association remarks:—"One-sided indeed is 'head knowledge' when it is not applied to a wise recognition of the dignity of manual labour. Both in Great Britain and America 'popular education' (so called) has not yet sufficiently taught this dignity, either to boys or girls, otherwise there would not be the present rush of the former into poverty-stricken clerkships, or of the latter away from the old-fashioned ranks of useful domestic service. One of the best of the myriad letters of Mr. Gladstone was the note written on this subject (dated February, 1877), in which that great statesman said: 'Working men should for themselves, and especially for their children, try more to elevate handicraft, and less to escape from it into the supposed paradise of pen and ink.' And if our pulpits were more practical, and less devoted to aërial generalities of transcendental theology, they would not only, as the *Spectator* wisely suggests, bring down Christianity into the practical duties of every-day life—'how to drive horses with humanity and sell even cabbages with honesty,'—but would also inculcate the truth that handicraft labour has for ever been dignified and ennobled by the participation and example of the Apostolic Tentmaker of Tarsus and Fisherman of Galilee, to say nothing of a still more august Exemplar. This conviction, and its practical recognition, becoming generally popular, the cells of prisons and the wards of workhouses would also, assuredly, tend to become far less crowded by miserable inmates."

Unhealthy Dwellings in Marylebone.—The *Daily Chronicle* reports an inquest held by Dr. Hardwicke, the coroner, concerning the death of Robert Bailey Bird, aged four years, of 1, Christchurch-residences, Lisson-street, Marylebone. The deceased, who had been to the Bell-street Board School, complained of his throat being sore, and although everything was done for him, he grew worse. There had been a good deal of illness at the schools, and the deceased some three months ago caught the measles there. There had been scarlet fever in the house, which contained twenty rooms, which were let out to ten families, each family having two rooms. The dust-bin, which was just outside the room-door of the parents of the deceased, smelt very badly, as it was not emptied often enough, whilst near to that was a waste water-pipe, down which the persons who lived upstairs emptied their dirty water, which ran into an open drain, and the smell therefrom was very bad. Dr. John Cuy Westmacott said that he had made a *post-mortem* examination, and found that death was from inflammation and ulcers of the windpipe, and from the evidence given he should say it was caused by diphtheria or scarlet fever, arising from the condition of the house. The jury returned a verdict that the deceased died from inflammation and ulceration of the windpipe whilst suffering from blood poisoning, arising from diphtheria and scarlet fever. The jury added that the sanitary condition of the house was unsatisfactory, and that a report respecting the drainage accommodation should be made to the Marylebone Vestry.

Condition and Health of Paris.—The abominable smells that pervade some quarters of Paris, and the unusual mortality of the last two months (the death-rate for July and August shows an immense increase over the corresponding period of 1879), are beginning to cause uneasiness to the Municipal Board of Health. According to the *Standard*, the medical men of whom it consists have held a meeting, the only result of which was a further illustration of doctors disagreeing. One gentleman held that the sewers were at fault; another, that the new system for utilising the contents of Parisian cesspools as manure did all the mischief. The condition of the water is also abominable, and has much to answer for. There has been no rain for six weeks to speak of, and there are 80,000 cesspools in Paris, to which the evil is to be traced. As, however, hundreds of people over the usual average are being killed, it would be gratifying to know that steps were being taken to remedy the known evils.

Scarcity of Water in Cardiff.—In consequence of the continued drought, the inhabitants of Cardiff were, on the 9th inst., called upon by placards to economise their consumption of water.

The Sanitary Institute of Great Britain.—This Institute,—the president of which is the Duke of Northumberland,—will hold its autumn congress next week, in Exeter, under the presidency of Earl Fortescue. In connexion with the meeting there will be an exhibition of sanitary appliances and apparatus, which is to remain open for more than a fortnight. The sections of the Congress are:—1. Sanitary Science and Preventive Medicine; president, Dr. De Chanmont, F.R.S. Section 2, Engineering and Sanitary Construction; president, Mr. Robert Rawlinson, C.B., M.I.C.E. Section 3, Meteorology and Geology; president, Sir Antonio Brady, F.M.S. The order of proceedings will be as follows:—September 21st., public luncheon at the Guildhall; three p.m., opening of the exhibition by the Mayor of Exeter; eight p.m., first general meeting; opening address by the president, Earl Fortescue. September 22nd, second general meeting. Section 1.—Address by the president of the section, to be followed by papers and discussions on Sanitary Science and Preventive Medicine; in the evening a *conversazione* will be held by invitation of the Bishop of Exeter at the Palace. September 23rd, third general meeting. Section 2.—Address by the President, followed by papers and discussions on engineering and sanitary construction. In the evening Dr. Richardson, F.R.S., will deliver a lecture. September 24th, fourth general meeting. Section 3.—Address by the President, followed by papers and discussions, meteorological, geological, and geographical. In the evening the closing general meeting of the Congress will be held, to be followed by a public dinner. The next day (Saturday) will be devoted to excursions.

Mural Paintings in Manchester Town Hall.—Mr. Ford Madox-Brown has just completed the second panel of his frescos now being painted in the town-hall of Manchester, and a writer in the *Liverpool Daily News* gives some interesting particulars of the work. The panel first painted (the second in order on the walls) is entitled "The Baptism of Edwin," and is illustrative of an important event in the very early history of Manchester. Panel No. 1 (the second painted) represents the Romans building a fort at Mancenion, and the subject embodies the foundation of Manchester, for although the British name Mancenion seems to indicate its locality as a centre for population, it is uncertain that anything worthy of the name of a town existed before the Roman Mancunium. The writer says,—"There may be less profusion of concentrated thought in this panel than in the other, but there is more of collateral invention, and as we half-listen to the piercing wind whistling about the limbs of the builders, and surging amongst the rich folds of Agricola's robes and of his wife's fur cloak,—the whole being wild, biting, and inveterate,—we cannot but feel that this is altogether the more satisfactory work. The cartoon for the third panel (still unpainted) represents the expulsion of the Danes from Manchester, and is a picture heaving, nay, rocking and reeling, with terrible energy, yet touched on the humoristic side also with certain curious incidents."

A New Monastery in Sussex.—Between Brighton and Worthing there is being erected a large Carthusian monastery, to be dedicated to St. Hugh, an offshoot of the Monastery of the Grande Chartreuse, in the mountains of Dauphiné. The estate is about 350 acres, of which fifteen are covered with buildings. The architect is M. Normande. To give an idea of its magnitude, it may be stated that the main court is larger than the Tom Quad, at Christ Church, Oxford, or the great court of Trinity at Cambridge, and is surrounded by a range of cloisters with stone-fretted vaults. The chapel is to be of cathedral-like dimensions.

Luminous Paint for Railway Carriages. The ceilings of carriages on the Great Northern, Midland, and Lancashire and Yorkshire railways have been painted with luminous paint, and passenger-trains composed of these carriages, when passing in the daytime through long tunnels, have not now to be lighted by means of oil-lamps, as is usually the case, there being sufficient light reflected from the luminous paint.

Mr. Rupert Kettle.—Her Majesty has conferred the honour of knighthood upon Mr. Rupert Kettle, of Wolverhampton, in recognition of the services he has for many years rendered as arbitrator in connexion with wages disputes in the iron trade and other leading industries of the kingdom.

Artisans' Dwellings in Dublin.—The report of the directors of the Dublin Artisans' Dwellings Company for the half-year ending 30th June last, states that the capital subscribed is now 33,730*l.* All the buildings on the Manor-street site have been handed over by the contractor. They consist of four two-storied cottages facing Manor-street, thirty-two of a somewhat similar size in Kirwan-street, and thirty-six one-storied cottages at the rear. The directors have in course of erection four cottages on a site in Buckingham-street. Negotiations with the Corporation are pending for a lease from them of the site known as the Coombe area, containing 4½ acres, at a rent of 200*l.* a year, commencing from the 1st of January, 1883. The directors propose to expend at least 20,000*l.* in building upon this site. A moiety of this amount will be borrowed from the Board of Public Works; one shareholder has promised to contribute 4,000*l.*, and the directors rely on the shareholders and public subscribing the balance required. The directors believe the site to be a most suitable one in all respects; it will give space for the erection of 200 cottages. The rental of the company's property up to the 30th of June, 1880, was 1,234*l.* 7*s.* 4*d.*, as compared with 1,114*l.* 4*s.* 8*d.* for the half-year ending December, 1879, showing an increase of 120*l.* 2*s.* 8*d.* The arrears of rent were 34*l.* 15*s.* 9*d.*; and out of a total number of 261 tenements, there were occupied 241. The entire revenue for the half-year, including balance of 61*l.* 19*s.* 2*d.* remaining after paying last dividend, amounts to 1,340*l.* 5*s.* 9*d.*, which, after providing for all expenses, will leave a balance of 799*l.* 11*s.* 5*d.* out of which the directors recommend a dividend at the rate of 4 per cent. per annum, leaving a balance of 127*l.* 12*s.* 11*d.*

A Reredos Difficulty.—Previously to the consecration of the church of St. John the Evangelist, Walton-on-the-Hill, near Liverpool, a memorial from a body of the parishioners was presented to the Bishop of Liverpool, calling attention to the existence of "a piece of sculpture containing in relief a full-length figure representing Our Saviour extended on a cross, with figures of the Virgin Mary and St. John at the foot of it, affixed to the wall over the communion-table." The reredos in question is the gift of Mrs. Gerard Leigh, of Luton, and was executed by Mr. J. Woolner, R.A. The Bishop of Liverpool, in reply, said,—"I do not like the sculpture over the communion-table, and I do not like the separation between the chancel and the body of the church. Speaking for myself, I should never think of adorning or arranging a church after such a fashion. But the question is not what I like personally or dislike, but what is legal, or rather what is not forbidden by the law of the Church of England. Now, I am informed by my legal officials that there is nothing in the church of St. John the Evangelist, Walton, which exceeds the limits allowed by the law of the Church of England. Under these circumstances I do not see that I can refuse to consecrate the church, whatever my own private feelings may be. If I call upon others to respect and obey the law, I must not set an example of disregarding legal decisions myself."

An English Colony in America.—Mr. Thomas Hughes, M.P., is in the United States on behalf of the English Emigration Association to found its first American colony. The Association has bought 300,000 acres of land, the tract extending through four counties of Eastern Tennessee. It is a fertile plateau in the valley of the Cumberland river; and Mr. Hughes will inaugurate the colonisation project during September by visiting the locality and delivering an address. The land has been surveyed and laid out in farms; some settlers are already there; hotels, nurseries, and fruit orchards have been started; towns are planned with extensive reservations for parks. The colonists are not expected to be of the poor classes, but will be English tenant-farmers, well-to-do tradesmen, manufacturers, and the younger sons of the gentry.

Death-rate in Dublin.—According to Dr. Cameron's report on the state of public health in Dublin during August, 1880, the deaths within the municipal area during the month were in the annual ratio of 39·27 per 1,000 persons living. On the northern side of the city the rate was 44·85 per 1,000; and on the southern side 36·82 per 1,000. The general death-rate was high, and the zymotic death-rate very high for the season.

York Minster.—Last week Mr. Street, under whose supervision the restoration of the south transept of York Minster has been carried out, paid his final visit of inspection prior to the scaffolding being removed from the southern façade. He expressed to Mr. Bradley, the clerk of the works, his warmest thanks for the excellent manner in which the work had been carried out, and also congratulated Mr. Milburn upon the satisfactory execution of the whole of the carving. The *York Herald* says it is not intended to proceed with the western aisle of the transept until the question of the new Will Office is finally decided. It is understood to be the intention of the Dean to have the ground now used as the stone-yard laid out as a grass plot, instead of being covered with gravel, as it was previously to the commencement of the restoration. It is now nearly nine years since the restoration of the south transept was commenced. The following have been the contractors:—Mr. J. Robinson, plumber, of Little Stonegate, for the leadwork of the aisle and transept roof; Mr. Rockledge, of Little Stonegate, for the new boarded ceiling, &c.; Mr. S. Thomas, painter, of Stonegate, for decorating the ceiling.

The Atmosphere of the Metropolitan Railway.—Frequent travellers by the Metropolitan Railway are not to be envied the atmosphere they have to breathe in the tunnel between (say) King's-cross and Paddington. Various plans for the purification of the air have recently been under the consideration of the company. It is stated that, in a modified form, a plan invented by Dr. Richard Neale is about to be tried on the line between King's-cross and Edgware-road. The proposal is to have a carriage, from which the ends and the greater portion of the sides are removed, fitted up with trays of lime placed obliquely, and moistened by water dripping down from the top of the carriage, and placed next the engine of the train. It is asserted that the air in the tunnel can be perfectly purified by this process, as a large quantity of impure air, coming into contact with the lime, would lose the noxious gases, and escape purified at the end of the carriage. Another proposed plan is to erect at Portland-road a screen consisting of many layers of coarse canvas, or similar material, moistened with a soda solution.

Growth of the Metropolis.—The annual report of Sir Edmund Henderson on the Metropolitan Police says that the increase of the metropolis during the year 1879 comprised 21,589 new houses, forming 401 new streets and two new squares, of a total length of 71 miles 468 yards. This makes the length of new streets added to the metropolis and handed over to police protection during the last ten years, 383 miles, 758 yards. Valuing the houses built in the year at an average of 300*l.* each, we have an investment of 6½ millions sterling.

A Canadian Cotton Factory.—The new Craven Cotton Factory, Brantford, Canada, is approaching completion. It is four stories in height, and is 175 ft. long by 73 ft. wide. The mill is being erected under the direction of Mr. Thomas Broughton. The doors, sash and window frames are supplied by Schultz Bros., and the painting by Mr. John Tainsh. The lumber is furnished by Mr. Wm. Young, and the brick by Messrs. Workman & Watt. The stone for the masonry for the ground floor and wheel house, which is substantially built, is chiefly brought from Troy, near Brantford.

Water Mstags at Hereford.—At Hereford there are in use 150 water-meters, and it is found that the quantity of water consumed where meters have been fixed does not exceed 10 gallons per head per day, whilst the average consumption all over the city is 40 gallons per head. The Hereford City Surveyor says:—"I am sure some gentlemen in this city have to pay as much as 10s. per 1,000 gallons for water used at their houses, whilst others close by do not pay 2d. per 1,000."

Reredos at Knapton.—A reredos, the gift of Mr. James Tirdall, has just been erected at Knapton Church, in the picturesque valley of the Derwent, some six miles from Malton. The church, dedicated to St. Edmund, is an old building, in the main of Early Decorated work, and consists of a nave, chancel, and north aisle. From time to time works of restoration have taken place therein, under the direction of Messrs. John Gibson & Son, architects, of Malton, who have also designed the reredos, which has been executed in English oak by Mr. Harry Hems, of Exeter.

City of London Public Works.—The following is an epitome of a tabular statement showing the loans raised by the City within the last quarter of a century for the purpose of public improvements:—For the formation of the Metropolitan Cattle Market and extension of its slaughter-houses, 1852-6 and 1873-6, 478,600*l.* For the Holborn-valley and Farringdon-market improvements, 1864-72, 2,376,000*l.* For the Metropolitan Meat, Poultry, Fruit, and Vegetable Market, site, approaches, &c., 1863-78, 1,037,000*l.* For the London Central Fruit, Flower, and Vegetable Market, approaches, &c., 581,000*l.* For the Foreign Cattle Market at Deptford (1870-79), 280,000*l.* For the enlargement of Billingsgate Market (1872-8), 272,000*l.* For the building of the Royal Exchange, 98,500*l.*; for the rebuilding of Blackfriars Bridge (1864), 300,000*l.*; for ditto and the purchase of Southwark Bridge (1867-9), 315,000*l.*; for the preservation of open spaces (1876-9), 100,000*l.* Out of the above accounts the only amounts paid off apparently are 604,100*l.* on the Holborn-valley improvements; 113,000*l.* on the Metropolitan Meat and Poultry Market, &c.; 22,000*l.* on the Deptford Cattle-market, 8,200*l.* on the Royal Exchange, and 60,000*l.* on Southwark Bridge. The total amounts due for the above-mentioned purposes stood, according to the above account, on the 31st of December last, at 5,129,800*l.*

Railway Construction in Australia.—Notification of an important change in the railway policy of the Queensland Government has been made. Until recently, the Government have followed the plan in force in the Australian colonies generally, of borrowing money for the construction of lines. Now, the *Melbourne Argus* says, they have determined to adopt the American land-grant system. During his recent visit to London, Mr. M'Ilwraith (the Premier) found that English capitalists were willing, and even eager, to make Queensland railways on these terms. Two syndicates were anxious to drive a bargain with him on the spot. So impressed was he with what he saw and heard, that he has determined now to stop the trunk lines at the earliest convenient opportunity, and to arrange for their continuation by private companies. He is quite determined not to go on with the present system of building these railways at the Government expense, and if any of them do not offer sufficient inducements to private enterprise, they will have to remain in abeyance.

The Value of our Minerals.—According to the report of Mr. Robert Hunt, F.R.S., Keeper of the Mining Records, the total value of the minerals produced last year was 55,733,967*l.*, about half a million less than in 1878. The production of 1878 was worth 2,000,000*l.* less than that of 1877, and that year showed a small diminution as compared with 1876. The figures for 1880 may be expected to be the first of an ascending scale.

The Association of Municipal and Sanitary Engineers and Surveyors will hold their Northern District Meeting at Darlington, on the 24th inst. The following papers will be read and discussed:—"Sheldon Sewage Disposal," by Mr. James Cregge; "Sanitary Appliances," by Mr. George Bell; and during the day the Darlington Sewage Farm, the Darlington Ironworks, the Park, and the Darlington and Stockton Waterworks will be visited.

Fire at a Builder's.—On Friday, the 10th inst., between eight and nine o'clock p.m., a serious outbreak of fire occurred on the premises of Messrs. Brass, builders and contractors, situated in Old-street, St. Luke's. Independently of extensive carpentry, joinery, and other workshops, there was stabling for eighteen horses, that number being then in their stables. The premises were completely gutted, and serious damage done to the surrounding property. Fortunately, the horses were got out without sustaining serious injury.

Lambeth Baths.—Mr. H. E. Pearce writes,—"I beg to inform you that my new newspaper kiosque, which is now in course of erection at the Lambeth Baths Pavilion, will be opened on Saturday, October 2nd. Will you be good enough to mention that your paper will be on sale there?"

An Exhibition of Gas Apparatus is now being held in Dublin, under the auspices of the "Alliance and Consumers' Gas Company." It includes cooking and heating appliances for use with gas, which are shown in full work. A similar exhibition is about to be held in Glasgow.

TENDERS

For rebuilding warehouse, No. 31, Houndsditch and Duke-street, for Messrs. Samuels & Co. Mr. H. H. Collins, architect. Quantities supplied by Messrs. Batstone Bros.:—

Sparks	£6,205 0 0
Ashby & Horner	6,170 0 0
Marks	6,026 0 0
Conder	5,938 0 0
King & Son	5,882 0 0
Kirk & Randall	5,846 0 0
Outhwaite	5,830 0 0
Col s & Sons	5,760 0 0
Downs	5,675 0 0
Croaker	5,585 0 0
Merritt & Ashby	5,550 0 0
Sabey & Son	5,495 0 0
Bentley	5,430 0 0
Abraham	5,384 0 0

For shops and houses to be erected at Landor-road, Stockwell, for Mr. C. W. C. Hutton. Mr. H. H. Collins, architect. Quantities by Messrs. Batstone Bros.:—

King & Son	£6,275 0 0
Higgs & Hill	6,240 0 0
Robinson	6,080 0 0
Taylor	5,937 0 0
Harris	5,904 0 0
Rice	5,850 0 0
Sabey & Son	5,824 0 0
Pack Bros.	5,795 0 0
Brass	5,687 0 0
Mitchell	5,678 0 0
Abraham	5,657 0 0
Kirk & Randall	5,648 0 0
Croaker	5,490 0 0
Colls & Sons	5,457 0 0
Downs	5,377 0 0
Sheffield & Prebble	5,173 0 0

For additions to the Rectory, at Hornsey, Middlesex, for the Rev. James Jeakes, M.A. Messrs. Wadmore & Baker, architects:—

Clark & Bracey	£1,735 0 0
Conder	1,735 0 0
Scrivener	1,710 0 0
Ashby Bros.	1,697 0 0
Shurmur	1,683 0 0
Dove Bros.	1,585 0 0
Mattock Bros.	1,177 0 0

For extension of premises, Goswell-road, for Messrs. Carter, Paterson, & Co. Mr. William Eve, architect:—

Abrahams	£4,320 0 0
Hall, Beddall, & Co.	4,095 0 0
Heiser	3,948 0 0
Lawrence	3,900 0 0
Harris & Wardrop	3,654 0 0
Hunt, St. Paul's Works, Bow Common (accepted)	3,615 0 0

For the erection of a factory at Millwall, for Mr. J. T. Morton. Mr. William Eve, architect:—

Heiser	£786 0 0
Crabb	769 0 0
Hunt	750 0 0
Harris & Wardrop	739 0 0
Wilson & Exton	738 0 0
Salt, St. Paul's-road, Burdett-road, (accepted)	709 0 0

For the erection of stabling for Messrs. Carter, Paterson, & Co. Mr. William Eve, architect:—

Eary	£490 0 0
Sweet & Loder	450 0 0
Hubble & Trott	389 0 0
Barnes	348 0 0
Nye, Ealing Green (accepted)	330 0 0

For a new fish-market, and extending and ventilating the fruit-market and butchers' market, Ashton-under-Lyne. Messrs. John Eaton & Sons, architects. Quantities supplied by the architects:—

Brown, Stockport	£7,200 0 0
Robinson & Sons, Hyde	6,950 0 0
Burton & Sons, Ashton	6,500 0 0
Castle Hall Saw-mills Co., Stalybridge	6,380 0 0
Holden, Stalybridge	6,289 0 0
France, Stalybridge	6,239 0 0
Meadows, Stockport	6,183 0 0
Haughton, Godley	6,173 0 0
Garside, Barnes, & Co., Stalybridge	6,150 0 0
Quarmby, Linthwaite	5,990 0 0
Herd, Ardwick	5,887 0 0
Napier, Manchester	5,948 0 0
Taylor, Dukinfield	5,882 0 0
Storrs, Sons, & Co., Stalybridge	5,869 0 0
Marsden, Ashton	5,850 0 0
Dyson & Sons	5,680 0 0
Holmes & Webster, Ashton	5,520 0 0
Gibson, Dukinfield	5,510 0 0
Neal, Ashton (accepted)	5,498 0 0

For Leigh special drainage works, for Martley Sanitary Authority. Mr. E. Pritchard, engineer. Quantities by Mr. E. J. Parnell:—

Contract No. 1.—Outfall Sewerage Works, Pipe Sewers, and other works.

Bell, Gateshead	£6,072 9 11
Holland, Leicester	5,391 4 0
Hobb & Glummer, Rotherham	4,487 5 11
Rayner, Liverpool	4,215 0 0
Everall, Great Malvern	4,091 10 0
Small & Sons, Gloucester	3,988 2 5
Jevons, Dudley	3,763 16 8½
Palmer, Birmingham	3,760 0 0
Hunter, Nottingham	3,715 14 4
Law, Kidderminster	3,649 0 0
Young & Nicholson, Chelmsford	3,565 6 8
Bourne, Worcester	3,510 0 0
Dewitt, Harbury	3,423 0 0
Osborn, Malvern	3,325 0 0
Cowderry & Sons, Newent (accepted)	3,278 17 0

For extra story to No. 60, Curzon-street, Mayfair, and additional works for Mr. Widdecombe. Mr. W. H. Collbran, architect. Quantities not supplied:—

Schieran	£1,5 0 0 0
Bolding	1,179 0 0
Henderson	1,097 0 0

For alterations to bar, and repairs, &c. to the Princess Victoria, Lower-road, Deptford, for Mr. Joseph Bartholomew. Mr. Henry Roberts, architect:—

Marr	£623	0	0
Banks	535	0	0
Simpson	493	0	0
Lewis	495	0	0
Godart & Co., Mile End-road (accepted)	446	10	0

For two houses, Spring-road, Bedford, for Mr. M. Hewlett. Mr. F. T. Mercer, architect:—

Moore	£459	0	0
Potter	440	0	0
Wharton (too late)	440	0	0
Boyse & Harris	430	4	7
Sparrow	429	0	0
Lilley (accepted)	427	10	0

For public house at Renhold, Bedfordshire, for Mr. Wells. Mr. F. T. Mercer, architect:—

Moore, Bedford	£490	0	0
Haynes, Sandy	475	10	0
Wharton, Bedford	460	0	0
W. & H. Sparrow, Rushden	450	0	0
Lilley, Bedford	440	0	0
Laughton, Bedford	420	0	0
Harrison, Bedford (accepted)	415	0	0

For house, Spring-road, Bedford, for Mr. E. Alderman. Mr. F. T. Mercer, architect:—

Moore, Bedford	£270	0	0
Croby & Son, Bedford	203	0	0
W. & H. Sparrow, Rushden	242	0	0
Potter, Bedford	240	0	0
Wharton, Bedford	228	10	0
Lilley, Bedford	225	10	0

For the erection of new stable and cottage buildings, Single Gate, Merton, for Mr. W. Goodyear. Mr. R. Cruwys, architect. Quantities supplied:—

Harmer, Wimbledon	£892	0	0
Johnson, Wimbledon	884	0	0
Mundy, Wimbledon	857	0	0
Templer, Merton	799	0	0

Rice, Clapham (accepted with modifications).

For roads and sewers on the first portion of the Champion Hall Estate, Lower Sydenham. Messrs. Stuart, Barker, & Son, surveyors:—

Simmons	£1,342	15	0
Harris	1,130	0	0
Blake	946	0	0
Jackson	915	5	0
W. & J. Woodham (accepted)	803	0	0

For rebuilding the Cock Tavern, Holloway-road, Islington, for Messrs. Lines & Heldon. Mr. W. J. Worthington, architect. Quantities by Messrs. Harris, Worthington, & F. Lennox Canning:—

Clarke & Bracey	£5,287	0	0
Lamble	5,230	0	0
Axley	5,200	0	0
Crockett	4,997	0	0
Hearle & Son	4,993	0	0
Marr	4,982	0	0
Outhwaite & Son	4,950	0	0
Burch & Moore	4,871	0	0
John & Henry Cocks	4,784	0	0
Clemence	4,745	0	0
Cowland Bros.	4,680	0	0
Mortar (accepted)	4,567	0	0
Chapman	4,559	0	0
Jackson & Todd	4,550	0	0

For village hospital, East Grinstead, for Mr. Charles H. Gatty. Mr. E. P. Loftus Brock, architect:—

Norman	£1,790	0	0
Nightingale Bros.	1,783	0	0
Charlwood Bros.	1,485	0	0
Godly (accepted)	1,250	0	0

For repairs and decorations to the Horse Shoe Hotel, Tottenham-court-road. Mr. Flack, architect. No quantities supplied:—

Worrall & Stevens	£1,100	0	0
Schoolbred & Co.	928	0	0
Berridge & Tuce	889	0	0
Collman & Scantlet	887	0	0
Hooman	800	0	0
McLachlan & Sons	749	0	0

For alterations and additions to St. Michael's Church, Stockwell. Mr. Thomas Dashwood, architect. No quantities supplied:—

Burmsa	£1,442	0	0
Lathey Bros.	1,048	0	0
McLachlan & Sons	975	0	0

For a pair of houses at Clement's Estate, Ilford, for Messrs. Withers. Messrs. Whitmore & Kennard, architects. No quantities supplied:—

Hosking	£1,587	0	0
Cardus	1,395	0	0
North Bros.	1,380	0	0
Hobern	1,290	0	0
Hawkings	1,168	0	0
Barnes	1,087	0	0

For rebuilding Nos. 77 and 79, Walworth-road, for Mr. P. Saillord. Mr. Benjamin Tabberer, architect:—

Sabey & Son	£4,130	0	0
Merritt & Ashby	4,097	0	0
Rider	3,948	0	0
Jarrett	3,900	0	0
Mark	3,780	0	0
Ashby Bros.	3,737	0	0
Marsland	3,706	0	0
Downs	3 673	0	0
Lawrence	3,650	0	0
Nightingale	3,633	0	0
Crabb	3,599	0	0
Conder	3,620	0	0

For house and shop, East Barnet. Messrs. Brooking & Nelson, architects. No quantities supplied:—

James, Barnet	£657	0	0
Richardson, Brixton	610	0	0
Butcher, East Barnet	594	0	0
Angood, Tolington Park	580	0	0
Howa.d & Gordon, Barnet	554	0	0
Beal, Battersea	528	0	0
Marriott, Tottenham	505	0	0
King, Hornsey	495	0	0
Ellwood, New Barnet	487	0	0
Miller, Barnet (accepted)	480	0	0
Childs, Tottenham	478	0	0

For the diversion of Pymm's Brook at East Barnet, for the British Land Company, Limited. Mr. Henry B. Michell, surveyor:—

Fizzey	£385	0	0
Dunmore	379	0	0
Acock	337	10	0
Peill & Son	320	0	0
Jackson (accepted)	290	0	0

TO CORRESPONDENTS.

S. S (already referred to).—S. Bros (should send list and amounts).—T. W. H. (intt.)—D. M. (intt.).—J. R. W. shall be forwarded)—F. (received)—H. & J.—W. S—H. H.—J W S.—R. P. S.—W. D—P. G. S.—F. S.—E. P.—D E. & Co.—W. H. C. B.—R F. G.—F. M.—A. S.—W. & R.—L. B & W.—S. B. & Son.—R. C.—J. H. B.—A. G & Co.—D. W.—E. P. L. B.—H. S. M.—W. J. W.—J. B.—J. S. K.—S. R. L.—L & S.—J. L.—A. G. B.—J M G (next week).—Graining (next week).—G. T. H. (next week)—R M B (next week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

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The Builder.

Vol. XXXIX. No. 1964. Saturday, September 25, 1880.

ILLUSTRATIONS.

CONTENTS.

The Cradle of Romanesque Architecture.

THE members of the Architectaral Association who wisely intend to visit Northern Italy this autamn are to be envied their trip to "fruitful Lombardy, the pleasant gardeu of great Italy," where so many iateresting and nniqne featares will reward even the hasty inspection that can alone bo given in the intonded few days' stay in each of the historic towns which are to he visited. Tarin, with its rectilinear streets, resemhling so cariously the plan of an American city, and where that delight of Italy, the *portici*, the arcades which Napoleon after his Italian campaign endeavonred to introdace iato Paris, as we see in the Rue Rivoli, is first met with,—Turin, with its famous Palazzo Madama and its famoas Armeria, hut with little else of interest; Milan, with its thousand treasures, too numerous to epitomise, hut where the artist might revel many a happy month, studded with architectaral marvels, dating from the deepest of the obscurity of the Dark Ages up to the present day, and which will donhtless make the Lombard capital the chief centre of the excursion; Bergamo, with its Broletto and choice Romanesque gem, Sta. Maria Maggiore; Brescia, with its antique Rotunda, and many another relic of tho art of classic days, the Middle Ages and the Renaissance, not least among the latter the well-known Loggia; Cremona, with its few hnt rare specimens of the art of the past; Mantua, reflected ia its calm lake, and alive with recollections of Virgil, and with many another famous featare, too sacred to be merely hastily mentioned; Pavia, where San Michele is a miae of artistic stndy, and ia its neighhonrhood the world-famed Certosa, thickly set with jewels of Reaaissance art,—all these are to be visited, and many another qniet spot wbere lingers still, spared hy the respecting hand of time and the more rathless march of human progress, traces of the art of the days when all was so different, when the very years seem to have heen longer, and the life sach as we can scarcely picture with exactness to our mind's eye. Italy ia this respect possesses a pecnliar charm for the artist, teeming as it does with recollectious, and hegemmed with marvels of architecture, scalptnre, and paintiag, where so mach speaks of the hy-gone days, where the traditions of the distant past may still he found alive, and, ahove all, where cities differ from each other, separated hut hy a few miles of ill-kept road,—a classic soil, oa which the formation of modern Europe has left at each step its plainly-read mark, where the mind and eye are charmed with pleasnres of ever-renewed novelty,

The district to which the Architectaral Association more particalarly devote their attention is one of the most interesting in Italy. The Lombard plain, studded with its innumerable cities, fabnlously wealthy ia the past, and even now forming the richest portion of the peninsula, presents to the artist generally, he he architect, scalptor, or painter, a series of featnres that possess aa exceptional interest. For the architect more specially there are points for stady and research of the deepest professional valae. Tbe nature of the country; its situation; the history of the develonment of its culture, and consequently of its artistic progress; the elements that influenced this development, and the results that attended it, offer a series of inqniries of something more than an archæological value. Of this fact we shall he convinced when the resnlts of the excarsion will have heen made known; for Lombardy is the cradle of that strange and heautiful style of architoctnre which has heen termed the Romanesqae, one of the most important of the many steps in tbe slow development of modern from Classic architecture, the expression of the change of a belief from Paganism to Christianity with its new needs, its new aspirations, aad its new hopes.

This Lomhard origia of a special style has led to the adoption of the term "Lomhard," as applied to the architecture (helonging to a certain period) of this portion of Italy, hat the accuracy of the term may he qaestioned. The harbarians who, ia the sixth century, invaded Northern Italy, nader the dreaded Alhoin, hronght with them to the Sonth no architectaral traditions of their own; hut, once arrived in the fertile plain of Lomhardy, we can trace how the style of architecture that arose after this important event was created.

Throughout the whole extent of her widely-spread empire, Rome had left the traces of her monumental art; and after the centaries of neglect and ruin that followed the fall of the Roman rule, these same haildings formed the sole models of construction and of decoration when not themselves directly used or their materials. This influence is everywhere traceahle, bat in varying degrees; in the western portion of the empire the deep-rooted traditions of the past were too powerfal to be much affected, as we see them later on, when the capital is fixed at Byzantiam, branching out ia a parely origiaal direction, when the Greek empire was ia its tarn to influence the world, not alone westwards, hut agaia eastwards, and the recent archæological discoveries in Central Asia have shown us how far this influence extended. While in the East the new Greek art was rapidly reaching its zenith, in the West the deserted Roman art was slowly dying,—not, however, hefore it had exercised its spell on the comparatively uncultivated people to whom it formed the sole school of tradition.

Under these inflaences, Roman art daily grew more corrapt, and its precepts and rules were forgotten; slow, indeed, was the decay,—slow as was the disappearance of the purely foreign element among tbe Italiaa populations. With this faot once accomplished, and order agaiu established, the necessity for self-defence ceases to hecome the all-absorbing thought. With the attendant leisnre is developed the desire for refinement and for art. Generations are yet to pass before this desire finds its full expression, hat the seeds have beeu laid, and ia time we see them blossom forth into a distinct and origiaal art, known as the Romanesque or Romano-Byzantine, which it has heen urged, hnt erroneoasly, first had its origin in France. Northern Italy is the cradlo of this interestiag and heautiful style of architecture, and there still exist a number of rare and perfect specimens of the creations of its artists.

As the modern school of scientific research has shown us is the case with the actiou of nature, so ia art, no perceptible change is the result of accident, but is due to the effect of surrounding influenoes. What these influences were in Lombardy it is not difficult to stady. As early as the sixth century, we find the traditions of Romaa architecture affected hy Byzantine art; the former had long been settled in the country, and existed, as an art of the past, in the numerous Classic remains, aud, as a living art, in the Christian hasilicas which since the time of Constantine the new religion had industriously erected. The second, the Byzantine art, we see introdaced during the rale of the Goths, not manifesting itself solely on the shores of the Adriatic, as we see it in Saa Vitale at Ravenna, hat penetrating to the very heart of Lombardy, where in Milan itself, in addition to several basilicas of tbe foarth and fifth centuries, we see rise a superh and thoronghly Byzantine church, dedicated to Sau Lorenzo.*

What this admirable Byzantine architecture was, aad its origin, it is nnnecessary here to inquire; snffice it to say, that with the transfer of the seat of the Romaa Empire to the hanks of the Bosphorus, this new and characteristic style makes its existence known. From its timid commencement ia the second centary, at Baalhec and Palmyra, it had gained in strength and holdness, till the day when Isodorus, of Miletas, in hailding the Temple of St. Sophia, consecrated the new style which saccoeeded that of Rome. Agaia the genius of the old Greek artists seemed to have risen from its long slnmber, and if the new expression may not possess the Classic parity of its elder sister, its marvels were to astonish, as they still

* See Dartein, "Étude sur l'Architecture Lombarde, et sur les Origines de l'Architecture Romano-Byzantine," Paris, 1870, folio, with an atlas of plates; and Vitet's "Etudes sur l'Histoire de l'Art," série deux,—Moyen Age; to which admirable works, with the cross references to be found in their pages, we are much indebted. Dartein's work, after an introduction, treats in detail a number of existing churches of the Romano-Byzantine style; Sant' Ambrogio at Milan; San Celso, also at Milan; at Brescia, the basilica of San Salvatore; the little church of Sta. Maria in Valle, and San Pietro di Civate; Madonna del Castello, near Almenno; and the Rotonda at Brescia.

do, the artistic world. "For the second time the Greeks held the sceptre of the great and noble builder's art; it was from them that the Arabs received its secrets, it was by them that the first lessons reached Europe, when in the eleventh century, after 500 or 600 years of darkness, the West again sought the light, and sought it in the East."*

In the West, however, the Roman traditions still formed the sole architectural school, so rooted that when Diocletian brought back, in the third century, from his Asiatic wars, an admiration for the Eastern architecture, which showed itself in his palace at Spalatro,—a coarse imitation of the Temple of Baalbec,—the innovation was to remain unnoticed. As Vitet has well expressed it, every spark of imagination had died out in this Italy, exhausted by eight centuries of grandeur. Even when from time to time rose in the populous centres some building, the architect of which had drawn his inspiration from travel in the East, its influence was *nil*, and the mass of constructions continued the Roman traditions, each day growing heavier and coarser. The relations between the two empires became rarer every day; the distance increased by the schism in their religious belief; thus the architectural movements of the East and West long remained mutually unaffected.

A point which Vitet has shown clearly as still further aiding in the maintenance in the West of Roman traditions, arose from the differing types of the places of worship adopted by the two empires; while the West modified for their religious purposes the basilicas of pagan Rome, —a tradition long retained, as we see in the basilica of San Clemente at Rome, Santa Praxeda, and St. Martin, built in the ninth century,—the Christians of the East created a new type, and built churches. What the basilica was it is needless here, in detail, to describe; suffice it to say that in the Roman city it served as the court of law, the hall of justice. The basilica was used by the Christians in preference to the temple, greatly on the score of its superior size. The temple, soiled as it was by Pagan recollections, and closed to the use of the new religion, there remained the two courses of adopting the basilica, or creating a new type of place of worship; the less noble, less religious course was adopted by the unimaginative Westerns, and the basilica was chosen, the idea further finding favour with the bishops, who sanctioned in the old temple of justice the worship of the new faith. The change was an easy one to make, and soon the painter and the mosaic-worker had decked with their suggestive symbolic images the walls and "tribune," as the apsis was called before that Greek term prevailed. A few further modifications were necessary,—into which, however, at this point, it is unnecessary to enter, — with the addition of the exterior "atrium," with its colonnade (such as still exists in Santa Ambrogio, in Milan) to shelter during the celebration of the mysteries the as yet uninitiated catechumens,—and in the midst of which rose the simple octagonal baptistery, with its sacred vase of symbolic purification, pointing out, by its position at the door of the temple, the road by which it alone might be entered. The further addition made of the beautiful and religious conception of the subterranean "confession," where reposed the relics of the martyrs, and the pagan basilica was transformed into a Christian place of worship, to affect for many a generation yet the monkish builders. Thus we see the Roman style prevailed, and was perpetuated by this adoption of the basilica for the usages of the new worship.

It was at this position that architecture had arrived when the barbarous Goths descended into Italy, swept over the fertile plain of Lombardy and down the pleasant coast of the Adriatic, driving before them the population. It was at this time that Venice was formed on the mud flats at the month of the Piave and the Brenta. But the Goths, as so often happens with conquering nations, were to be in turn overcome by the refinement of their enemies, and the prevailing Roman taste was to influence their untaught artistic natures. We have only to mention the tomb of the learned and enlightened Theodoric at Ravenna,—at this moment so seriously threatened in its existence,—and we see how Roman is its style; and yet Theodoric had been educated in Byzantium. In building his tomb he was, however, obliged to employ Italian workmen.

* Vitet, "Etudes sur l'Histoire de l'Art,—Moyen Age," Paris, Edition 1866, 8vo., p. 296.

Let us not pass over the mention of this wise and good prince,—an early archæologist of the truest type,—without a tribute of respect to his memory. His influence was to be marked on the later artistic and literary development of Italy, and his reverence for the past led him to a holy respect for its noble architectural creations. He it was, let us not forget, who wrote to his architects, Daniel and Symmacus,—"You will repair those monuments which have suffered by the effects of war, but in such a manner that they shall not appear to have been repaired, and,"—a sentiment, he it remarked, uttered now 1,300 years ago,—"that the original construction shall alone be re-established in its primitive state."

But the rule of the Goths was to be overturned, and under the renowned and unfortunate Belisarius and Narses, Italy was again to become one of the jewels in the crown of the Roman Emperor reigning at Constantinople. Had the Greeks only kept their hold on the empire, it is more than probable that from their appearance,—that is, in the sixth century,—the traditions of Byzantium would have taken root in Italy; for it must be remembered that to this period belong the baptisteries of S. Giovanni, built by the Archbishop Neo, and the beautiful Church of San Vitale at Ravenna, both in the purest Byzantine style; but still the introduction was distasteful, and we see at a later date the Bishop Ursicinus build his grandiose Church of St. Apollinaris according to thoroughly Roman principles and traditions. The Greek influence had, therefore, not yet commenced to work when the allies whom they had imprudently called in, the Lombards, or Longobards, seized Italy.

It has been, as we have above remarked, a subject of no small discussion whether the architecture termed "Lombard" was not an introduction of these barbarous conquerors. But in the present day the question has been satisfactorily settled. The Lombards, a wilder and even less civilised people than the Goths, can scarcely have introduced an architectural style of their own. Indeed, so improbable do facts show this Lombard origin to be, that it may be dismissed without further discussion.

The Lombards, once settled down, did as their predecessors had done, and conformed themselves to the tastes and traditions they found about them. At this moment there existed in the world,—the world as it then was understood,—but two styles, which Vitet, and others before him, have concisely termed the Neo-Greek and the Bastard-Roman. The Lombards, therefore, when their refinement led them to that necessary consequence of all cultivation, the consideration of the arts, had alone to choose between these two styles, and a very indifferent acquaintance with the early architecture of Northern Italy will show that all those works attributed to the Lombards are either semi-Roman or Oriental. But it is to be remarked that it is to the former that they attached themselves, and for this fact it is easy to account. Western by birth, the Lombards remained strangers and unfriendly to the Greeks and their ways, and such, during their stay of two centuries, they continued to be. Their tastes were purely Roman; they spoke and dressed in the Roman fashion; it is therefore scarcely likely that they would have employed Greek architects; the utmost they had seen of San Vitale at Ravenna was its shining cupola on the horizon, while at home they lived in the midst of ruins and of buildings stamped deep with Roman traditions.

Such was still the Roman influence, that when the Lombards leave Italy, we trace it in the eighth and ninth centuries. San Clemente, as has been above remarked, built in this latter century, is in its general character a pure basilica. But times were about to change. The influence of Byzantinm commences to filter into the West. The German Emperor Charlemagne, Roman in his refinement, leaves, in his palace at Ingelheim and on the banks of the Rhine and the Garonne, the traces of his admiration of Oriental architecture. Vaguely he foresaw that it was thence that was to spring,—many centuries were to elapse before his prophecy came true,—the dayhreak of refinement and culture, and after seeing San Vitale at Ravenna, Aix-la-Chapelle is gifted with its wondrous temple; but for Northern Europe, with the death of Charlemagne, the light was to die out again; deeper shades still were to fall on the Dark Ages, and which alone can explain the superstitious belief which prevailed that with the fatal year 1,000 the world was to close its career; at such a moment architecture was to suffer the most seriously of the arts, and the tenth century is the saddest, the most miserable in its history, as indeed it is in that of European civilisation.

When at length opened the new century, a fresh spirit is infused into the West, particularly remarkable in Italy, under the enlightened rule of Otho the Great. The high roads of commerce were frequented again, the ports re-opened, the trade between the East and Italy flowed again West, and the rich tissues, the perfumes, the secrets of the arts and learning of the Orient became known to the West. With the increase of wealth and ease came naturally refined tastes; and the grandeur, commercial and artistic, of the Italian cities, rivalling each other in splendour, commences from this date.

Italy and the West thus prepared, Byzantine architecture again makes its appearance, not, as in the sixth century, in the midst of war and calamity,—not as in the reign of Charlemagne,—but among a wealthy community seeking for a new expression of the new needs of a new society. Penetrating by the Adriatic sea on the east, by the Arno on the west, the Venetians on one side in their basilica of St. Mark, on the other the Pisans in their superb cathedral, were the first to accept the traditions of Byzantinm. Venice and Pisa are followed by Verona, Ancona, Lucca, Ferrara, Bergamo, Parma, Milan, all the great towns of Northern Italy. Soon, writes Vitet, the Italian soil was covered with monuments more or less Oriental, at first simple and severe in their magnificence, then elegant and light, and later on more ornate, more florid each day. The new style reigned unrivalled for two centuries, till Europe, through one of those circumstances which make the history of art so noble a drama, turned with enthusiasm in the thirteenth century to another architecture which Italy alone received with coolness, the ogive architecture, which created the cathedral of Rheims, the cathedral of Cologne, the spire of Friburg, in Brisgau.*

The Oriental tradition mingling with the still existing traditions of the Roman builders, created that architectural style known as the Romano-Byzantine, or the Romanesque, which found in Lombardy the favoured land of the meeting and blending of the two influences of which it was made up. From Lombardy the monkish architects bore the new style to France, to Burgundy, and to chillier Normandy, whence in time it spread throughout France. The Norman Conquest was to introduce it into our island, where the creations of its artists, familiar to the profession, are to be found in many a quiet old-world corner of England. Germany was to receive even more directly the architectural influence of Lombardy, which showed itself markedly on the banks of the Rhine.

With the eleventh century the Church, now growing rich, was to develop its architectural zeal with an energy which, particularly noticeable in Italy, was to spread throughout Christendom, and the Romano-Byzantine style was to cover Western Europe with its characteristic productions, modified in each country by those local influences which are so invariably to be noticed in the history of architecture, and which have properly led to almost similar works belonging to the same family being denominated differently in different countries, and even provinces. In this sense of the term, "Lombard architecture" must be regarded as the purely local expression of the Romano-Byzantine style in Northern Italy. Once this fact is understood, there cannot again arise the possibility of a belief that the invading Lombards, or Longobards, introduced into Italy an original architecture. This fact is the more important to have settled, as it is in the monuments of Lombardy and Northern Italy that the Romanesque style is to be studied in its most distinctive and original character, and where it has left so many still-existing creations of its architects, all stamped with a peculiar character of striking beauty, the direct result of the honest faith in which designer and workmen toiled so steadily together. This character it is out of place to describe; it is familiar to every student of the history of art. Northern Italy is the cradle of this style, and the Architectural Association, in their present trip in Lombardy, will have many opportunities of studying on the spot the earliest creations of this intensely-interesting period of the development of their art, which was to lead to the later marvels of the Gothic architects.

* Vitet, p. 310.

There exist throughout Northern Italy a large number, comparatively speaking, of monuments belonging to this distant period, and to these more than one member of the Association will pay especial attention; the conceptions of these early architects are worth minute observation, particularly by the English student, the constructive materials used by the Lombards being precisely the same as those necessitated by the geological structure of England. The same material necessities that influenced the architects of those times regulate the conceptions of the English architect of to-day. The want of building stone, or rather the extreme difficulty of obtaining it, in Constantinople,—which, when it became the capital of the Roman Empire, saw rise in every direction gorgeous palaces and churches,—and the abundance of clay, obliged the Byzantine architects to employ brick as their building material, and in this course they had the precedent of their ancestors at Nineveh. In Northern Italy this feature of the early architectural style is peculiarly noticeable, and, let it be remarked, the noble edifices which the Lombard architects erected with the aid of honest bricks and mortar, destroy for ever the theory so often put forward that with small building materials it is impossible to create great works.

The Architectural Association will make one of their chief objects of study, during their excursion, the use of brick and terra cotta, so largely employed throughout Lombardy, and valuable results may follow their combined inquiries. How long the traditions of the use of brick and more elaborated terra cotta were retained, and what results may be obtained by their aid, we see in the graceful creations of that great architect of the Renaissance, Bramante, in his church of Sta. Maria delle Grazie, in Milan, which the Association will do well to study, as it is shortly to be handed over to restorers. In the hands, however, of such learned students as Sig. Angelo Colla, and his accomplished co-worker, Sig. Tullo Messarani, the necessary work may, we trust, be as lovingly done as could be desired.*

What other wonders the Association on their tour will see, those who know Northern Italy will remember,—wonders ranging from the Classic architectural remains scattered over Lombardy, no less plentifully than elsewhere where the Roman power was dominant, through the Dark Ages and the Revival down to modern days. It is to be hoped they will not neglect the architectural works of the Renaissance, as brilliantly represented in Northern Italy as are the still earlier and rarer remains of the Romanesque period.

MARGINS OF SAFETY.

WE recently drew the attention of our readers in the pages of the *Builder* to the unsettled state of the question of wind-pressures as affecting exposed surfaces over widely-extended areas. The absolute necessity of having some reliable data to go upon in the case of structures that are subjected to exceptional dangers from atmospheric disturbances will, no doubt, urge itself upon the scientific world, and it is to be hoped that ere long no doubtful answer will be given to the questions that are being at present asked on the part of practical engineers and the public generally, as to the necessary margins of strength that will secure absolute immunity from accidents. In the meantime, no harm will be done by looking back upon the sayings and doings of the early masters of those arts which, within recent years, have been subjecting the forces of Nature to the uses of man, and one passage occurs to us as peculiarly appropriate at the present time, not only as regards wind-pressure, but in its general bearing on the question of stability. "When we have to do with, and to endeavour to control, those powers of Nature that are subject to no calculation, I trust it will be deemed prudent not to omit in such a case anything that without difficulty can be applied, and that would be likely to add to the security." These words are Smeaton's, and are quoted by one of the most eminent engineers of our own time, as of exceptional authority as coming from the mouth of "our greatest marine engineer."

Taking the sentence we have just quoted as a text upon which to hang a few observations, it will be noticed first that there is an admission on the part of Smeaton which implies that he was himself in the habit of dealing with natural forces that were subject to no calculation. These were for the most part either wind, or the destructive agency of heavy masses of water driven violently against artificial obstructions by its fury. If an engineer is to be justified in throwing over the time-honoured maxims of his profession by distributing his materials in a manner that differs essentially from previous practice, he must be able to show that all the possible forces with which his finished structure has to contend have been exactly calculated, and a sufficient margin of safety provided for each and all of them. Where the force is of such a constant character and is subject to such a well-known law as that of gravity, Smeaton's words imply an exception. There is no reason why the calculated strains to be provided against on account of the mere weight of a structure, and of a passing load, should not be estimated with the utmost exactness; and in these cases the margin of safety may be provided for more as a safeguard against possible flaws of material than as a provision against any ignorance of the forces that are subject to established laws. Smeaton, were he still living, would no doubt have been as much opposed to unnecessary accumulations of material as the most advanced of our modern engineers. All this, however, leaves the question of uncalculated forces practically untouched, and when provision has to be made for withstanding the fury of the winds and waves, the words we have used as a text have lost none of their significance.

When writing on the subject of wind-pressure, we pointed out that there is no established rule for the guidance of engineers and architects in the case of structures that offer an exceptionally large area to the force of the winds in exposed positions. Nearly a century has passed since the days of Smeaton, and, considering the immense strides that have been made in the theory as well as the practice of engineering during the years that have intervened, it is somewhat astonishing that such a state of matters should exist. We concluded with the expression of a hope that the magnitude of the interests involved in the construction of such vast structures as those which are required for bridging the estuaries of the Tay and the Forth may soon have the effect of bringing about a full scientific investigation of the subject, and a clearing up of all doubts for the future.

Meanwhile, when we consider that the admission made by Smeaton with regard to the existence of "powers of nature that are subject to no calculation" still holds good, it would be well for engineers engaged in works of such a character to pin their faith to the second part of the sentence, and "not to omit in such cases anything that without difficulty can be applied, and that would be likely to add to the security."

The particular circumstance that gave rise to these words was the proposal made by Smeaton to use joggles in the masonry of the Eddystone Lighthouse, and it is not at all unlikely that they were used as an argument for the expenditure of more money than those who were responsible for its erection were willing to spend. It would be well if engineers, instead of making efforts to save money at the expense of stability, as too frequently happens, were rather ready to find arguments such as Smeaton's for convincing their clients that the most costly structure would more than likely prove to be the cheapest in the long run. Although the effect of nearly a century of storms has made it necessary to reconstruct the Eddystone, and to reconsider its design, the precautions of Smeaton were so far justified that he was able to state that "after a stone was thus fixed we never, in fact, had an instance of its having been stirred by any action of the sea whatever." Had the circumstances varied and the structure been exposed to still greater violence, Smeaton would, no doubt, have seen his way to making still further provision for the safety of the structure consistently with the principle laid down in the sentence referred to. Until, then, engineers and architects are in a position to estimate the maximum possible force of the winds and waves in a given situation with as great certainty as the force of gravity,—and it is exceedingly unlikely that any such perfection of information will ever be attained,—until, in fact, the "powers of nature that are subject to no calculation" are thoroughly understood, it will be well for them to provide margins of safety that are far more than sufficient to withstand any average, or even any observed, destructive force. Works that have been designed to withstand the fury of the elements frequently succeed in doing so until their sufficiency becomes a standard for similar undertakings, and it happens not unfrequently that after they have served the purpose of a precedent their destruction proves the fallacy of the argument. In the construction of masonry to act as a breakwater in exposed situations it would, indeed, be difficult to over-estimate the allowance that ought to be made for exceptional exhibitions of natural forces.

A quotation from the report by the Messrs. Stevenson, upon the effects of a storm which took place at Wick, in 1872, is an apt illustration of how wide the margins of safety, in certain cases, ought to be. "The (seaward) end of the work, as has been explained, was protected by a mass of cement rubble work. It was composed of three courses of large blocks of 80 to 100 tons, which were deposited as a foundation in a trench made in the rubble. Above this foundation there were three courses of large stones carefully set in cement, and the whole was surmounted by a large monolith of cement rubble, measuring about 26 ft. by 45 ft. by 11 ft. in thickness, weighing upwards of 800 tons. This block was built *in situ*. As a further precaution, iron rods 3½ in. diameter, were forced in the uppermost of the foundation-courses of cement rubble. These rods were carried through the courses of stone-work by holes cut in the stone, and were finally embedded in the monolithic mass which formed the upper portion of pier." . . . . . "Incredible as it may seem, this huge mass succumbed to the force of the waves, and Mr. Macdonald, the resident engineer, actually saw it from the adjacent cliff being gradually 'slewed' round by successive strokes until it was finally removed and deposited inside of the pier. It was not for some days after that any examination could be made of this singular phenomenon, but the result of the examination only gave rise to increased amazement at the feat which the waves had achieved. It was found on examination by diving that the 800 ton monolith forming the upper portion of the pier which the resident engineer had seen in the act of being washed away, had carried with it the whole of the lower courses which were attached to it by the iron bolts, and that this enormous mass, weighing not less than 1,350 tons, had been removed *en masse*, and was resting *entire* on the rubble at the side of the pier, having sustained no damage but a slight fracture at the edges." It is quite impossible that an estuary can ever be the scene of such destructive agencies as those which occur on portions of the coast exposed to the full force of the open sea, but such extraordinary phenomena with regard to the waves ought to be well considered even in the case of a comparatively-sheltered structure, when the lives of passengers, as well as the capital employed, are involved in its failure to withstand their fury.

THE ABATEMENT OF NUISANCES.

ALTHOUGH it is a maxim of the law that there can be no wrong without a remedy, it is not unusually in the nature of the law to make that remedy which it gives to a sufferer a long and tedious one. Wrongs to property, especially, are often the most difficult and expensive to obtain redress for, and a legal remedy is therefore often regarded as only one degree better than the wrong itself. But there are certain matters in respect of which the law permits a man to seek redress by his own hand, and with the utmost expedition that he pleases. This is a privilege of the highest value to owners of property; but, just as Pope stated that a little learning was a dangerous thing, so we, perhaps, may be permitted to point out that the power of private redress is also somewhat of an edged weapon, and may not improbably wound him who employs it. Perhaps, too, no persons have more interest in such private remedies than have owners of buildings and land, and it is for this reason that we propose to offer a few remarks on the question of the abatement of nuisances to show what is the power which the law gives to private persons, and consequently within what limits it is confined. A well-known legal writer has gone so far, indeed, as to state

* As to those who will more especially devote their attention to Sta. Maria delle Grazie,—with which Bramante's name is linked indissolubly with that of Leonardo da Vinci,—may we venture to refer them, while at Milan, to Sig. Colla, whose drawings of projected restoration of the church formed so conspicuous a feature in this year's architectural exhibits at the Paris *Salon*, as was noticed in these pages? To the restoration of another of the Renaissance buildings of the Lombard capital, Sig. Colla has also devoted his attention, the Palazzo Marino, now the Townhall of Milan.

that it is never advisable for a person to pursue this remedy; but we think that if employed with care and caution, and with a clear knowledge of the object sought to be attained, it need not prove so exceedingly dangerous. As regards nuisances themselves, it must be borne in mind that the legal meaning of this word is somewhat different from that which it holds in common parlance. It is used in its broadest meaning, and does not mean something offensive to the senses, which is the usual meaning attached to this word. Derived as it is from the French *nuire*, to hurt, it means something which injures and hurts property or person, and has thus a very extended range. It has also been defined as being a consequence of something not directly or immediately injurious, — injurious, however, in its effect. Thus a person who digs a channel or erects a dam on his own land does no more than what is in itself lawful; but if the effect of his so doing is to divert the water from a natural water-course, to the loss of a riparian owner below, or to turn it back to the injury of a riparian owner above, such acts become unlawful. The first point, then, in regard to this subject, which is very elementary in its nature, is that a thing must first of all be a nuisance before it can be abated. It is not enough that there must be fears or probabilities of a certain thing turning out to be injurious; it must actually have developed into this legal species before a person can take the law into his own hands. On the other hand, it is satisfactory for an injured party to know that if the nuisance is so mixed up with some legal right as to be inseparable from it, then, that this legal right may be put an end to by the abatement of the nuisance. The case of Cawkwell *v.* Russell (26 *Law Journal* Reports, Exchequer, p. 34), decided in the year 1856, and which has always been regarded as sound law, is an instance of this proposition. The result of the case could not possibly be put in briefer form than it is in the judgment of Baron Alderson, which is perhaps the most pithy judicial decision to be found in the law-books. We give the whole judgment in the following lines:—"If a man has a right to send clean water through my drain, and chooses to send dirty water, every particle of the water ought to be stopped, because it is all dirty." There the plaintiff had been suing the defendant for obstructing the drainage of his houses, and it appeared that the plaintiff had a right to let clean water run through the defendant's drains, but as he sent dirty water the defendant took the remedy into his own hands, and so completely abated the nuisance that he also stopped the flow of clean water. Hence arose the judgment which we have set out above, and which forms a capital illustration of the proposition, that if a nuisance cannot be abated without the conclusion also of some legal right, that legal right must cease. But it must also be borne in mind that it will not do in all cases to act in this wholesale kind of fashion, and that if the nuisance is abated in an unreasonable manner, the person so doing lays himself open to the unpleasant consequences of an action at law, and illustrates what we have already said that the abatement of nuisances is somewhat of a two-edged legal weapon, which may cut and injure the user of it. Let us give an example also connected, as was the last instance, with the flow of water. A plaintiff had a prescriptive right to the flow of water led by means of a gutter from a mill-stream at a point where an ancient weir was erected, and he wrongfully lengthened the gutter for the purpose of irrigating more land. Consequently the flow of water down the defendant's mill-stream was diminished, so that there then existed an injury or nuisance which he might abate. But, unfortunately, he set about doing so in too thorough a manner, for he pulled down the ancient weir, and consequently prevented any water at all from flowing on to the plaintiff's land. Such in brief were the facts in the case of Hill *v.* Cock (26 *Law Times*, new series, p. 185). The result of the action which the plaintiff naturally brought against the defendant was that the Court held that the defendant was not justified in stopping the plaintiff's excessive user of the water by means which altogether prevented his enjoyment of the water. Again we may quote from the judgment, namely, that of Mr. Justice Willes, whose decisions always command the highest respect. "The flow of water," he says, "to the defendant's mill was injured by the alteration of the gutter, and the plaintiff had thereby destroyed the measure of his right over the old course, and created a confusion of his ancient rights. If the whole of the defendant's right had been interfered with, as it was in the case of Cawkwell *v.* Russell, then the taking down of the weir would have been a reasonable mode of destroying the plaintiff's enjoyment. However, he is bound to abate the nuisance in the most reasonable manner, and subject to there being no confusion of rights created, the jury have found that it was not practically necessary for the purpose of abating the nuisance to pull down the weir. If the extent of the nuisance was so great that it was reasonably impossible to abate the nuisance, then I should say there exists a right on the part of the proprietor of the servient tenement to interfere with the whole." It would not be easy to state the law upon this subject much more clearly than is done in the two judgments which we have quoted, as they show what is the power which the law places in the hands of a person who is affected by a nuisance, and within what limits that power may be exercised. But it will also be noticed that in the last judgment Mr. Justice Willes speaks of the jury,—the great judges of fact. Hence it will be obvious that dangers arise in the abatement of nuisances by private individuals because what may appear reasonable to an aggrieved and injured individual who does not look at the matter in the calmest possible light, may appear by no means so reasonable to a jury of his countrymen, feeling at the moment great belief in the sanctity of the law of which, in that particular case, they are the temporary guardians. No doubt the owner of the mill-stream did not consider that he was doing an unreasonable thing in stopping *in toto* the flow of water, but when it came before the jury and the bench, a different opinion prevailed. Hence we have here an instance also of the necessity for not acting without careful consideration, and only going to the extent of stopping the actual nuisance. Again, to touch most briefly on another point: as a rule, no previous demand to remove the nuisance is, except in some exceptional cases, necessary. Still, we would never recommend a man to abate a nuisance without first demanding its removal; for should the matter come before a court of law, the absence of such a demand does not place the "abater," as we may call him, in a favourable light. Owners of land and buildings, if they have these main principles in their mind which we have pointed out, and if they act calmly, may thus find the abatement of nuisances by their own hand a more speedy and more satisfactory remedy than an appeal to the courts of law.

MODERN NEW YORK.

THE halo of tradition that surrounds the name of New York is by no means exceptionally attractive or important. New York is essentially a modern city, and visitors from the old world come and glance at it, not for the purpose of seeing architectural remains of bygone generations; not to gaze on archives, or monuments centuries old, but to see a modern city,—a metropolis throbbing with business life, one of the world's busiest marts, standing at the back of one of the finest harbours in the world. It is not too much to say that the foreign visitor cannot possibly see anything around the wharfs at which he may land to favourably impress him. We have no docks, really, unless the somewhat dilapidated wooden piers at which the ships land their passengers and goods can be dignified with the name. When the visitor to our city for the first time has run the gauntlet of the Custom-house officers, and protested against the extortion of the cab-driver, he gazes with astonishment on the wretchedly dirty appearance that almost everything wears. The streets, even in the heart of the city, are filthy and uneven. The best of them are paved with granite blocks, more or less irregularly laid, which renders riding in an ordinary vehicle, or walking, very tiresome. Gaunt top-heavy telegraph-posts stud the causeways thickly along the most important streets, for, with all their improvements, New Yorkers have never yet put any of their telegraph-wires underground.

When a man has fairly settled himself down to view men and things from an unprejudiced standpoint in this marvellous city, he cannot but find much to delight him. To walk from the extreme south end of the island along the Broadway in a northerly direction for six miles, and realise that the whole island was sold so recently as 1626 to the Dutch Governor by the Indians for $24,—that in 1656 it contained only 120 houses and 1,000 inhabitants,—is no easy task. The development of the city has been unique in the history of cities. It is true enough,—and no one can distinguish the fact more easily than an Englishman,—that there is a great deal of room for improvement. One of the greatest and ever-present grievances is the bad condition of all the streets. The pedestrian who walks along Cheapside, London, is inconvenienced but little by the noise of passing vehicles, owing to [the smoothness of the material with which the street is laid. But in the Broadway,—and, in fact, everywhere in New York, where there is any great amount of traffic,—the incessant noise, clatter, and rumble are well-nigh distracting to all quiet mortals who regard a continual deafening sound as one of the banes of mundane existence. Even in Fifth-avenue, the great aristocratic street of the city, along which stand the residences of some of the richest men in the country, there is no asphalte or wood-paving,—nothing but hard, badly-laid granite blocks. In all my perambulations, I have not seen a square yard of wood-paving anywhere. Why it finds no favour I can form no idea, especially when considering the vast amount of wood which the country produces.

To see modern New York at a glance, one must needs take a walk along Broadway, called by the old Dutch settlers "Heere Straat." This is the city's great spinal column, and it is the one great thoroughfare running north and south that declines to observe the arrow-like straightness which is the characteristic of most of the streets. It swerves now to the west, and then to the east, cutting across several "avenues," which, being laid out more recently than the erratic "Heere Straat," continue their course in as straight a line as men could draw. The individual who walks up this grand thoroughfare for the first time without uttering the word "magnificent" many times must be sadly deficient in his power to appreciate architectural boldness and skill. On either hand, for five miles, there is an embarrassment in the riches of gigantic solid stone, brick or iron structures, used as hotels or for business purposes. While it is not my intention to refer in detail to the noteworthy buildings of New York, I would not pass without a word concerning the oldest house in the city. It is now known as "Washington Hotel," and is No. 1, Broadway. It was erected in 1742 by Sir Peter Warren, K.C.B.—a name immortal in the annals of English maritime warfare. At the time of its erection it was the most magnificent building in the city, but it has long been eclipsed now. While 138 years is but a small period in the history of some houses in the old world, we regard Washington Hotel as a very ancient building, because it is the most ancient we have. There is an interest attached to it, moreover, in the fact that Sir William Howe, Sir Henry Clinton, and Sir Guy Carlton (afterwards Lord Dorchester) all patronised this house. Improvements are constantly being made along Broadway. Small and unsightly houses, erected before the present generation entered into active life, are gradually disappearing, and in their places buildings, fitted up with the latest improvements and appliances, are being reared to the height of seven, eight, or ten stories.

The elevated railroads, of which the English bear only fragmentary accounts, are a great boon to those who live several miles from the heart of the city, though they are a great nuisance to those past whose houses they run. They are badly managed at present, but with good and fair treatment the public would admit that they were an inestimable boon. An extension northwards, which without these railroads would render travelling from one end of the city to the other a long task, is rapidly progressing, and many fine new buildings are now being erected on ground which a few years ago was considered far into the country.

New York. T.

Penrith.—Messrs. Graham's premises, in the Market-square, are being rebuilt. The front is of local red stone, the roof being broken with half-timber gables. The new building, designed in the old English style, will present a picturesque appearance. The work is being done by Mr. Grisenthwaite, of Penrith, from the designs and under the superintendence of Messrs. Hetherington & Oliver, architects, of Carlisle.

HOUSE DRAINAGE AND SEWAGE WORK AS A SPECIALTY.

THE tenour of the evidence which has been received hy the Sanitary Section of the Society of Arts, and discussed at meetings of the society, has shown that the most fatal errors in the application of settled principles of sanitary work are committed in the construction and drainage of edifices even of the first-class in the metropolis, by architects of the highest position. I believe I am warranted in stating it as the conviction of the section, that for the public protection, the subject of house-drainage must he cultivated and practised as a specialty. This conviction will, I believe, he strengthened hy what takes place in the United States. There, the English practice in house-drainage works and sewerage is generally closely followed hy American as well as by English architects and artisans. There may he deviations from old rontine, and improvements might he looked for from American artisans, where the conditions are such as to stimulate the exercise of the suggestive faculty of ingenuity; hut there, as here, they do not appear yet to arise in common practice. A report made to the Massachussetts State Board of Health, hy Mr. Elliot G. Clarke, principal assistant engineer of sewerage works in Boston, presents such a reflex of the errors in principle committed in common British practice, most of them, no doubt, carried over from England, that I have hegged for the loan of the woodcut illnstrations, to reprint with the report, for instruction here, and the State Board has been so kind as to lend them for the purpose.

I am glad, however, to learn that sanitary science in construction is heing taken np as a specialty in the United States, and I helieve, from the report of Mr. G. E. Waring, jun., of Newport, on the condition of Washington, that if the principles he propounds are taken up hy the Government there, for putting its seat in a proper condition, as an example to other cities in the Union, the United States Government may set an example to our Government of what may he done even for the British metropolis. He shows, what has long heen shown for London, hut not done, how the damp of its surcharged site may he removed by subsoil drainage; how a system of circulation may he introduced, and one of stagnation removed. He would carry in the pure water direct hy a constant supply, without cisternage and without stagnation, and would remove all the fouled water, and all the excretory matter from the houses, hy self-cleansing drains, and from the town hy self-cleansing sewers. He would remove storm-water hy separate channels to the river, and not mix it with the discharges from the house and create a necessity for large man-sized sewers accumulating stagnant deposits, or extended cesspools such as those under the Metropolitan Board of Works or the Vestries in London, in which the putrefactive matter is kept for weeks and months, giving off the noxious products of decomposition, and diffusing them into houses and streets. He proposes that all waste organic matter should he delivered at the mouth of the sewer at least within twenty-four hours of its production. I helieve that it may he done in less time than that at Washington. To do this there must be a proper adaptation of the sizes of the drains and sewers to concentrate the flow of the fouled waters, and to make them self-cleansing. In exposition of the ignorance which is prevalent there as well as here, he states, for example, "that the particular idea of the size of a drain required to receive the drainage of a house or of a number of houses is strangely in error. A pipe, 6 in. in diameter, having an inclination of 4 in. in 100 ft., has a capacity of discharge of nearly 200 gallons per minute, say 12,000 gallons per hour, or, hetween eight and eleven in the morning, 36,000 gallons. It is usual to estimate that during the three hours ahont one-third of the daily flow is discharged. Such a pipe, then, at such an inclination, would he adequate to the removal of nearly 150,000 gallons per day. If each household averages six persons, and if the daily consumption is even 50 gallons per head, the service would suffice for 500 houses; or supposing the sewer to run only half full, for 250 houses." Here, in London, it is common to put down drain-pipes of that size for single houses. "It is to he considered, also, that it is rarely necessary to lay a sewer with so slight a fall as 4 in. in 100 ft., and that an increase of fall secures, of course, an increase of discharge. During the past year, under the direction of the National Board of Health, I have made a number of gaugings in different parts of the country, to determine the actual practical dry-weather flow of the public sewers during the hours of the greatest use." Our local sanitary authorities would do well to follow this example. He says the result of these gaugings fully sustains the estimate thus given. "Generally, where from 50 to 100 houses contribnted to the sewer, the discharge filled a 6-in. pipe from less than 1 in. to 2½ in. deep. A sewer in Milwaukie, draining an area of ahont 75 acres, and serving a population of over 3,000, had the whole of its flow through a 6-in. pipe, which it did not entirely fill. A sewer in St. Louis, draining a district of over 11,000, had its entire flow through a 12-in. pipe, which it only ahont one-half filled. The helief is very general that if a given flow of sewage can he discharged through a small pipe, it can surely he discharged through a large one. This is not true. The whole sewage, solid matters and all, will he completely removed by a small sewer, while only the liqnid portions and the smaller solids will he removed by a large one. The solid matters, heyond the capacity of the broad and deep stream to move them, remain as a deposit in the largo sewer, always subject to decomposition, and often liable to obstruct the water-way, to lessen the already slight scouring capacity, and to invite further deposits." In this metropolis, there are estimated to be upwards of 1,000 miles of sewers of deposits—extended cesspools—chiefly nnder the management of the vestries, that serve as dire demonstrations of these truths, as well as the house-drains in the common conditions described in the annexed report. It will he found in the United States that by following out the principles set forth, three houses and three towns may he generally drained well at the cost heretofore incurred in draining one ill.

EDWIN CHADWICK.

COMMON DEFECTS IN HOUSE-DRAINS.

The purpose of this paper is to state what are the common defects in house-drains, and to show the usual forms and condition of such drains as they exist in our cities and towns to-day. The statement is chiefly based on observations made in Boston while constructing intercepting sewers; hut it is assnmed that examinations in other cities and towns of the Commonwealth wonld reveal a condition certainly no better, and prohably worse. Some testimony will he offered from those whose occupation has given them opportunities for observation; and, while it is not intended to cite exceptional cases of defective arrangement or construction, a few characteristic examples will he given, such as investigation would prove to he very common.

What are the essential conditions of an efficient house-drain, one or more of which must he violated to constitute a defect?

Briefly stated, they are, that the drains must he of size and shape to concentrate its flow, smooth inside, suitahly inclined, tight, properly connected with the house-pipes and sewer, strong and durable in material. It is of great importance that the portion of the drain within the house should always be in snch a position as to admit of ready inspection at any time; it should he in sight,* and not concealed. Let us see what proportion of Boston drains reasonably fulfil these conditions.

Existence is perhaps the most essential condition of a drain; and, hy an Hihernicism, non-existence may he termed its most serious defect. Naturally, non-existence was not observed in digging for the intercepting sewers, hut there is sufficient evidence that it is not unknown.

The writer has seen a case where a drain-pipe from a dwelling ran through the walls, and there ended. Several similar cases have heen reported to him; and another, where a block of six expensive houses, occupied for months with all the customary apparatus in the way of plumbing and waste-pipes in full operation, had no drains heyond the walls to the street-sewer. Such cases are rare, and generally reveal themselves quickly; hut it is more common to find drains which are so solidly filled with earth, grease, and other matter, as to exist only in name, and which, for any good they accomplish, might just as well not exist at all. One, examined hy the writer some months since, had apparently had nothing through it for years, the whole waste from the soil-pipe having accumulated heneath the cellar-floor. The same state of things was found to exist helow the Rockland Bank Building in Boston. A case has heen mentioned to the writer where it is thought that three deaths can he directly traced to the stoppage of a drain which was so clogged as not to act. Almost every one who has been led into this line of inquiry has some similar instance to relate, and evidence could he multiplied indefinitely. Of the house-drains crossing the intercepting sewer-trench, during its construction last season, fully 25 per cent. were almost or entirely choked with sludge.

An example of semi-existence, observed while digging for the sewer in Charles-street, is worth noting, as showing the intelligent judgment sometimes exercised in doing this kind of work. It will he understood hy referring to the sketch (fig. 1). The drain was one for surface-water; and the drain-layer, in digging from the house towards the sewer, came upon a log lying across his trench, and here stopped short, chopped a hole in the log, found it hollow, and connected his drain to it without going farther. It is true, the log led to no outlet, hut then it saved trouble, —to the drain-layer.

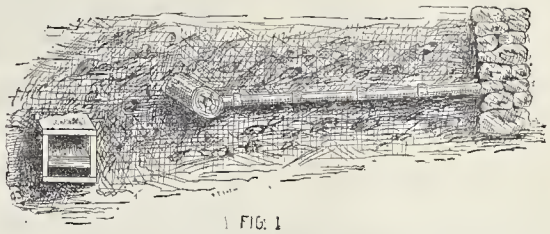


FIG. 1

As to the question of the size of drains, it was found that of 113 observed while building sewers the past year:—

11	were ahout	4	inches in diameter.		
4	„	„	5	„	„
21	„	„	6	„	„
5	„	„	7	„	„
27	„	„	8	„	„
8	„	„	9	„	„
11	„	„	10	„	„
26	„	„	12	„ or over	„

The sketch helow (fig. 2) illustrates the wide range of this diversity. Most of them drained single dwellings similarly situated; and if the

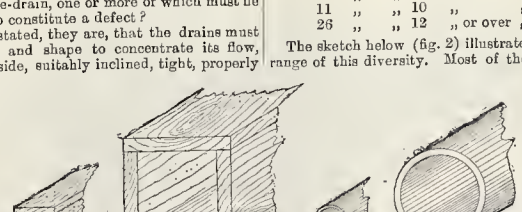


FIG. 2

* The same rule applies, of course, to soil-pipes, although that part of the subject does not come within the scope of the present inquiry.

small ones were large enough the others must have been unnecessarily large, and *vice versâ*.

But what is the proper size?

Probably nine engineers out of ten would answer, "By no means larger than 6 in."; and nine drain-layers out of ten would now say, "Never smaller than 8 in." The former argue that the drain need only be large enough to pass through it all that it can reasonably be expected to carry, and that anything beyond this tends to make the ordinary flow spread thinly over a wide bottom, without a sufficient depth to carry solid matters along with it. The latter reply that, in fact, a drain never does receive only what can reasonably be expected; and that, the larger the drain, the more storage room for the unreasonable accumulation of clothing, tin and glass ware, dead animals, &c., usually found in it. "In practice," say they, "large drains take longer to choke up than small ones, and are therefore better."

Their facts are correct, but their conclusions may be doubted. In building a drain, the object should be to prevent the beginning of a deposit; and this is much easier in a small drain than in a large one, as will be understood from fig. 3,

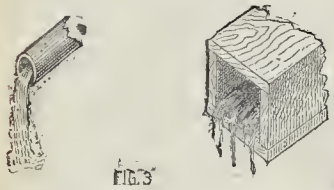


FIG. 3

where an equal quantity of water is supposed to be flowing in a 4-in. and a 12-in. drain. It might be thought (by one who thought at all about such matters) that the discharge of a great volume of water, as from a bath-tub, would tend to scour out and clean a drain. So it might a very small one. But in such a structure as our sketch represents, with a flat bottom 12 in. wide, the stream caused by such a discharge would probably meander over the bottom of the drain, and be nowhere over ½ in. deep. Let a deposit once begin, and subsequent accretions as surely choke a large drain as a small one, only it takes longer to do it. And it may even be questioned whether it is an advantage to be able to use for an additional year a drain nearly full of putrescent filth, or whether it is not better to have the evil disclosed and remedied as soon as possible. It may safely be said that three-quarters at least of the house-drains in Boston are too large, because, even if some of them perform efficient services, small ones would do as well, and be less liable to get out of order.

In respect to form, there is almost as much diversity as there is in size. Figs. 4 to 10 give the more common shapes.

The first three must be condemned at once, on account of their flat bottoms. The water

FIG. 4

FIG. 5

FIG. 6

FIG. 7

FIG. 8

FIG. 9

FIG. 10

passing through them spreads out into a thin sheet, which does not readily wash along solid matters. Floating matters also tend to stick in the angular corners more than they would on rounded surfaces. That this is so, is shown by the record. Of the 113 house-drains whose condition was noted, 45 were constructed with flat bottoms; and of these 26 were choked, or nearly so with sludge; 19 were reasonably clean. Of the remaining 68, which had rounding bottoms, 12 were full, or partly so, of sludge; 56 were reasonably clean. The common appearance of these flat-bottomed drains, as they were uncovered, is shown in figs. 11, 12, and 13. Figs. 13 represents the condition of a drain, now disused, which came from the City Hospital grounds.

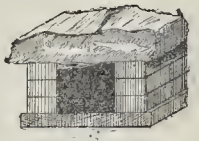


FIG. 11

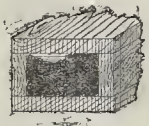


FIG. 12

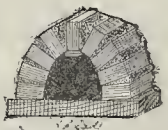


FIG. 13

The shapes shown in figs. 7, 8, 9, and 10 are unobjectionable, although, in fact, these drains were often too large, and had other defects. Fig. 8 is a kind of construction which was in vogue twenty-five years ago; and, except for liability to open joints, its angular bottom and its size is passably good. Our facts seem to show that 40 per cent. of the Boston house-drains are defective in shape.

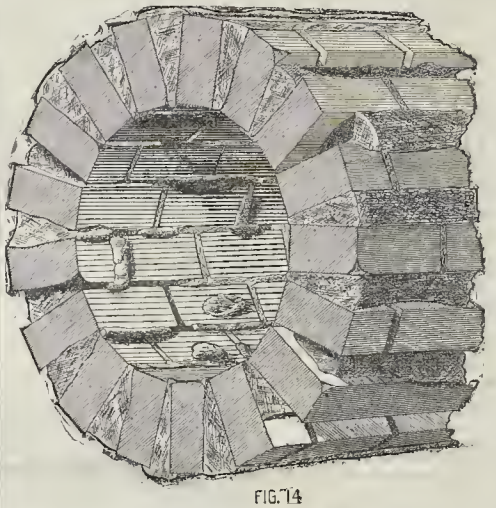


FIG. 14

A drain should be smooth, so as to afford no prominences for solid particles to lodge upon. Planed wood, slate, and brick are smooth enough. In use they soon become covered with a film of slime that makes them very slippery. Unplaned wood, which until recently has been somewhat used, is apt to be rough, and to have splinters pointing against the flow, which catch solids moving upon them. The chief difficulty in making a brick drain smooth is the care required to see that no mortar is left projecting into the drain. Fig. 14 shows the manner in which such work is often finished.

It is possible to strike each joint of the lower half of the drain so as to leave a reasonably smooth surface; but a difficulty harder to avoid is caused by portions of the mortar uniting the arch-bricks falling when the supporting centres are removed. These lumps of cement, indicated in the sketch, adhere to the bottom, and, unless carefully scraped off, harden, and form serious obstructions to the flow of sewage.

Pipe-drains, whether cement, clay, or iron are smoother than those of brick. Glazed clay pipes are especially smooth. In these, however, it is very common to find the mortar uniting the several sections of pipe projecting into the interior, forming a series of little dams which obstruct the flow. Fig. 15 illustrates this. This can be avoided by carefully cleaning the interior of each pipe, after laying it, with a swab or hoe,—a simple precaution, but often neglected by a careless drain-layer. It will not be an exaggeration to say that three-fourths of existing drains are defective as to their smoothness.

The best rule in practice for the inclination of a house-drain is to give as much pitch as is possible, and in few cases is less than ½ in. to the foot safe. A great many drains are faulty in this respect. The actual inclination of drains crossing the trench of the intercepting sewer the past year was not taken; but of the 113 met with nine are recorded as level, and fourteen as pitching the wrong way, that is, towards the house. One of these, coming from a public school building, was about 7 in. lower at the curb-stone than at the sewer. The condition of such a drain is shown in fig. 16.

The water stands in the depressed portion of the drain to the height of its connexion with the sewer, and having little motion deposits are apt to occur. In the case referred to it is but fair to say that the school-drain was clean, so far as seen. Very possibly an abundant use of water or recent heavy rains had scoured out any deposit that may have taken place. It is probable that most of this inclination in the wrong direction occurs in the street, near the sewer. The drain-layer frequently begins to put his drain simply with reference to the house, without inquiring what is the elevation of

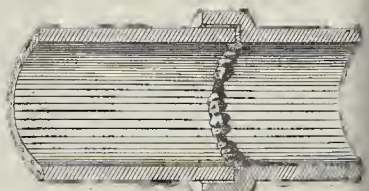


FIG. 15

the sewer into which it is to empty. He digs his trench towards the street, and lays his drain on a slope which he judges by his eye to be sufficient. This in itself is a deceptive matter, as a trench generally seems to slope down towards the observer. When the sewer is reached, it is found to be higher than the portion of drain already laid. What is to be done? It is not the drain-layer's fault that the sewer is so high. He cannot take the trouble to dig up his pipe again. It is only a few inches any way, and the pipe is run up and connected, the trench filled back, and, "out of sight out of mind."

It was stated that one of the essentials of an efficient house-drain is that it shall be tight.

Mr. Ernest Bowditch has called the writer's attention to a condition in which, at first sight, a leaky drain might appear better than a tight

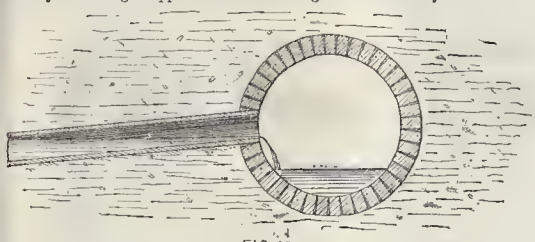


FIG. 16

one. He says, "It is sometimes noticed, when plumbing is from twenty to twenty-five years old, and where all the drains outside the cellar-walls are of open stone (technically French drains), the soil-pipe not being ventilated, that there is no perceptible leakage of sewer-gas into the house. It is reasonable to suppose that in these cases the gas generated outside the house works up through the soil, rather than force the traps of the house. The modern method of tight drains and cesspools tends to drive all gases into the house. It is frequently more important, therefore, that recent plumbing should be ventilated than that of older date.

Both tight and open drains tend to produce evils; but those arising from a tight drain can be obviated by proper ventilation of the house-pipes, while the evils from leaky ones are irremediable. Therefore, we say, drains should be tight, that sewer-gas (or what is worse, matters capable of producing sewer-gas during a long decomposition) may not escape; and also that water may not leak out, leaving the solid contents of the drain stranded.

This want of tightness is the commonest defect of all, and probably three-quarters of the annoyance from drains is due to it. In the annual report of the Boston City Board of Health for the year ending April 30, 1878, is given the result of examinations of 351 house-drains in different sections of the city. Of these, 193, or 55 per cent., are reported as defective; and in nine cases out of ten the defect consisted in the drain not being tight. This defect, more than others, affects the better kind of houses.

Mr. Theodore Clark, who has had experience with this class of dwellings, speaks thus of earthenware and cement drain-pipes:—"These, I think, rarely remain tight many years. Even where the drains are laid with the greatest care, I have observed that water will often, in course of time, make its way out around the joints between the pipe and the ring of cement. When broken it is found that the cement has taken a perfect mould of the pipe; but either from some greasiness, or possibly a little dust on the pipe at the time of laying, it has failed to adhere, and water has ultimately forced its way through. An accumulation of water caused by an obstruction in the pipes will often search out such places, which must have previously allowed gas to pass freely. Another very frequent source of trouble is the settling of the ground under and around the drain-pipes. In houses with drains originally in perfect condition, their joints will frequently, in a year or two, be found to be separated, the pipes cracked, or the branches settled away from the soil-pipes which enter them. In either case the drainage saturates the ground about the defective places with matter, whose effluvium will penetrate even concrete.

In my experience, defects of this kind are far more common than leaks in iron soil-pipes, imperfect traps, or other defects attributable to the plumber; and the earthen drain-pipe should generally be first examined in searching for the cause of unpleasant smells in any part of a house, as effluvia originating in the cellar often find their way through furnace-pipes and behind furrings to the remotest corners of a building."

In this connexion may be cited several cases recently reported, in each of which a smell was noticed whose source it seemed impossible to locate, until at last a leak was discovered in the drain, directly communicating with the cold-air supply-pipe of the furnace, which latter, of course, acted as a distributor of the gas through the entire house. A similar leak into the air-duct of the Boston City Hospital proved a source of serious illness, and probably of increased mortality, among the surgical patients, until remedied in course of the various improvements introduced by Dr. Cowles.

Leaky drains are due to a variety of causes. In a brick drain the joints between the bricks may not be solidly filled with mortar, the mortar may not adhere to the bricks (a common result of not wetting the latter before laying), the bricks themselves may be shaky or rotten, or the structure as a whole may be broken by unequal settling. In some drains no attempt is made to have tight joints. A kind much built some years ago, and of which many examples

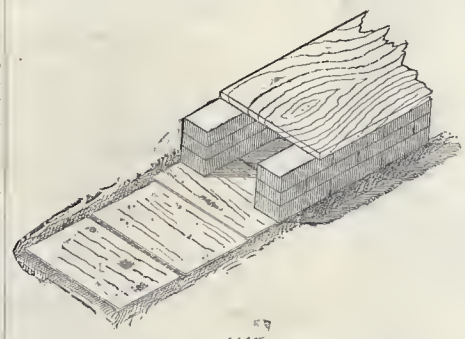


FIG. 17

remain, is shown in fig. 17. In this the bottom is made of roofing-slates placed side by side, or sometimes overlapping, but never

FIG. 18

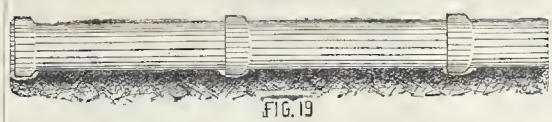


FIG. 19

with anything to prevent water percolating through the joints into the soil below. Fig. 17 reversed, with plank below and slates above,

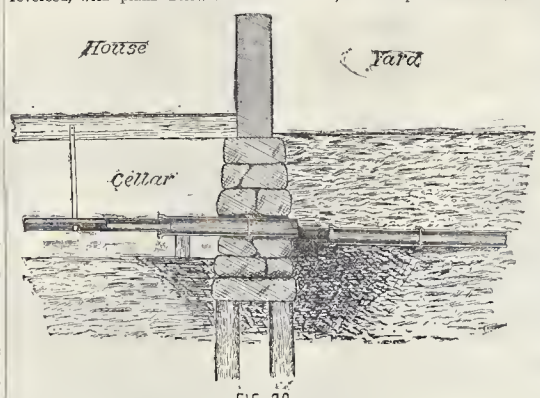


FIG 20

would resemble more than half the drains on Beacon-hill as they were originally made, and still exist. A plank drain may leak through open joints, variously caused through knot and nail holes, and by the rotting of the wood where it is not constantly wet. A pipe-drain may leak from bad joints, from flaws in the pipe itself, or because it had been broken. The breakage is generally due to unequal settling, sometimes to defective pipes, and occasionally to improper methods of laying them. The sections are sometimes carelessly or ignorantly laid on the bottom of the trench, resting merely upon their flanges as shown in fig. 18, instead of upon their entire lengths, with depressions dug out for the flanges, as in fig. 19.

In the former case, unless the dirt be rammed back beneath the pipe with unusual care, the pipe acts as a beam resting on supports 3 ft. apart, and is liable to be broken by the superincumbent earth, or by any shock, as of a body falling, or a wagon jolting over it.

As the greater proportion of leaks are caused by defective joints, it follows that a brick drain with joints every inch or two is more liable to this defect than a clay or cement pipe with joints 2 ft. or 3 ft. apart, and that iron pipe in 5 ft. lengths is less liable to it. A place where a leak frequently occurs, especially in a house built on made land, is where the drain passes through the cellar wall. If the foundation wall is supported, and the ground on either side settles, a condition of things is produced shown in fig. 20.

A drain may exist in such a state as this for months, or longer, without detection. The water follows the wall, perhaps into neighbouring houses, saturates the ground in the vicinity, and finally finds an outlet through some pervious stratum, or into some well. If the cellar be examined, little moisture may be apparent—an ill-defined odour to which the family become accustomed, and about which visitors feel a delicacy of speaking, being the only suggestion of trouble,—until finally, perhaps, may come some "unaccountable" sickness, or "mysterious visitation of Providence." Mr. W. H. Bradley, Superintendent of Boston Sewers, spoke thus of this matter three years ago, in a communication to the city government:—"The number of drains leaking under houses and into foundation walls is very large; it is almost certain to occur with every house upon made land, and is always neglected by owners and tenants till it becomes insupportable; and with sickness traceable to such causes, and continued discomfort prevailing, the parties most interested still wait for the city to carry out costly general measures, thinking thus to abate their private nuisance. As a rule, a bad smell in a house means something wrong locally, and should be stopped in a day."

The examinations of house-drains, before referred to, made by the Boston Board of Health, which aimed at the discovery of leaks by the use of strong-smelling volatile oils, show that more than one-half of the Boston drains (and

the proportion would probably not be less elsewhere in the State) are defective from want of tightness.

A drain should be firmly and properly connected to the sewer at one of its ends, and to the soil-pipe (if this connexion be within the house, as it almost invariably is) at the other. More leaks probably occur at the other place than at any other. The inspectors of the Board of Health, after pouring a little oil of peppermint into an upper water-closet, most frequently recognise the familiar odour at this point. Sometimes there is not even a pretence of making a tight joint, the soil-pipe being merely inserted loosely into the drain. In other cases the joint, intended to be tight when made, through careless construction is not so; and again having been tight when made, it may have been injured since. Fig. 21 is from a sketch made by Mr. Bradley of a case brought to his attention, existing in the house of a Boston physician. The drain may settle away from the pipe, or the pipe may settle into the drain; an iron pipe by its expansion and contraction may break the joint between them. So liable is this place to disturbance, that when possible it is well to build it so that it may be accessible to examination at any time when there is the least suspicion of wrong. Rats frequent drains, and dig into and out of them with surprising facility. An influx of rats into a house should be taken as strong presumptive evidence of a defect in the drain.

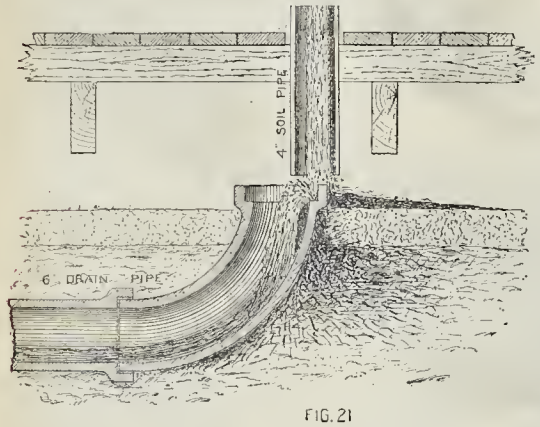


FIG. 21

The mode of connecting a drain with the sewer affects more the efficiency of the latter than it does directly the sanitary condition of the house. But as, indirectly, the condition of the sewer as to cleanliness, efficiency, and liability to generate gases, affects, through the drain, every house connected with it, the proper junction of the drain and sewer deserves a degree of attention which, till quite recently, it has seldom received.

A drain should enter the sewer either by a curve tangential to the direction of flow in the sewer, or at an acute angle with that direction, so that the contents of the drain shall unite readily with that of the sewer, and the velocity of neither be much retarded. Nineteen out of twenty drains in Boston, built previously to 1876, enter the sewer at right angles. The effect of such an entrance from the top or side it is attempted to show in the sketches (figs. 22 and 23), where the tendency to arrest the flow in both structures, and to cause eddies and deposits, is shown in a somewhat exaggerated way. Fig. 24 shows the better result attained by connecting the drain at an acute angle.

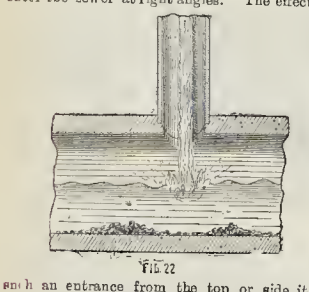


FIG. 22

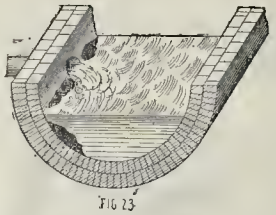


FIG. 23

It will probably be conceded that, whatever may be the mode of connexion between drain and sewer, it should be made in a firm and workmanlike manner. In practice it has generally been very loosely and roughly made. Sometimes there is no connexion at all, as shown in fig. 25, where the drain is simply brought pretty near to the sewer, and a hole broken into the latter. Of course, water from both drain and sewer soaks into the ground, and occasionally the earth falls into them. Often, as in figs. 26 and 27, a hole, somewhat too large, is cut into the side of the sewer, and the pipe pushed through, and allowed to project, more or less, into the sewer. Fig. 28 shows the rough way in which pipes are often connected with the arch of a sewer.

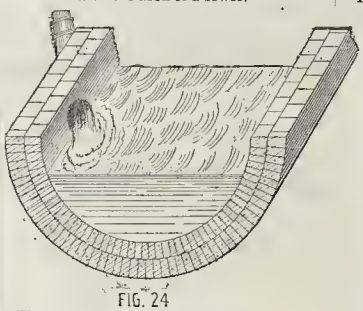


FIG. 24

The proper height in a sewer at which drains should be connected is about its ordinary flow-line. At this point the water from the drain mingles with that in the sewer with the least disturbance to both. In Boston, drains have commonly entered the sewers wherever they happen to run against them. As a general rule, they are too low (fig. 29); and water from the sewer backs into them, making a sluggish current. Their being too low might be expected from what was shown in connexion with inclination of drains; and this results largely from an effort to drain cellars into a sewer higher than the cellar floors. Occasionally, a drain-layer, having found a sewer much lower than he expected, has dug vertically to it, broken a hole in the top, and around the hole erected a chimney with which to connect his drain (fig. 30). Often the hole into the sewer is much smaller than the drain which empties through it (figs. 31 and 32). In such cases there are shoulders around the hole, on which solid matters accumulate.

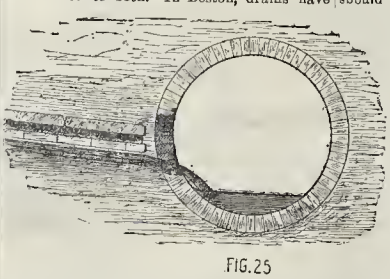


FIG. 25

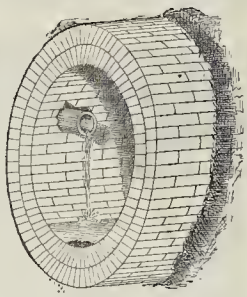


FIG. 26

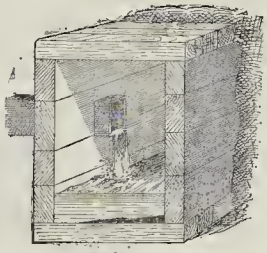


FIG. 27

The sketches that have been given exhibit what until very recently has been the method, or rather lack of method, of making connexions with the sewers of Boston; and it is supposed that the manner of doing such work elsewhere in the State has been very similar. In Boston there has been an improvement in this respect during the last three years. The superintendent of the sewers, realising how much the efficiency of his charge was impaired by the way in which house-drains were frequently connected with the sewers, obtained, against considerable opposition, authority to require that any future connexions should be made under his inspection. His regulations require junctions to be made with slants and curves, as shown in fig. 33; but of the total number of existing drains, the proportion so connected is very small. Speaking generally, it may be said that almost all the drains in old Boston are defectively connected with the sewers they enter.

The material of which a drain is composed should be durable, both on account of true economy, and, what is more important, because, being generally out of sight, any decay or failure in it is not readily discoverable. For the same reason that portion of the drain within the house should never be put where it cannot be easily examined in case there be any suspicion of trouble. The materials most generally used for drains are brick, stone, slate, vitrified clay, cement, wood, and iron.

Bricks made of good clay thoroughly burnt all the way through, are among the most enduring of building materials. But all bricks are not so enduring. From some kinds of clay good bricks cannot be made. In every kiln of bricks there are some which are not thoroughly burnt. A soft brick will rot and disintegrate in water. Therefore, while, as regards durability, bricks may be said to be a perfectly suitable material for drains, the statement is only true

provided great care is used in selecting them. Building stone and slate, often used for the tops and bottoms of drains, are generally durable (though there are instances of slate disintegrating in the course of years); but

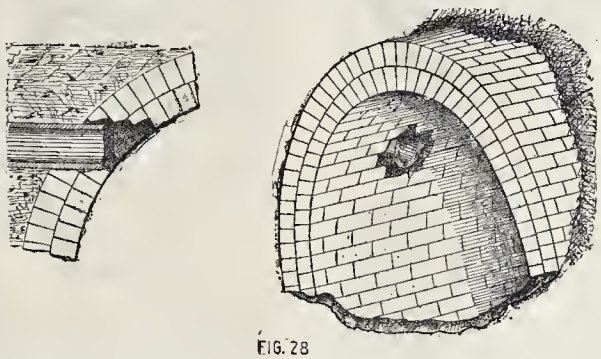


FIG. 28

there are other reasons why their use is not to be commended.

What has been said about bricks applies to the clay drain-pipe (now so commonly used), to a degree not usually recognised. Too frequently one hears Akron pipe spoken of as though it

FIG. 29

possessed unvarying qualities. It should be remembered that such pipes are burnt in a kiln very much as bricks are. Before burning they may be air-checked; like bricks, the pipes nearest the fire may be warped or fire-cracked; those higher up may be less thoroughly burnt,

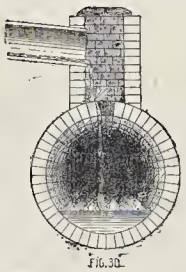


FIG. 30

corresponding to "light-colored bricks." Others may be quite soft, and imperfectly glazed, or the glazing may scale off by "popping."

Slip-glazed pottery pipes are still more liable to defects. They are made of a different kind of clay, and, being burnt at a lower tempera-

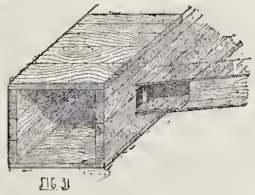


FIG. 31

ture, are usually more porous and less hard. The glazing, which is formed by dipping them before burning into a thin mixture of argillaceous earth, forms a skin over the pipe, which at times peels off under the action of frost, acids, or hard usage. While either kind of pipe, if well made, is durable enough, poor samples of each were occasionally noticed while constructing the intercepting sewer. It is important that in using them for house-drains care should be exercised in their selection.

Without going into the vexed question of the comparative merits of clay and cement pipes, it is sufficient to say here of the latter, that while they can be, and often are, made so as to be very durable, yet cases where they have failed and disintegrated are frequently reported; and it is extremely difficult to judge from their appearance whether they are good or not. In resisting the acids or alkalies, they have been proved far inferior to well-burnt bricks or clay.

It is not easy to shape wood into the proper form for a drain. If it is always kept wet, as in the bottom of a drain constantly in use, it will last an indefinite time. Where it is alternately wet and dry, as in the sides or top of a drain, it is sure to decay sooner or later. Of those seen last year, the report concerning many is, "rotten," "could not be held in place," "fell to pieces when handled," &c. The state of one such drain observed by the writer, in which the cover had partially rotted away, and earth fallen in, is given in fig. 34. Unless there are exceptional conditions, the use of wood for house-drains must be condemned on account of its liability to decay, as well as for other reasons.

The use of iron as a material for the construction of house-drains is of too recent date to permit of an absolute statement as to its durability. Thus far there seems little reason to doubt that it is suitable in this respect; and its many other merits will probably lead to its more extended use for this purpose.

Sanitary science, as it now exists, is of recent origin. Until within twenty years the arrangement and construction of sewers and drains were committed to mechanics and labourers, and were considered beneath the attention of educated men. Interest in the subject was first excited through the discovery by the medical profession, that a large class of diseases (thereafter called filth diseases) was induced by the presence of gases arising from defective drainage.

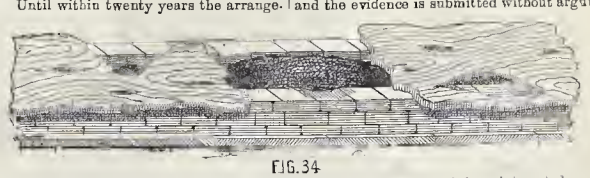


FIG. 34

To investigate and cure the inefficient methods and appliances which caused these gases, lay within the province of the engineer; and hence sanitary engineering and sanitary engineers came into existence. These latter devoted themselves with ardour to unearthing evils and devising remedies for them. Like new brooms, they attempted to sweep clean, and to purify at once the Augean stables they had discovered. But, like all reformers, they were sometimes carried away by their discoveries and theories, so that occasionally public opinion has re-acted against an exaggerated presentment of the evils of bad drainage. People have replied, "Nonsense! things cannot be in such a desperate condition, or the human race would have died

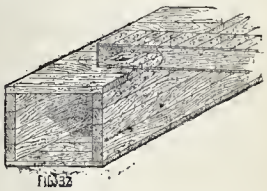


FIG. 32

out. Our fathers lived comfortably to a good old age without bothering their heads about drains, ventilators, or traps; and we are willing to take our chances."

It might be answered that our fathers did not have our intricate apparatus for drainage to bother themselves about. Neither did they put on double windows, and ventilate their houses through their cellars, nor connect their drains with their sleeping-rooms, as we do. The writer has no wish to be an alarmist. The risk from sewer-gas is probably not so great as many suppose: it is a slight risk, but a slight risk of a terrible danger. If a man thinks there is no need of insuring his house because his father lived in it for fifty years without a conflagration, he has a right to his opinion. What has been given in this paper, besides a few

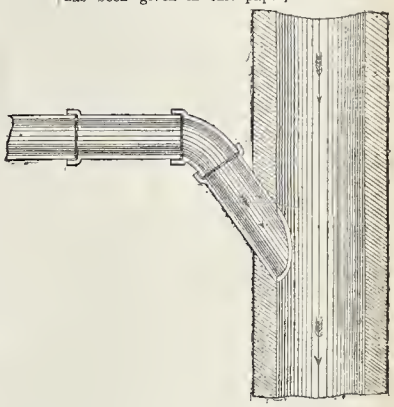


FIG. 33

general principles, is a simple statement of what exists as seen by the writer and others. The question of plumbing has not been noticed, because the writer is not especially qualified to discuss it. He merely speaks whereof he knows, and the evidence is submitted without argument for the consideration of those interested.

Should any one, admitting the evil, ask concerning a remedy, the answer is twofold. For the defective drainage which already exists, there can probably be no immediate radical relief; it can only come as people learn to

appreciate the danger of sickness and the value of health. When householders become sufficiently interested to wish to know where and what their drains are, and to make a few investigations with bottles of peppermint and otherwise, then will the better day be at hand.

As to what may be done to prevent an increase of bad work, a suggestion is offered. It is safe to assume that every man who builds a house for himself desires that its drainage shall be fairly efficient: unfortunately, it is not equally safe to assume that he will spend the time, thought, and money necessary to make it so. Now, since a defective house-drain may affect not only the owner of the house, and his family, and all who may thereafter reside there, but also the whole neighbourhood, would it infringe on personal liberty too much to require that the house-drain, if no more, shall be built according to approved plans and under municipal inspection? Merely to require that before beginning such work a plan of it should be put on record would accomplish something. In drainage, to have some plan, even if a bad one, is better than none. It insures a little thought beforehand, a knowledge of the height of the sewer, and an adaptation of the drainage to it.

In Frankfort-on-the-Maine, which has lately been sewered on the most perfect system, and with the latest results of engineering skill, it was found impossible to realise the expected benefits unless some control was exercised over house-drainage. In that city, connexion with the city-sewers is not compulsory; but if any one desires, as nearly all do, to drain into them, it is required that detailed plans in duplicate, showing everything to be done, shall be filed, one with the Board of Works for its approval, and the other to be kept at the house. The whole work is done subject to its constant inspection of materials and workmanship.

In the eighth annual report of the State Board of Health, January, 1874, pp. 130–132, are given the conditions under which buildings, &c., are allowed to be drained into the new sewerage system of Frankfort. The plans to be filed are referred to thus:—"Whenever the drainage of any house, yard, &c., is projected, the owner of the property in question must, after having signed the requisite certificate, furnish to the Department duplicate plans bearing the signature of the contractor, and containing a map of the locality on a scale of at least 1 : 2,500; a ground-plan of at least 1 : 250; and a sketch of the main drain and branches with its horizontal plane on the same scale as the ground-plan, and its profile at least 1 : 125. The certificate and one of the duplicate plans are to be kept among the documents of the Sewage Department; the other plan must be always ready for inspection by the officers at the place for which it is designed. All plans presented must contain all the works projected; the exact position of sinks, gullies, traps, and other details; the direction of the superficial water-carriers; the position of the rain-spouts, cisterns, privies, waterclosets, cesspools, vaults, wells, pumps, and other arrangements for water supply; also the levels of the surface where the works are projected, including the grades of the latter, the depth of the cellar, the lowest levels of the ground, and, where possible, the depth of the foundations,—all to be given by the standard grade."

This preparation of plans is the pivotal point about which centres the whole regulation of private drainage. Its effect is, probably, that, as the owner and mechanic are unable to make the plans with the requisite nicety and accuracy, they are prepared by an engineer familiar with the proper designing of such structures. It will be noticed that this filing of plans is not to be a mere form, but that a duplicate is to be kept on the ground, to be constantly referred to in constructing the work.

The question of sewerage is forcing itself upon the attention of all our cities and towns. Boston has appropriated between three and four million of dollars for a system of interception, whereby its sewers shall discharge freely at all times, and their contents be diverted from the vicinity of dwellings. It is the first most important step, and, as the taxpayers feel, costs dearly. If the full benefit of this improvement is ever to be realised, it will only be when the house-drains and common sewers are rendered equally efficient, and the fundamental condition of perfect sewerage,—an uninterrupted removal of waste matter from the house to its final place of deposit,—is attained.

PUBLIC WORKS IN THE COLONIES.

FROM official papers, just published, relating to her Majesty's Colonial Possessions, we get some further interesting information concerning public works. In the report which refers to *Jamaica*, we read that, last year, the sums of 8,180*l.* and 10,999*l.* were spent, respectively, upon maintenance and new works. Among these works may be noticed the following, under the head of "Maintenance":—Gas-fittings have been provided at the General Post-office. Extensive repairs and painting on the following buildings: the Supreme Court-house, Kingston; the Island Secretary's Office, Spanish Town; the Court-houses at fourteen of the principal towns and stations in different parts of the island; the Colonial Secretary's Office, the General Post-office, the Customs offices at Kingston and Port Royal. Minor alterations have been carried out to the Collector of Taxes' Office, Morant Bay, and to the Customs House offices at Montego Bay. Considerable repairs and painting have been carried out at several of the prisons and constabulary stations throughout the island; gas-fittings have been provided at the General Penitentiary and the Constabulary Barracks, Kingston. The range of thirty-two cells, for females, at the General Penitentiary, commenced last year, has been completed, and handed over for occupation. Another range of forty-eight cells, for females, has also been nearly completed. The Deputy-Superintendent's quarter, at the General Penitentiary, commenced last year, has been completed. Extensive improvements, commenced during the last year, at the Stony Hill Reformatory, have been finished. Improvements have been carried out and additional accommodation provided at certain district prisons and constabulary stations, and a new constabulary station was erected at Ulster Spring, in the interior part of the parish of Trelawny. Considerable repairs have been carried out at the public hospital and several parochial hospitals, including seven hospitals that were formerly a charge on the immigration funds. The total expenditure, under the head of roads and bridges, has been 26,873*l.*, thus divided: maintenance and repair of main roads and bridges, 22,598*l.*; new works on the main roads and bridges, 4,275*l.*; total, 26,873*l.* The average cost of maintenance has been 30*l.* 9*s.* per mile, being the lowest rate since 1871-72, although the seasons have been quite as favourable as the average. In the previous six years the rates have been, respectively,—31*l.*, 33*l.*, 37*l.*, 49*l.* 16*s.*, 33*l.* 7*s.*, and 34*l.*

With regard to *New South Wales*, we learn that the total amount expended on the finished railways of the colony at the close of the year 1878 was 9,784,645*l.* The expenditure on unfinished lines to the same date was 493,206*l.*, and the sum expended in the year 1878 was 963,351*l.* The returns of roads and bridges shows that during the year 1878 the sum of 500,745*l.* was expended. This amount includes the following items, issued to trustees from unclassified vote, 5,343*l.*; trustees from minor roads schedule, viz.,—Northern District, 10,560*l.*; Southern, 8,679*l.*; Western, 5,042*l.* Harbours and rivers show an expenditure for the year of 218,001*l.* The actual amount expended on finished works of this class was 206,320*l.*, and on unfinished works, 672,717*l.* The amount laid out by the colonial architect during the year 1878 on public buildings of the colony was 263,446*l.* The cost of furniture for the year amounted to 13,401*l.* The expenditure for the year on sewerage works for Sydney was 21,906*l.*, which, with previous outlay, gives a total cost of 639,386*l.* The waterworks of Sydney show an expenditure for the year of 63,086*l.*, which brings up the total cost of this undertaking to 1,059,019*l.* The expenditure on both of these last-mentioned works includes salaries, interest, and other expenses.

In papers relating to *British Honduras* we find incidental allusion to the various projects in contemplation at the present time, viz.:—The Panama or Nicaragua Canal, the Mexican cable to connect the ports along the Pacific, and another to connect the Atlantic ports with Cuba, the Costa Rica and Tehuantepec railways, the new steam routes recently organised to these ports, the various companies forming to commence operations or undertakings in the neighbourhood, and the recent gold discoveries in Honduras. The present appearances of the colony beyond Belize, we further learn, are hardly inviting to a stranger. There are no roads beyond a few tracks which are impassable in wet weather, and bungays, doreys, or pit-pans comprise the means of water transport; yet there are few countries which afford so many natural highways. Rivers and pine ridges intersect the country in all directions, and intervening swamps or creeks are the only difficulties to be surmounted in road-making. Nor does the place present that example of advancement or successful colonisation which seems so desirable should be the case in view of surroundings. The opinion is expressed that a loan of 100,000*l.* does not seem rash or unreasonable; the amount is only a little over two years' income, and this would build a couple of rail or tram ways,—one along the valley of the Old River, connecting Belize with the western frontier, a distance of seventy miles; the other could be made through the southern or northern district, as might be determined: the distance in either case to be limited to thirty miles,—if in the southern district, to open up the magnificent lands in the neighbourhood of the American settlement, and to give access to the highlands in the interior in the direction of San Lins and Coban; if in the northern district, as a question of defence, as much as to develope the agricultural resources of that part of the colony. A portable railway would suffice, and the following estimate has been given for 100 miles:—Cost of plant, 400*l.* per mile, 40,000*l.*; cost of clearing track, 500*l.* per mile, 50,000*l.*; contingencies, 10,000*l.*; total, 100,000*l.* The estimate for constructing the roadway may seem unreasonable, but the pine ridges, which are hard, sandy, open plains, with necessary timber (*pinus rigida*) along the wayside, could be availed of for the greater part of the distance; intervening swamps and creeks present the only difficulties, and they would form the only expensive parts of the route.

In respect to public works in *Ceylon*, we learn that the expenditure of the Public Works Department last year was Rs. 5,553,639 00¾, being Rs. 495,627 57¼, or a little less than 10 per cent., over that of 1878. The cost of the establishment, including, in addition to salaries, fixed and provisional, all salaries on account of allowances, transport, and office contingencies, was Rs. 408,891 02, or about 7½ per cent. on the expenditure upon works. Tables have been published which exhibit a classification of the expenditure, under the headings of "Establishment," "Construction," "Upkeep, Repair, and Improvement of Roads, Bridges, and Buildings," and "Irrigation Work," the funds from which the expenditure has been met, the expenditure incurred in the several provinces, and an abstract of the expenditure on the various classes of public works in each of the provinces of the island. The expenditure on irrigation works was Rs. 327,772 73¼, being Rs. 113,485 25¾ in excess of the expenditure in 1877, and it includes a sum of Rs. 33,167 26 spent on the commencement of the very important work of the restoration of the Yodi Ela in the North Central Province. The Director of Public Works reports that the Pavilion at Kandy is in good order, and that the Queen's House at Colombo and the Cottage at Nuwarra Elliya require repair. The furniture and equipment at the Pavilion and at Queen's House are in fair order. The furniture at the Cottage is not provided at the public expense. The expenditure on the breakwater, which is not included under the head "Public Works," amounted, in 1878, to Rs. 560,945 05, bringing the total expenditure from the commencement of the work to Rs. 3,188,552 05. The work was advanced by an additional length of sea-wall of 326 ft., and by an additional length of harbour-wall of 343½ ft.

According to official statistics, the sum expended on public works in the *Transvaal* during the year 1878 was 4,904*l.* 15*s.* 8*d.*, including 1,150*l.* 8*s.* 3*d.* for repairs to roads throughout the province. Nothing substantial could be shown for the whole expenditure, with the exception of a cottage built for the curator of the Botanical Gardens, Natal. This, however, is easily accounted for, inasmuch as when the country was taken over, nearly all the public buildings—both at the seat of Government and in the districts—were in such a disgraceful and dilapidated state that had the exchequer been equal to the immediate demand, it would have been far cheaper to have pulled down the majority of the buildings, and built new ones. The chief items of expenditure were for such necessary additions and "patching-up" repairs necessary to keep public offices from the intrusion of burglars and the effects of rain and dust. A large outlay had to be incurred to render the magistrates' courts and other offices

fit for habitation internally, and for providing them with such scanty furniture as was necessary to carry on the work. In like manner the sum of 1,150*l.* 8s. 3d. was expended on the roads, if one can so designate the rude tracks which have been formed by the ox-wagons. This may seem an insignificant sum for such an object in a country larger than France, but it bears a favourable comparison with the amount spent by the late Republic, which averaged during the last three years of its rule 3*l.* 6s. 8d. per annum. The sum of 150*l.* 10s. had to be paid in part payment of a contract entered into by the late Government for the construction of a water-course at Christiana which, on examination, proved to have been so far badly executed that, had it to be redone and carried out under proper supervision, it could be completed at one quarter of the expense contracted for, viz., 3,000*l.* A large annual outlay is also entailed for rent of public offices.

FROM ITALY.

A FRIENDLY correspondent writes,—I left my country abode on the 19th, and started off to Chiusi, thinking to see there the nucleus of Etruscan art in its museum, and, to my horror, found it had been sold to Palermo. A museum at Chiusi still exists, but though interesting, is not larger than many possessed by private persons. In fact, I went to the house of a private gentleman, who pays experienced diggers to dig around in the tufa, and who sells the findings at high prices, he being depended on. I then started off to Orvieto. These old Etruscan cities are all built as near the sky as circumstances will permit. I did so long to see the façade of the cathedral there, and was not one atom disappointed, as one is so often when imagination has been for years dwelling on the beauty of some particular object. The drive up to Orvieto from the station is now over a fine road, that winds round and round up to one of the old gates of the city. The façade is certainly the finest of all the Gothic façades I have seen, and the brilliant colours of the restored mosaics brought out the soft colour of the lovely columns, and all the wonderful work around the portals. And those marvellous reliefs! How beautiful the front is. I was so sorry to be seeing it alone. Then the marvels of the interior,—the Fra Angelicos and Signorelli,—a group by the former of Fathers and Saints in a compartment of the roof of the principal chapel looks as if painted yesterday. There has been a deal of bad restoration, but now there seems a loftier spirit pervading the works, and as the funds fall in they will restore the two chapels. The windows of these chapels are of thin layers of alabaster, transparent. I started off one evening at six, in a carriage, with the proprietor of the hotel as guide, to visit the Etruscan painted tombs. We drove about ten miles down from Orvieto to the plain, then up on the other side, equally high, and then we waded along narrow paths, through brushwood and over ploughed fields, till we descended the side of the hill to find narrow passages cut in the tufa leading to the tombs. The freshness of the vermilion colouring of the figures, nearly life-size, with the grand black outline, is quite startling. A glorious full moon lighted us, but we had to carry candles in the tombs. They are carefully guarded by iron doors. It would be better if there were bars only to allow the outward atmosphere to keep the tombs dry. One grieves to see these treasures neglected. On the road I went to see the chapel of an ancient Badia, where there is an altar-piece by Signorelli that must go to decay soon, and in an old palace another in perfect preservation, of great beauty. I shall never forget that drive. We did not get back till half-past ten, and the moonlight was as day. And how I had walked!—but the interest was so great that the fatigue was lessened. Then there was the glorious wine of Orvieto to refresh one, —wine such as the Olympian deities must have drunk! The next morning at half-past seven I had breakfasted, and was off with my intelligent guide to see all we could of Orvieto. We went to an old church,—San Giovinele. The priest, an intelligent old fellow, had fancied that there might be something hidden under the thickly-whitewashed walls, so he began to scrape, and found his church painted in fresco all over the walls, and columns also. The brick pavement has been raised 1 ft. above the base of the columns. Behind the altar he found incrusted in the wall a square piece of marble, of old twelfth-century work; and near, pilasters still older, which he dug out and made into an altar, and the old man described the long ceremony, fasting, he had to go through when a bishop passed, who consecrated the new altar. The pilasters are pure Byzantine,—the front piece is obviously twelfth-century work; and, sure enough, we found a piece of the same in another part with 1127, or rather MCXXVII. on it. The frescos on the wall are quite Giottesque, and one old Madonna is Cimahüé to a touch. I longed to help to scrape off all the whitewash, for not an eighth has been uncovered. Is there no one who will help the poor old canonico with a little cash?

I went to the opening of the Donatello Society in Florence, which you have already mentioned.

You know that Firenze has her king here, and 32,000 soldiers, who have been doing the grand manœuvres and the review, and the Donatello Society thought it would give *éclat* to open while the king was here. So what pictures they had they hung. The king examined them minutely, talked a great deal, hoped a great deal, and praised ditto. Prince Amadeo did the like. This is a move to do good to Florence artistically. The prime mover is Léon Gaucherel, artistic director of *L'Art*. The *Builder*, I think, is the only journal that has made the Society known in England.

WORK AND THE WORKMAN.

THIS was the subject of an address, delivered to the members of the Trade Unions Congress on Thursday in last week by Dr. John K. Ingram, Fellow of Trinity College, Dublin. Taking as a definite type of the workman's life the form it assumes in the great centres of manufacturing industry, he proceeded to consider the general conception which they ought to form of the industrial functions, the relations which had to be regulated, and the moral ideas which ought to preside over that regulation. The whole modern organisation of labour in its advanced form rested on a fundamental fact which had spontaneously and increasingly developed itself—namely, the definite separation between the functions of the capitalist and the workman, or, in other words, between the direction of industrial operations and their execution in detail. The ascendency of wealth was deplored by some and if it necessarily meant what was properly known as plutocracy, the absolute domination of wealth, the prospects of society would be gloomy enough. But the use of wealth, as of every other social force, must be regulated and moralised, a task which ought to be easier than that of controlling the rude preponderance of military force which was its historical predecessor. The active rich, if they would conceive their position aright, must rise above the purely private point of view, and must regard themselves as discharging a true public function,—that of conservators and administrators of human capital. They could not claim to be the creators of this capital; the largest part of it was the fruit of the laborious economies, discoveries, inventions, and institutions of many generations. This conception of the capitalist as a social functionary heightened his dignity, entitling him to respect by virtue of what was really a public office,—a respect which could on that ground be shown by his inferiors without hypocrisy or servility, even when his private character was entitled to little esteem. At the same time, the ideal thus presented must on good natures have an elevating effect, must tend to raise them above the vulgar abuses of wealth, and to make them regard as the greatest advantage it conferred the power of more largely and effectually benefiting their fellow-men. Our ideas of the office of the workman must also be transformed and elevated. The way in which his position was habitually contemplated by the economists, and, indeed, by the public, was a very narrow, and therefore a false one. Labour was spoken of as if it were an independent entity, separable from the personality of the workman, or it was treated as a commodity, like corn or cotton. By viewing labour as a commodity, we at once got rid of the moral basis on which the relation of employer and employed should stand, and make the so-called law of the market the sole regulator of that relation. The entire case received a different complexion when we placed ourselves at the social point of view, from which alone these subjects could be rightly studied. Labour, in the widest sense of the word, was then seen to be the continuous and combined effort of our race for the improvement of its condition and its nature, the present using the acquired knowledge and transmitted resources of the past, and handing down an augmented inheritance to the future. This was the only really human conception of labour, the only one which put employer and employed each in his right place. It would place on a solid basis the claim of the working-man to the respect and courtesy on the part of his superiors in rank; it would profoundly modify our way of viewing his remuneration. His faithful services was now too often regarded as obtaining in his wages a full equivalent return. The wages of the workingman ought to be regarded as the indispensable means of keeping him in such a state of physical health, material security, and moral quietude that he might be able to continue his service to society and to prepare a new generation for the same service. The only true recompense of the right performance of his functions lay in the conscious fulfilment of social duty and in the approbation and esteem which he justly earned from such of his fellow men as had the opportunity and the capacity for appreciating his work. The twofold conception he had presented of the capitalist and the workman brought out distinctly their duties to each other. These obligations were binding on both sides,—on the part of the workman for faithful work, as opposed to eye service, and for abstinence from all unreasonable demands; in the master, as the higher and more powerful of the associates, they involved a larger responsibility and duties of a wider range. As the appropriate motto of the feudal ages was *noblesse oblige*, so that of modern industrial society must be *richesse oblige*. The masters must subdue in themselves the base inclinations which prompted too many, while accumulating personal gain and lavishing it on their own pleasures and ostentations, to neglect their co-workers, who ought to share in equitable measure the benefits arising from their joint operations. The masters ought to be, as some of them had nobly shown themselves, the friends of their workmen, interested in their welfare and that of their families, and actively studying that welfare, in which he said he assumed the continued existence of the separation between the capitalist and the workmen. As to the so-called co-operative system, it had not yet received much cordial approbation from the working man. The co-operative stores or societies of supply were genuine efforts of the people to escape from the abuses of the retail traffic, in order to obtain good articles at reasonable prices. These had been really successful, and had done much good; but they were not true co-operative societies,—they were joint-stock companies. But the co-operative societies of production had far more widely-reaching objects, at least in the conceptions of the social speculators who had most strongly advocated them. To these they presented themselves as the true solution of the labour problem. Professor Cairnes believed that in this new organisation of industry lay the one hope of the working classes, and Mr. Thornton preached it as a panacea for the evils of the world of labour. He ought to speak with caution and modesty in opposition to such men, but he was compelled to say that in his opinion the proposed solution was an impracticable one, and that the material and moral results of any attempt to realise it on a large scale would disappoint the expectations that had been entertained respecting it. Our recent policy had been to give the security of the State for the deposits of the savings of the working classes,—a policy founded on the just idea that for them, not gain, but the prevention of loss, was the first object. The natural destination of such savings was not industrial investment, but the formation of a modest reserve to meet special domestic exigencies, or to make possible the performance of special domestic duties. It was said that the co-operative system would enable workmen to understand the difficulties of the capitalist, and so be more reasonable in their demands; but Dr. Ingram thought the lesson would be dearly bought by repeated failures, and that the same lesson could be sufficiently inculcated by observation and study. He combated the idea that the co-operative system would draw out the best qualities of the working man, and had no faith in moral regeneration founded on motives of self-interest. He thought that on the whole the effect would be to spoil the best qualities of the working-man. His large sympathies and generous impulses would

be supplanted by comparative deadness to social interests; the enjoyment of domestic life and the cultivation of the intellect would be subordinated to the pursuit of profit; and he would be likely to prolong the hours of labour on the plea that he was working for himself. He believed that the immense majority of working-men must remain to the end working-men, and that only. He further believed that this necessity admitted of being fully reconciled with their happiness and their dignity. What they ought to aim at was the elevation of their class as such without seeking to alter the basis of the existing organisation of industry. In this work they would find not only an abundant but a fruitful field for all their public spirit, energy, and sagacity. It seemed to him the merit of the trade-union movement was that it followed precisely the practical and hopeful line he had indicated. Attacked and denounced as scarcely any other institution had been, the unions had thriven and grown in the face of opposition. This healthy vitality had been due to the fact that they were a general product of social needs, indispensable as a protest and a struggle against the abuses of industrial government and inevitable as a consequence of that consciousness of strength inspired by the concentration of numbers. Under the new conditions of industry they had purged themselves from abuses which were explained, if not palliated, by the injustice of the law from which they had now liberated themselves by steady, moderate, and well-considered action. They had been instruments of progress; they had infused into the working-man a new spirit of independence and self-respect. The testimony of all who had the best means of knowing was that instead of multiplying strikes they had diminished their frequency and mitigated their violence. They should proceed further in the same path. If there were anything remaining in their rules which could not be defended on principles of the highest social morality, they ought to expunge it. They should put forward no claims that were not rigorously just. They should seek to give effect to these claims by conciliatory methods, regarding strikes as a last resource,—sometimes, indeed, necessary, but always deplorable, as intensifying evil passions and compromising many innocent existences. They should discuss all the questions that concerned them, such as those of wages, hours of labour, piecework, apprenticeship, on higher grounds than those of material class interests; they should invite the attention of the thinking public to these questions, and look to the best disinterested opinion as the judge and controller of their operations. What were the objects which the working-class ought to keep before them? First, adequate wages. It was stated that the working-class must submit to a reduction of wages in order that the capitalist might undersell the foreign competitor, and then wages would rise. The same appeal was made in Continental countries to defeat British capitalists. To judge by the language used by capitalists and their spokesmen, it might seem that the great question of industrial life at the present time was this,—what working population among civilised nations would be content to live the most miserably, in order to drive the others out of the markets of the world? He hoped the working classes would follow no such *ignis fatuus*. What was really to be desired was that the foreign working-man's standard of living might rise, and that he might maintain every increase of the wages which he had once secured. That would doubly promote the interests of our working-men, for the foreign working-man would then be a better customer for English products generally, and he less likely to be transferred from his own country to England for the purpose of reducing their wages. He thought that if any foreign country had peculiar facilities for any form of production it was desirable that they should be brought into effective operation. If each nation withdrew from those branches of industry for which its native bent or its circumstances disqualified it, choosing those for which it had special advantage, the common harmony would be greatly promoted, while the general wealth would be augmented. It was one of the greatest evils of the protective system that it stood in the way of such adjustments. The second want of the workman was a well-regulated house. Dr. Ingram advocated the cultivation of the domestic affections and duties. The wife, he observed, was the centre of the home, and in order to enable her to discharge her sacred duties she ought to be freed from the necessity of non-domestic labour, which was now too often imposed upon her. He commended the efforts of those who were endeavouring to improve the dwellings of the working-classes. The third requirement of the working-classes was educated. He dwelt at some length upon the importance of this object, and in conclusion observed that the truly vital interest of the working-men was that the whole class should rise in material comfort and security, and still more in intellectual and moral attainments.

A SIGNBOARD AND A QUESTION.

THE newspapers have given particulars of a singular dispute touching the ownership of the signboard of the Royal Oak Hotel, Bettws-y-Coed, submitted for the decision of the Bangor District Court of Bankruptcy. The sign, which is well known to most tourists in Wales, was painted by David Cox in 1847 as the signboard of the hotel. David Cox re-touched it in 1849, and in 1861, at the request of many admirers of the artist, it was placed in the hall of the hotel. The late landlady having gone into liquidation, the trustees claimed to include in the effects the old signboard, for which it was stated a connoisseur had offered 1,000*l.*, and a dispute now arose whether the painting was not a fixture, and as such belonged to the lessor, Lady Willoughby D'Eresby. The judge, after a perusal of the voluminous affidavits, decided in favour of her ladyship, directing that the costs of the application should be paid out of the debtor's estate. To make us agree in the decision as to this old sign, we ought to hear that no other signboard had been put up in its place outside.

The incident reminds us of Sir Edwin Landseer's old shutter. Mr. Jacob Bell had done some friendly commission, as on many other occasions, for the artist, and the latter desired to give him something. Bell would have nothing, but ultimately said, "Well, give me the old shutter in the stable window," a rough panel on which Landseer had partly painted a picture. For this, as he told us himself, he was afterwards offered 600*l.*

PROJECTED LOCAL BOARD OFFICES FOR SOUTH HORNSEY.

ALREADY the necessary documents in connexion with the purchase of the freehold of the site whereon stood Milton-road Chapel, South Hornsey, have been signed, and plans have been prepared for the Local Board Offices which are to be erected there. The total frontage of the land is 119 ft., and the depth, 96 ft., and this has been signed over to the Chairman of the Board (Mr. G. C. Boor) for 1,600*l.*

Mr. Fry, the Local Board surveyor, has prepared plans for the erection of a stone building, to include clerk's, surveyor's, inspector of nuisances', and other offices, Board-room, and all necessary conveniences, whilst in the yard at the rear is to be erected a mortuary with *post-mortem* room (distinct from other buildings), which is intended, in general details, to be as near an approach to the Parisian Morgue as possible. Other erections on the site will include surveyor's residence, foreman's cottage, fire-engine station, cart-sheds, tool-houses, stables, and other essentials to the work of the Board. The principal building will have a frontage of 46 ft., and an elevation of 34 ft. The Board-room will be 43 ft. 6 in. long, and 23 ft. 10 in. wide, the elevation from floor to ceiling being 16 ft. An ante-room for the convenience of committees, deputations, judicial inquiries, inquests, &c., is also to be provided, with separate lavatories for officials and the public. The surveyor's residence will be of brick, with stone dressings, as also will the fire-engine station. The heating of the building will be carried out by means of hot-water pipes to be laid beneath the basement floor, but beyond this there will be no underground operations whatever.

A special committee of the Board appointed to inspect the plans and make the necessary inquiries and arrangements, reported that they had seen similar erections to those under notice which had cost 7,966*l.* Mr. Fry submitted his plans as described, and estimated their entire carrying out at an outlay of 6,643*l.*

The Board unanimously adopted the plans, and agreed to at once apply for powers for the borrowing of 7,500*l.*, which latter sum was thought to be advisable in view of any contingencies.

CHURCH OF ST. NICOLAS, ABINGDON.

FOR many years past the restoration and repair of the parish church of St. Nicolas has been contemplated. A report as to its condition was made as far back as 1867, and the works are now to be commenced in earnest, under the direction of, and from drawings prepared by, the architect and sanctioned by the Bishop's Court this year. A new one will be placed in the nave, and the church will be newly benched with oak.

The freestone work, externally, will be of Doulting, and, internally, of Corsham stone. The church is said to have been built by an abbot of the abbey, Nicolas de Coleham, between the years 1289 and 1307. Mr. Edwin Dolby, of Abingdon, is the architect, and Mr. Edward Williams, of the same town, the builder.

PERTH MUNICIPAL BUILDINGS.

As the people of Glasgow are preparing to erect Municipal Buildings in their city, it may be specially interesting to know what is being done in that way at this time in other parts of Scotland.

The new buildings for Perth occupy the site of the old Council-chambers, and the adjoining property recently acquired by the Police Commissioners, and has frontages to Tay and High streets. The main entrance is from the High-street. On the ground-floor there is the city chamberlain's office, 25 ft. by 23 ft.; registrar's office, 19 ft. by 15 ft. The police office fronts Tay-street, and is 30 ft. by 22 ft.; superintendent's rooms, 16 ft. by 13 ft. Behind the police-office there are two ranges of cells, four on each side, entered from a large corridor, and shut out from the main office by an iron gate. Apartments are provided for the mustering of the policemen, and for a fire-engine house. The council-chamber is situated on the first floor, its dimensions are 41 ft. by 25 ft. The burgh court-room, 30 ft. by 22 ft., is on the same floor, having a public entrance from Tay-street, and a private entrance from the council-chamber, adjoining which there is a committee-room, 24 ft. by 21 ft.; and a waiting-room, 17 ft. by 13 ft. Offices are also provided for the treasurer to the Police Commissioners, and for the burgh assessor. A house for the superintendent of police occupies the second floor.

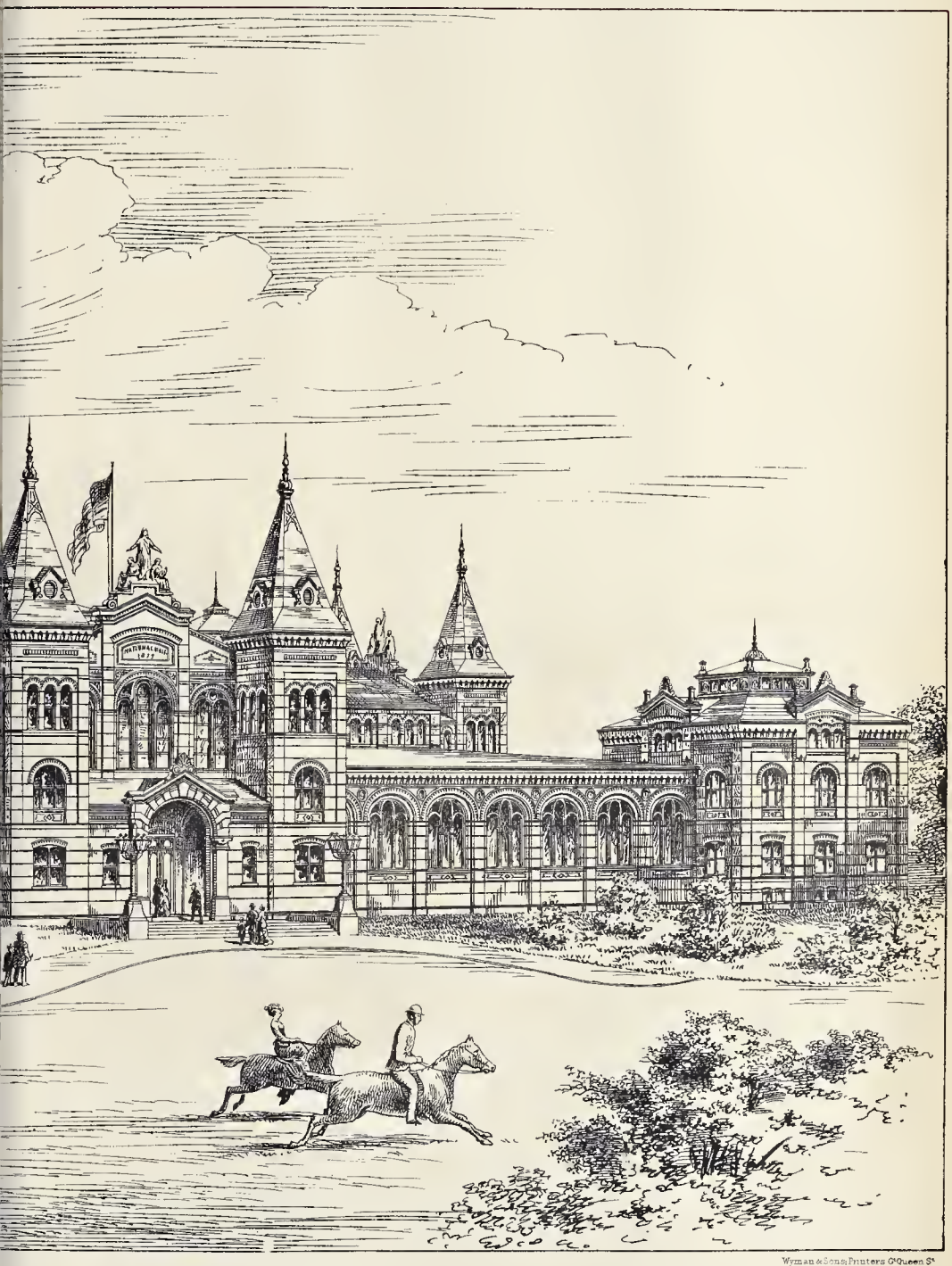
The elevations are faced with freestone from Bonfield Quarry, Fifeshire; the internal stonework has been taken from the local Huntingtower quarries. The ceilings of the council-chamber and burgh court-room are of pitch pine, and the panels are decorated with quaint stencil designs in colour. The finishings for doors, windows, and panelling on walls, &c., are of yellow pine. The main entrance doors and furniture are of oak. The council-table around which the councillors sit is horse-shoe shaped to facilitate communication with the councillors from the city clerk's desk, which is placed near the magistrates' bench.

The cost of the buildings is about 11,000*l.* Messrs. A. & A. Heiton, of Perth, are the architects; and Mr. Wells, burgh surveyor, is the inspector of works.

Lock-out in Paris.—One hundred and thirty cabinetmakers of the Faubourg St. Antoine locked their workmen out on Monday night. According to the *Standard*, this step was decided upon at a meeting of masters on Saturday, in consequence of the hostile action of their workmen. These have, it appears, been for some time in the habit of forming partial strikes by proscribing certain employers, for whom they refused to work, except on conditions settled by an executive committee. The houses in question have now agreed to close their workshops until the proscription has been withdrawn, but have appointed a committee to meet a deputation of the men for the discussion and arrangement of matters. The workmen met, and resolved to exact wages at the rate of 80 centimes per hour, and not to work more than ten hours a day. Two thousand men are thrown out of employment.

Whiteman & Bass *Photo Litho* 236 High Holborn

THE NEW NATIONAL MUSEUM, WASHINGTO



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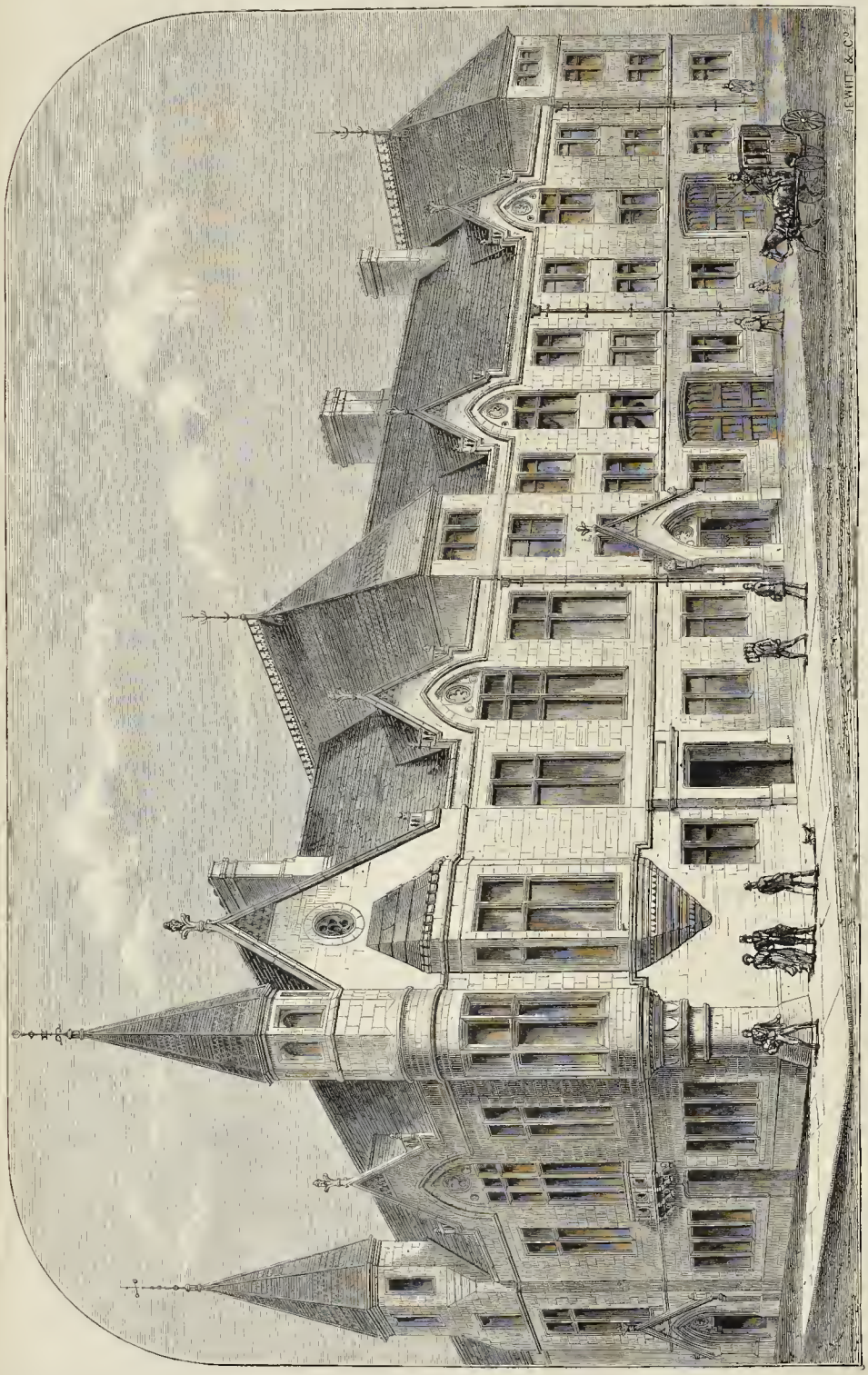
STATES.—Messrs. Cluss & Schulze, Architects.

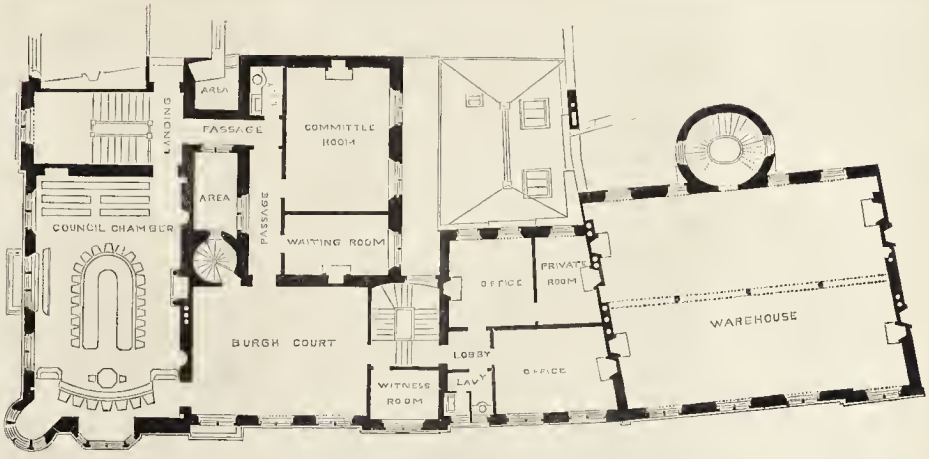


NEW MUNICIPAL BUILDINGS, PERTH.—Messrs. A. & A. Heiton, Architects.

JOKES IN STONE: MODERN CORBELS, FROM CHESTER CATHEDRAL.

POLITICAL CONTENTION.

RELIGIOUS CONTENTION.



NEW MUNICIPAL BUILDINGS, PERTH.

THE NEW NATIONAL MUSEUM, WASHINGTON, UNITED STATES.

A LARGE quantity of valuable material for the development of the resources of the nation, much of which was given by foreign Governments to the United States, and from the exhibit of the United States on the occasion of its Centennial International Exhibition, lying dormant and inaccessible to the public, an appropriation of $250,000 was made by Congress, on March 4, 1879, for the erection of a fire-proof building for the National Museum, on the public grounds near the building of the Smithsonian Institution. The funds were to be expended under the control of the Board of Regents of the Smithsonian. The Regents created a building commission, of which General Wm. T. Sherman, Dr. Parker, and Prof. S. F. Baird are the members. On invitation of this Board, Major-General M. C. Meigs consented to act as consulting engineer. On March 25th following, the Commission placed the construction of the building in charge of Messrs. Cluss & Schulze, architects, whose designs had been adopted. They prepared at once plans, working drawings, schedules, specifications, and advertisements for materials of all kinds required, and, for labour in the different branches of the work, took advantage of the low prices then prevailing, and proceeded to finish the building within the limit of the moderate amount placed at their disposal.

For a description of the building we are indebted to the architects.

The building starts on the ground in the form of a square with sides of 327 ft. extreme length. This is surmounted by a cross and a dome. Within its facades, a net area of 102,200 square feet, or $2\frac{3}{4\frac{5}{6}}$ acres is covered by roofs. It contains underground the boiler-room and pipes of a steam-heating apparatus, a coal-cellar, and two large cellars for storage purposes. From one of these cellars a subterranean communication with the adjacent Smithsonian building is established, which besides ordinary uses, will serve in cases of panic, fire, or tumult.

On the main floor there are available, in seventeen halls, which freely communicate with one another by wide and lofty archways, 80,300 square feet of floor-space, and a proportionate amount of wall-space for exhibition purposes. Further, there are available on the main floor and two upper stories of four corner pavilions and eight towers, 27,400 square feet of floor-space, divided off into 135 rooms for administrative purposes, offices, working rooms, photographer, the necessary modern accommodations, &c. And, finally, about 4,000 square feet of floor-space on galleries which are intended in part for special exhibits, and in part to afford an unobstructed view of the *ensemble* of the exhibits.

On the whole, the one-story plan which has prevailed among experts ever since the Paris Exhibition of 1867, has been adopted. But by the introduction of upper stories in ornamental pavilions and towers, ample office room has been secured without encroaching materially upon the floor-space of the main halls.

The centre of the building is octagonal on the ground-floor, and is surmounted by a 16-sided polygon of 67 ft. diameter, which contains a tier of large windows, and constitutes a dome-like structure with a slate roof and a lantern, crowned by a decorated finial. This dome is 77 ft. high on the side walls, or 108 ft. to the top of the finials. Four naves of 65 ft. in width, and 117 ft. in length, radiate from the dome, and extend to the outside walls of the building; these naves form a Greek cross, over the centre of which the dome rises, and part of the spaces between the arms of the cross is fitted up with halls of 65 ft. square, and of the same height as the naves, the side-walls of both being 42 ft. high, while the height to the ridges of the slate roofs is 56 ft. These roofs are in part constructed double, for the purpose of so perfecting the drainage of the roofs that accumulations of ice and snow can nowhere obstruct it. The spaces between the high walls of and around the Greek cross on one side, and the exterior walls of the building on the other side, are allotted mainly to eight halls of reduced height, covered by lean-to metal roofs, the extreme height of which is 32 ft. By this treatment wall-spaces are obtained for the introduction of clearstory windows, which light the square halls, and assist in lighting the naves.

The four symmetrical exterior walls of the building are broken by projections in the centre and at the corners, and these have been amply utilised for miscellaneous administrative purposes, as stated above.

A modernised Romanesque style of architecture was adopted for the new building, in order to keep a relationship with the adjacent Smithsonian building, which is designed in Norman, a variety of this style. It was found necessary to modernise the style on account of the different building materials used, brick in place of red sandstone, and to do justice to the modern demands for elegance of construction, the greatest possible available floor-space, easy communications, efficient drainage, a well calculated and pleasing admission of light, free circulation of air, and other hygienic requirements.

The external architecture is based upon the general arrangement of the interior; it shows plainly the prominence of the four naves, and the careful management of the light for the central portion of the building. Four main entrances are in the centres of the façades between two lofty towers of 86 ft. in height; these act as buttresses for the naves. Between the towers, above and receding from the doorways, there are large arched windows filled with ornamented glass, and above those the gables of the naves are formed; they contain inscription plates, and are crowned with allegorical groups of statuary. The group over the northern gable, designed by C. Buberl, of New York, introduces Columbia as the protectress of science and industry. The second group, by the same artist, represents Peace with the fine arts.

To both sides of these prominent central features there are curtain walls, 27 ft. in height, which have the effect of arcades. Pavilions are placed at the corners; they are of less height than the towers, but sufficiently raised above the curtain walls to overcome the unfavourable effect which these comparatively low walls would otherwise produce.

In the rear of the curtain walls, the clearstory rises to the full height of the naves, the roofs of which terminate against the side walls of the dome. The dome is treated in a similar way, and strictly in the same character as the curtain walls above alluded to.

In addition to the windows in the solid masonry of the exterior walls, clearstory, and dome, lofty lanterns have been provided above the centres of the naves and square halls, so as to afford perfect light for this enormous space without resorting to flat skylights, which for various reasons, were avoided. These lanterns, square and oblong, together with those of the related features of the pavilion, have been so arranged, in combination with towers, groups, clearstory, and the rising dome in the background, as to produce good skylines.

All the walls above ground are composed of brickwork, built hollow, with air spaces for outside wall. To neutralise the monotony and commonplace appearance which could not have been avoided with red-brick fronts of such extent, a sufficient number of buff bricks have been introduced in panels and spandrels, interspersed with a small number of blue bricks in the ornamental work of brick cornices. A base course of granite extends all around the building. The wrought work of the main entrances, window-sills, inscription plates, copings, &c., is grey Ohio freestone. The floor-beams, girders, and roofs are constructed of rolled and shaped iron. The floors are fireproofed by brick arches and concrete. Of roofs there are no fewer than thirty-seven, many of them of complicated construction. The lanterns on the ridges of the naves are large enough to cover moderate-sized dwellings. The light but solid framework of all the roofs will be left in full view, painted in light neutral tints.

The covering of the metal roofs is laid upon fireproofed gratings, suggested by Gen. M. C. Meigs.

The slates are hung to iron purlins. In order to facilitate the heating of this building, the sashes all through the edifice are glazed with double panes, having an intermediate air-space. In all windows facing the halls, the outer pane consists of obscured glass, in order to obtain a mellow light, and to avoid the necessity of shades.

The floors of the main hall will consist of concrete, but the rooms and smaller halls will, for convenience sake, be floored with Florida pine laid on concrete.

The interior is being plastered in sand finish, washed in tints.

The wide main entrance-doors, of walnut and oak, open outward on spacious tiled vestibules, with sides and arched ceilings of ornamented buff brickwork. These vestibules are closed after hours by wide double wrought-iron gates, richly ornamented, and finished in bronze and gold.

The northern entrance is intended for general use, and hence was made prominent. A spacious tiled platform, bounded by granite side blocks in front of this entrance, is approached by broad granite steps: these are flanked by stately candelabra.

In all their steps the architects were guided by the absolute necessity not to overrun the appropriation at disposal, and hence to produce the best effect with great economy, the exterior decoration was confined to the centres of the fronts, where the art of the sculptor has been called in.

The completion of this building, in which are enclosed 3,500,000 cubic feet of space above the cellars, required more than 5,500,000 bricks, 3,250 cubic yards of rubble-work and concrete, 500 tons of iron, 31,000 square feet of glass, and so forth.

CARICATURES IN STONE.

THERE was some sad nonsense talked in the House of Commons the other day, just before the prorogation, because it had been stated in a newspaper that the corbels of one of the windows at the New Law Courts were being made to represent, one the architect of the building, and the other the "obscure" contractor. What motive the member had who raised the objection, and who must have known that such freaks were matters of every-day occurrence, it is difficult to imagine. The incident has reminded us of some grotesque modern carvings which a friend of ours lighted upon lately at Chester Cathedral, and of which we give engravings, for the amusement of our readers. These corbels will be found on the north-east corner of the north transept of the cathedral, and seem to be known locally as Political Contention and Religious Contention. In the first, Lord Beaconsfield and the late Dr. Kenealy are readily recognisable engaged in a struggle, in which a crown and a cap of liberty are concerned; and in the second Mr. Gladstone, whose likeness is better in the original than in our presentment, is using his learning as a fulcrum for the upsetting of the Romish Church.

We leave our readers, however, to exercise their ingenuity in discovering exactly what the little caricaturist desired to convey in these freaks of the obisel.

SANITARY REFORM IN THIS COUNTRY.

THE Exeter Congress of the Sanitary Institute was opened on Tuesday evening last with an address by Earl Fortescue, as president. It purported to give a history, from the writer's own point of view, of all the legislative measures which have followed the first movements on the subject, and was necessarily, therefore, very long. He objected strongly to the doings of the Metropolitan Board of Works, and to the course pursued by the present Government in respect of the Water Companies. We give the concluding paragraphs of the address:—

We have had eloquent declamation enough about the horrors of war. Still, along with the terrible amount of suffering and crime incident to it, no one can deny that war also calls forth in the nobler natures engaged in it some of the finest qualities of man,—patriotism, courage, endurance, self-denial, self-sacrifice,—not to speak of the lofty Christian heroism of men like Havelock. If peace has its victories no less than war, peace has its victims far more numerous than war. For instance, the needless waste of life in the United Kingdom during the Crimean War, was many times greater than the loss of life in the Crimean War,—a waste accompanied by the long train of physical, intellectual, moral, and spiritual evils involved in general degradation. For all experience shows that, as a rule, dirt, disease, and vice are concurrent; that with rare exceptions, families cannot lodge like pigs and live like Christians.

With regard to fresh legislation, the first Sanitary Consolidated Act of 1875 seems to embody most, though not quite all, that is wanted. The principle of distributing the cost of works, and especially of the smaller kind, over a series of years by the Improvement Rate, first sanctioned in the Metropolitan Sewers Act, 1848, has been far too little encouraged or adopted. It may seem rather complicated at first,

but we found by the aid of tables that it was easily worked, and it practically averted, to a great extent, difficult and intricate questions of ownership as regarded chargeability for such works, since the occupiers were generally satisfied that they received benefits from them worth the extra rate to be paid for them. The principle, also, of engaging an officer's whole time for the public service, and employing it in any public duties not practically incompatible, seems worthy of much more extensive adoption, not only because of the great saving in trouble and correspondence to which it conduces when co-operation between different authorities of any kind is required, but also because it removes the temptations to sacrifice public duty when it conflicts with private interest, which must sometimes arise in the case of a public officer having also private practice. Only the boundaries of unions,—which must, now that the parish has been almost wholly superseded in that respect, be regarded as the unit of local administration in England,—are in so many cases incongruous with those of the counties as to present great, though I hope not insurmountable, difficulties in the way of what I have long wished for,—the establishment of representative county boards as general intermediate authorities between the union and Downing-street. Administration is now much more in default than legislation. As the Sanitary Commission say in their Report:—

"The system of self-government, of which the English nation is so justly proud, can hardly be applied with success to any subject, unless the governing bodies comprise a fair proportion of enlightened and well-informed minds; and if this be true as a general proposition, it is especially true in regard to matters affecting public health.

In the next place, many sanitary questions of vital importance are, from their very nature, incapable of being completely provided for by any amount of legal enactment, however minute and explicit. So large a discretion must of necessity be left to local authorities as to details, that in practice much will always depend on the energy and wisdom of those who compose such authorities. Moreover, there are limits to the power of any central authority to remedy the evils produced by local inefficiency. It may control, stimulate, and in some cases supplement the efforts of local bodies, but it cannot be a substitute for them."

This has been practically recognised by the Legislature, and as Dr. Acland truly observes in his recent address:—

"On the education and voluntary action of the people depends now, before all things, their sanitary condition. They have the means of obtaining knowledge; they have the means of obtaining power. If they have the will they can obtain both. There are good books now and to spare on every branch of the question,—legal, engineering, chemical, medical, &c."

I further agree with him when he says:—

"Compulsory powers should only be exercised by the central authority in the most extreme cases, and this should be clearly understood to be the principle of action; but, as a corollary, the central authority should with the utmost freedom collect the best information, and disseminate it in the freest way. If the Treasury should not sanction the gift of reports, every local official should receive notice of all Government health publications, with the statement of the contents, cost, and where to obtain them, immediately on their issue. This would promote progress of education—and would, quite certainly, be done, and is the least that would be done, *mutatis mutandis*, by any large private company dealing with the subject. It is being done to some extent by the model bye-laws recently issued, but should be done much more extensively."

This constant diffusion of sound principles and of practical information by the wide distribution of these official reports, as well as by their general circulars and separate letters to the unions, was largely practised by the early Poor Law Commissioners. But I found, when I became secretary to the Poor Law Board, that very little more than the mere necessary formal sanctions and orders had been for some time issued from the office. The same remark applies to the change of policy in sanitary matters ever since the suppression of the first General Board of Health.

When the Treasury were stopping the former wide circulation of Reports, &c., on the plea of expense, I hardly ever recollect any member of any Government throwing any impediment in the way of the granting and printing masses of useless papers moved for in either House, however useless he knew printing them to be. The mere adoption of the system of printing large numbers long adopted by the Statistical Society of omitting the hundreds of thousands in all cases of tables of figures where minute accuracy is not required (and to how vast a proportion of them does this not apply?), would have saved over and over again the cost of continuing freely to diffuse information tending the wealth and weal, because the health, of the community. It was economising the means of economy. *Magnum vectigal parsimonia.* But refusing the useful expenditure pleased many of the same class of members that refusing the useless expenditure would have offended.

Ministers may declaim grandly about sanitation, yet we have always found honours and encouragements markedly withheld from every sanitary reformer,—*laudatur et alget.* The Local Government Board has for some time had the double charge of supervising the poor relief and the sanitary administration of the country. I am sure I am not at all disparaging the valuable public services rendered by my friend Sir J. Lambert, when I compare his in both departments with those of my valued and honoured old friend Mr. Chadwick, who took the chief part in preparing the great Poor Law Reform Act of 1834, as well as the convincing and exhaustive Report of the Commission of Inquiry, which paved the way for it; and who, after years of able and energetic work as secretary to the Poor Law Commissioners under that Act, equally prepared the way, by his masterly Sanitary Report of 1842, for the Public Health Act of 1848, and afterwards, as member of the General Board of Health under that Act, rendered such valuable services (nowhere so little appreciated as in his own country) to the cause of sanitary reform throughout the world. Not only have foreign sovereigns recognised this on various occasions, but the illustrious Institute of France years ago paid him the rare compliment of electing him into their body. Yet, while Sir J. Lambert has deservedly been made a Knight Commander, his far greater predecessor is only a Commander, of the Bath. To take another striking example, Mr. Rawlinson, sanitary engineer to the same department, of whom I have already spoken, received the same honour as Mr. Chadwick; but it was for sanitary science rendered to the army before Sebastopol, where he was under fire, not in acknowledgment of his successful work at home. Sir J. Bazalgette has also received the same distinction, and was knighted, if I am not mistaken, on the completion of his largest and most costly failure. I must add one more signal instance of official neglect,—the name of Dr. Farr, known and honoured by every zealous statesman and sanitary reformer throughout the civilised world.

As it seems clear that sanitary reform, though commended in general terms, has not received, nor is likely to enjoy, much official sympathy, and though praised in the abstract, is always liable to incur Parliamentary and municipal opposition in practice, we must endeavour, now that pretty sound legislation upon it has been obtained, to influence as far as possible public opinion on behalf not only of its principles, but its details, co-operating heartily with the many societies and associations, to say nothing of the many private individuals who have done so much to elucidate and stimulate an interest in the subject under its various aspects. We must try to enlist general administrative action in conformity with them; and in this term I would comprehend all administrative bodies, from the Cabinet down to the school managers of the country parish: and not administrative action alone, but family action and personal action, and that not of the men only, but also,—I may almost say mainly,—of the women, and especially of the mothers. Not only is there nothing unfeminine in the action we ask of them, but it is pre-eminently in their own province, and essentially womanly.

And now let me commend to your sympathy and support a most valuable and unobtrusive Association, though enjoying the patronage of some of the highest in the land,—the Ladies' Sanitary Association, which has enlisted among its helpers and counsellors various able and benevolent men, and among them the scientific, eloquent, and genial President of this Institute, but has never quitted its own modest sphere of work for one more ambitious or conspicuous. It is ready to co-operate with all engaged in the good cause, but its particular object is to diffuse sanitary knowledge and promote sanitary reform, especially among the poor; and it tries to do this very much, among other ways, distributing plain little sanitary tracts among them; instituting mothers' meetings and classes of adult girls, and giving them sanitary and domestic instruction, and establishing nurseries for motherless babes, which may serve as schools for mothers of all classes, school-mistresses and nurses. It seeks to form branch associations. I trust that it will, before long, be able to count many.

I have trespassed already much too long on your attention. But I must remind you, in conclusion, that the cause of Sanitary Reform appeals not only to enlightened self-interest, but to our feelings of humanity and sense of religious duty. The law given by God to Moses comprised regulations recognised to this day as of great practical sanitary value, and our Divine Master and Great Example not only spake as never man spake, but showed His tender regard for the bodies as well as souls of men by going about doing good while upon earth, healing the sick, making the blind to see, and the lame to walk, and ministering to bodily wants and bodily suffering.*

EXHIBITION OF SANITARY APPLIANCES AT EXETER.

IN connexion with the Autumn Congress of the Sanitary Institute of Great Britain, which was commenced on Tuesday last in Exeter, an exhibition of sanitary apparatus and appliances was opened by the Mayor on Tuesday afternoon, amidst the ringing of church-bells, the playing of bands of music, and the display of unlimited bunting. It is to be hoped that the progress of the mayor in state through the city on such an errand will duly impress the citizens and those who have charge of the sanitary condition of the city with the importance of aiming at the attainment of the best possible hygienic conditions, for at the opening meeting of the Congress on Tuesday evening his worship admitted that the rate of mortality in the city was far greater than it ought to be. The exhibition is arranged in the new abattoirs on Exe Island,—buildings which, erected at a cost of about 4,000*l.*, appear to be admirably adapted for their special purpose, and capable of minimising as far as possible the offensiveness attaching to slaughter-houses. These abattoirs have not yet been opened for use, and so are much more salubrious than the streets and lanes immediately adjacent. Although, with the view of temporarily putting a better face upon things, the streets had been gravelled and planted with conifers and evergreens at intervals, those who had charge of these arrangements apparently forgot to use some of the deodorising agents so plentifully to be met with on the stalls of the exhibition. The exhibition itself is not so large and varied as the one held in Croydon last year, but the exhibits include many improvements and novelties. As might be expected in an exhibition held so far from London, several well-known firms are not represented in the collection, but, on the other hand, many West and South of England firms are exhibitors.

In *Class I., Construction and Machinery*, Messrs. Salmon, Barnes, & Co., of Ulverstone, exhibit (No. 1) their well-known revolving shutters in iron and wood. Messrs. Steele & Wood, of Stoke-on-Trent, show a collection of decorative tiles, with vitrified colours protected by glaze, in stoneware. Mr. Henry C. Webb, encaustic tile manufacturer, Worcester, displays specimens of wood, leather, marble, tiles, and other materials stained by a novel process. It is more especially applicable to wood, in which material the effect of inlaid work is produced. The peculiarity of the process is that the colours of the patterns (and there is practically no limit to the number of colours used in each design) go right through the wood or other material operated upon. Pitch-pine is the wood used by preference. The surfaces obtained by the process when polished have a very nice effect, and promise to afford a cheap and good substitute for parquetry and other work. The same process is applicable to the staining of paper, it being possible to stain fifty or sixty sheets at a time. Mr. Webb also exhibits specimens of a new method of inlaying by pressure hardwood or

* Some of the addresses delivered and papers read before the Sectional Meetings we will notice next week.

metal in soft wood. In Section 2 ("Paints and Protectives") of Class I., Messrs. Samuel Wills & Co., of Bristol, are the only exhibitors, their stall containing a variety of varnishes. In Sections 3 and 4 ("Wall Papers and Decorative Materials") Messrs. Wm. Woollams & Co., of London, have a good display of their non-arsenical wall-papers and dado-decorations. This firm, it will be remembered, was awarded the Medal of the Sanitary Institute for similar productions exhibited last year at the Croydon Exhibition. Messrs. Goff & Gully, of Exeter, exhibit specimens of "Lincrusta-Walton," or "Linoleum Muralis," as it used more fitly to be called; so do Messrs. Cotterell Bros., decorators, of Bath and Bristol. Of the merits of this material we have often spoken. The last-named firm also make a good display of paperhangings, asserted to be non-arsenical; they are well designed, but whether they are the firm's own products is not stated. In Section 5 ("Machinery adapted for Sanitary Purposes") Mr. J. B. McCallum, the borough surveyor of Stafford, exhibits the "Excelsior" Pail or Tub-Van, designed for the conveyance of excreta in pails or tubs through towns without polluting the atmosphere and causing a nuisance. The van is non-absorbent, being of metal as far as possible. It is constructed with the view to prevent an accumulation of smells within, and the arising of noxious odour during the process of collection and passage through the streets. To gain this end ventilation is obtained through charcoal or other disinfecting ventilators. One important feature is the ample provision that is made for collecting any sloppings from the pails, thus preventing the same from finding its way into the streets. A collector is formed as a false bottom, which can be emptied by means of a screw-plug at the end of the journey. The weight of the van is apparently considerably less than that of the ordinary type. The van is made to contain twenty-four tubs; it will turn in its own length; and the openings, instead of being fitted with hinged doors, which are liable to be damaged by the wind and unnecessary wear and tear in opening carelessly, are fitted with doors sliding upward, which are made to remain open or shut at pleasure. Mr. McCallum also exhibits a revolving hand-sweeping brush and collector for road-scavenging, which is stated to have important advantages in point of economy. Messrs. Crossley Brothers, of Manchester, exhibit one of their "Otto" Silent Gas Engines at work. It is not surprising to learn that there is an increasing demand for this clean, easy-going, and economical motor-engine. Messrs. J. C. Stark & Co., of Torbay, exhibit a "Two-man" gas-engine,—a new patent; and Mr. J. E. H. Audrews, of Stockport, shows a "2-man" Bisschop gas-engine of new type. Among the exhibits in Class I., we noticed a plan for the disposal of the sewage of Exeter, involving the construction of new main sewers, and an outfall to conduct the sewage to proposed settling-tanks at Duck's Marshes, below Exeter, whence the effluent water is to pass into the tidal portion of the river Exe. The scheme has been prepared by Mr. H. Percy Boulnois, M.Inst. C.E., surveyor to the City of Exeter. Messrs. J. W. Trew & Sons, architects and surveyors, Bristol, exhibit designs for cottage hospitals and other buildings. Not included in the catalogue is a curious collection of sea-weed products from Paris, one of which, a flexible semi-transparent tissue resembling oil-skin, is capable of use (so it is claimed) for the remedying of damp walls.

In *Class II., Sewerage and Water Supply*,—Section 1 comprises water-closets. Mr. William White, F.S.A., of Wimpole-street, exhibits the "Shrewsbury" water-closet, invented and patented by him. It possesses the merits of cheapness and efficiency. Special and ingenious means are adopted to obtain a much more effectual flush-out of the pan than is attainable by the usual means. The water is discharged suddenly into the pan through a down-pipe at least 2 in. in diameter. Mr. White also exhibits his improved ball-valve and hib-cock. The makers of all these appliances are Messrs. F. Pierce & Co., of Little York-place, Baker-street. Mr. A. T. Angell, of Fulham-road, exhibits the patent self-ventilating "Disjuncta" closet, the principle of which is equally applicable to baths, sinks, &c. The space beneath the seat is so made as to prevent the passage of air through the joints of the woodwork to the interior of the house, but is ventilated direct into the open air by louvres made in the external wall. Inside this chamber or space the closet-basin is completely disconnected from the trap below, and it is claimed that all effluvium arising from the trap, and all sewer-gas that may be forced through it when the valve is opened by the uprush of air meeting the downflow of the contents of the closet or sink, will be carried outside through the louvres. A working model of the same closet is also exhibited by Dr. Churchill. Messrs. Capper, Son, & Co. exhibit Pearson's patent trapless "twin basin" closets. Mr. David Gill, of Weston-super-Mare, exhibits his "automatic action" water-closet, his patent flushing apparatus, and his "sanitary twin door." The closet is all in earthenware, and possesses the merit of being readily fixed, without breaking through or interfering at all with the floor surface. It is claimed for it that all effluvium caused while the closet is being used is carried away by a back draught at a point below the top of the basin. Underneath the pan is an outer air-chamber, with an air-passage to the front of the basin, and the air entering the closet-pan, while the latter is in use, passes over the contents of the receptacle, and through the exit air-pipe at the back. Ventilation of the closet-chamber itself is sought to be accomplished by means of air-boxes (one for ingress and one for egress, situate respectively at the bottom and top of the wall of the chamber), and these air-boxes are closed or opened by the raising or lowering of the closet-lid. When the closet-lid is up, the outer air is excluded, and the only ventilation is that through and across the closet-basin (supposing, that is, that the door is so made as to prevent the passage of air under or round its edges, for the inventor does not use the window for ventilation); but when the closet-lid is down, ventilation is going on through the room and through the closet pan as well, the inlets and outlets to each being separate, as already mentioned. For use in combination with these appliances, where it is specially desirable (as in hospitals) to take every possible precaution to cut off all passage of foul air from the water-closet to the interior of the building, Mr. Gill has devised twin doors, ventilating the space between them by special means. The whole arrangement, though perhaps theoretically perfect, is rather too elaborate and expensive for general use, but it is right to say that Mr. Gill advocates the use of double doors more as a means of securing privacy than as absolutely necessary on sanitary grounds. Messrs. Doulton & Co., of Lambeth, show their serviceable "Lambeth" valve closet and their improved side-outlet trapless closet, together with various closet-pans and other appliances in stoneware and earthenware. Messrs. Garton & King, of Exeter, exhibit Stidder's trapped "Universal" valve closet and wash-out closet and trap. Messrs. J. Tylor & Sons, of Newgate-street, show an excellent valve water-closet, and their patent "clear-way" regulator valve closet, with parallel pull. They also exhibit seat-action closets and water-waste preventers. Mr. Bostel, of Brighton, again shows his "Excelsior" water-closet. Messrs. Brazier & Son, of Blackfriars-road, exhibit their "self-acting aromatic and deodorising water-closet," which has a chamber communicating with the water in the bottom of the pan and trap. This chamber is charged with lime and camphor, and every time the closet is used the water in the chamber is renewed, without, however, letting the lime or camphor escape. In Section 2 ("Dry Closets") the British Sanitary Company, of Glasgow, exhibit their patent self-acting earth-closet, which possesses some very good points, notably the non-liability of the earth to clog together in the hopper when not quite dry. Mr. James Woodhead, of Bradford, Mr. James Wood, of Newport, Mon., Mr. H. Phillips, of Exeter, Mr. John Parker, of Woodstock, and Messrs. Wippell, Bros., & Row, of Exeter, are exhibitors of dry closets and commodes of various kinds. In Section 3 ("Urinals") Messrs. Doulton & Co., and Messrs. Tylor & Sons are exhibitors; and Mr. Henry Phillips, of Exeter, shows a cheap urinal in connexion with a large receptacle for dry earth, so as to utilise the manurial properties of urine. Section 4 is devoted to sewage treatment, the exhibits under it including Spence's patent aluminoferric cake, Mr. William Batten's patent manhole covers and ventilators (previously noticed by us), and a model of a patent "sewer gas annihilator," exhibited by Mr. H. P. Boulnois, C.E., City Surveyor of Exeter. Some of those who saw this thought that it would merely prevent the sewer gas finding vent. Mr. Isaac Shone, of Wrexham, shows a number of large drawings and models illustrative of the application of his pneumatic sewerage system to the drainage of towns. Mr. J. A. Stephan, of Worcester, Messrs. Doulton & Co., and the Sanitary and Domestic Appliance Company, of Manchester, are exhibitors of filters. Messrs. Trew & Sons, of Bristol, exhibit working drawings of farm drainage works. In Section 5 ("Traps"), Mr. J. M. Craig, of Kilmarnock, exhibits two of Buchan's patent ventilating sewage-gas traps; and Messrs. Doulton & Co. have a collection of traps, open-air receivers, and gas interceptors,—all worth attention. Messrs. Candy & Co., of Newton Abbott, exhibit two full-sized models of their registered "perfect drain ventilator, which was awarded a bronze medal at the Royal (Cornwall) Polytechnic Society's meeting this year. Messrs. Brazier & Son, of Blackfriars-road, show their fat-interceptor and drain. In Section 6 ("Sinks") Messrs. Doulton & Co. exhibit slop, mortuary, and other sinks, and Messrs. Tylor & Sons their patent enamelled iron slop sink. In Section 8 ("Apparatus for Water Supply") Mr. Joseph Willoughby, of Plymouth, shows ball-taps which have a small plug formed within the main plug, to which a lever and float are attached. Messrs. Tylor & Sons display a large variety of "waste-not" and other valves, and Messrs. Doulton call attention to their high-pressure hall and draw-off valves. Mr. George T. Tonks, of Birmingham, exhibits Meakin's patent "frictionless balanced supply valve." The substitution of glass balls for those made of copper or zinc allows of the use of balls of a larger size than usual, while they are cheaper. In Section 9 ("Cisterns") Messrs. Doulton & Co. exhibit their water-waste preventing cisterns; and Mr. Thomas Davis, of Exeter, exhibits a cistern divided into two distinct compartments, the water in the one to be used only for flushing closets, and that in the other for drinking and culinary purposes. In Section 10 ("Flushing and Watering") Messrs. Bowes, Scott, & Read, of Westminster, exhibit Mr. Rogers Field's patent self-acting flushing tanks. Messrs. Doulton & Co. also have an automatic flush-tank, and they are large exhibitors in Section 11 ("Miscellaneous Sanitary Goods"). In the same section, Messrs. Henry Sharp, Jones, & Co., of the Bourne Valley Pottery, Poole, show their "Rock-Concrete" tubes for sewerage works, and Mr. John Phillips, of the Aller Pottery, Newton Abbot, and the Kinson Pottery, Poole, exhibits his patent "access pipe" for allowing of the ready examination of a drain. The arrangement consists of two pipes, butt-jointed as to the lower portions, and meeting on and supported by a "rest"; the upper portions of the pipes are cut into so as to leave a circular hole when placed together, and over this hole a saddleback cover is made to fit, supported by the "rest" already mentioned. At the same stand are also exhibited Phillips's patent vitrified stone-ware invert brick, terra-cotta chimney terminals and wind-guards, and specimens of Devonshire faïence. The Branksea Island Pottery Company display a variety of stone-ware for sanitary purposes. Mr. W. Scammell, of Exeter, and Messrs. Candy & Co., of Newton Abbot, are exhibitors of the same class of goods. In this section Messrs. Tylor & Sons show their patent grooved joint, for fixing lead-pipe without solder.

Class III., Heating, Lighting, and Ventilation.—In Section 1 ("Heating Apparatus") of this class, Messrs. Chorlton & Dugdale, of Manchester, exhibit their "sunlight" stoves. Messrs. Doulton & Co. have a good display of their new "Lambeth Radiating Tile Stoves," in glazed fire-clay. They require little or no attention, and consume very little fuel. For halls, churches, school-rooms, &c., they are not only healthier, but, by reason of their colour, far more cheerful in appearance than iron stoves. Messrs. Carton & King, of Exeter, show Gillingham's patent heat radiator, and Mr. R. H. Griffin, of Kirby-street, Hatton-garden, exhibits eight of his patent ventilating and heating register-stoves. Mr. J. Williamson, also of Kirby-street, sends a number of stoves, hot-plates, &c.; and Mr. G. E. Pritchett, architect, exhibits examples of his cellular tile construction for warming walls and floors. In this section and in Section 2 ("Cooking Apparatus"), Messrs. Willey & Co., of Exeter, and other local firms, exhibit a large variety of gas-stoves for cooking and heating purposes, the Exeter Gas Company offering prizes for the best appliances shown,—among which we may mention Messrs. Verity's patent gas fires, and George's patent

Gas Calorigen, exhibited by B. Farwig & Co., of London. Mr. Constantine, of Fleet-street; the Wilson Engineering Company, London; and Messrs. H. C. Davis & Co., of Cambserwell, are exhibitors of kitchen-ranges and other stoves. In Section 3 ("Lighting") there is a varied display of gasfittings by Stark & Co., Torquay; Webster & Co., Nottingham; and Willey & Co., Exeter. Section 4 is devoted to ventilating appliances, the exhibitors including Mr. Thomas Lloyd, of Winchester; Dr. Hinckes Bird (who exhibits his appliances for costless ventilation as described in the *Builder* in 1862); Mr. Josiah Moore, of Clerkenwell (Moore's louvre ventilators); Messrs. C. H. Sharp & Co., of Newgate-street (who show their "Crown Ejector" and other ventilators); and Messrs. C. Kite & Co., of London, exhibit their registered dormer ventilators for church roofs. The Sanitary and Economic Supply Association, Gloucester, exhibit Dr. Bond's patent "enthermio" ventilating gas stove; and Mr. Crispin, of Bristol, shows a lean-to greenhouse, ventilated on Hunt's patent auto-pneumatic system, which is worth attention. Messrs. Robert Boyls & Son, of Holborn Viaduct, send their long-tried and well-proved air-pump ventilators and other appliances.

Class IV., Personal Hygiene, Food, and Disinfectants,—is an interesting one, but we have not space to instance the numerous exhibits in the eight sections into which it is divided.

Class V., Miscellaneous,—includes thermometers, barometers, microscopes, and other scientific instruments likely to be of service to sanitarians and medical officers of health.

In opening the exhibition,

The Mayor (Alderman W. H. Ellis) said he felt sure that from the exhibition the citizens of Exeter would be able to get a great deal of valuable information. That was the first exhibition of the kind that had ever been held in Exeter, and he believed that it was one of the best that had ever been held anywhere. In it were to be found appliances of every kind, including drain-pipes, traps, ventilators, and cooking apparatus. Exceptionally might be mentioned the gas cooking apparatus. He was happy to say that the Gas Company of Exeter had been very liberal in offering medals for the best kinds of gas-cooking apparatus, the result being that they had there one of the best collections of gas apparatus ever brought together. He believed he was right in saying that they had over one hundred exhibits entered in this class. He trusted that it would be the means of encouraging a new mode of cooking in the future. The site on which this exhibition was being held was, to his mind, the best site that could have been possibly chosen. It was the site of the old Gas Works, and it had now been utilised by the Town Council for a public slaughter-house or abattoir. He trusted that as soon as the present exhibition was over the butchers of the city would see that it was to their advantage to come there to kill their animals. He hoped that whilst the exhibition remained open it would be visited by an immense concourse of people, who would he then able to gain valuable information to carry away to their homes, and so render Exeter and the neighbourhood one of the healthiest places in the world, and one of the most desirable places for people to reside in. He concluded by declaring the Exhibition open.

Earl Fortescue thought the best thanks of the Institute were due to the Mayor and inhabitants of Exeter for having provided them with that most admirable site for the exhibition of sanitary appliances. The thanks of the members of the Institute were also due to the Mayor and citizens for the cordial reception and kind hospitality which they had received at their hands.

Dr. Richardson heartily seconded the observations of Lord Fortescue. He thought the members of the Institute were most deeply indebted for the great care and kindness evinced on the part of the authorities of Exeter in forwarding this Exhibition, and he might say that practically no part of the work of the Sanitary Congress was of such importance to the country at large as this exhibition. For many days after the congress had closed the people for miles around Exeter would have an opportunity of visiting the exhibition; and if they learnt the practical lessons to be gathered from the exhibits, the exhibition was likely to be of more benefit than would arise from all the speeches and lectures in the congress. He knew of nothing so educational to the poor as an exhibition of that kind, and for that reason he most cordially seconded what had fallen from Lord Fortescue.

The exhibition, which is to remain open from ten a.m. to ten p.m. on every week-day until Saturday, October 9th, has not yet (so far as our observation has gone) been very largely attended. Mr. E. L. Box is the curator.

THE SOURCES OF OUR COAL SUPPLY.

DEPENDENT as is the position of the kingdom so largely on the reservoir of long-stored-up power which is contained in our coalfields, the extent to which the latter are drawn upon is a subject of great interest, and this the more because of fluctuation in the degree in which we draw upon the various sources of our coal supply. Railways have "set all the towns of Britain a-dancing," according to Carlyle; and they are changing very materially the extent to which we are dependent upon specific coalfields. In the official reports of the Inspectors of Mines we have reliable records of the extent to which our coalfields are drawn upon. In the kingdom we have coalfields stretched over nearly a twentieth part of its extent. In Scotland, the coalfields are chiefly between the shores of Fife and Haddington, and of Ayrshire. In England, the great coalfield of the north is early-famed; that of the midlands stretches over part of Yorkshire and the counties that adjoin it on the south; westward is that of Lancashire and Cheshire; and there are those of North and South Staffordshire; all these, with the rich seams of Wales, comprise the great bulk of the British coalfields. These coalfields, or the collieries therein, 3,356 in number, are under the inspection of fourteen inspectors. Each inspector reports to the Secretary of State yearly, his report embodying a statement of the amount of coal produced from the mines under his charge, the loss of life in the production of coal, and other similar particulars. The reports, therefore, contain official statements of the extent to which the respective districts contribute to the total fuel supply of the kingdom.

Taking last year as a typical one, it may be stated that 133,720,393 tons of coal were produced from the collieries in the kingdom. As the collieries vary in size,—the production varying at each from a few tons to nearly half a million tons a year,—it is evident that a citation of the numbers of pits in each district would be useless to indicate the proportionate production of each. And, though it would be less unsatisfactory, even the number of persons employed would be apt to mislead; for whilst in Ireland each person employed in and about the coal-fields gives back 100 tons of coal yearly, in Scotland the average output is over three times that quantity. The number of "persons" employed in and at the mines, it may be said, is 476,810,—three-fourths being employed under ground, whilst in the number employed above ground there are 4,842 females. Taking, then, the figures of exact production, these may be shortened by being placed in the decimal form, representing the millions of tons of coal produced in the districts. Each of the inspectors divides the output into that of the distinct counties; but whilst this is generally followed, in one or two instances the slight production of one part of a district is added to that of the chief portion. The following, then, are the quantities of coal produced by the districts or parts of districts named:—Cumberland, 1·525 million tons; North Durham, 6·105; Northumberland, 5·537; South Durham, 17·155; Lancashire, North and East, 8·993; Ireland, 0·129; Denbighshire, 1·499; West Lancashire, 9·562; and Flintshire, 0·721; Yorkshire, 16·241; Derbyshire, 7·561; Leicestershire, 1·103; Nottinghamshire, 4·316; Warwickshire, 1·051; Cheshire, 0·723; Shropshire, 0·822; North Staffordshire, 4·017; South Staffordshire, 7·806; Worcestershire, 1·522; Glamorgan (part), 0·746; Gloucestershire, 1·289; Monmouthshire, 4·660; Somersetshire, 0·742; Carmarthen, 0·664; Glamorganshire (part), 11·747; East Scotland, 11·300; West Scotland, 6·160. In these, with the exceptions of one or two very small contributions, the total is made up. In the working of the mines under the Coal Mines Act, there is also produced fire-clay, shale, &c., but the quantities are small, and are excluded from those above given.

These are the official figures, and it is evident that the great coalfield of the north-east of England still takes the lead in production, for it yields nearly 29,000,000 tons of coal, a quantity not very far short of one-fourth of the total brought to bank in Great Britain. The rich seams of South Wales are being increasingly drawn upon, and they now yield over 12,000,000 tons; but as it is estimated that that basin contains one-third of the available coal supply of the kingdom, and as the present output could be maintained for more than twenty-seven centuries, the increase of that output may be expected without alarm. From the coalfield of Lancashire over 18,000,000 tons are drawn yearly; from that of the Midlands, we extract in the counties of Yorkshire, Derbyshire, and Nottinghamshire more than 27,000,000 tons,—or, in proportion to the ascertained available coal, at least fourfold that hewn from South Wales; whilst the vast beds of North Staffordshire are drawn on to a comparatively slight degree. Those of Scotland preserve a steady output of 17,000,000 tons last year.

The reports of the inspectors furnish no information as to the uses of the coal; and the only facts that are obtainable as yet from other sources show that during last year more coal than usual was exported, and that more was sent to the metropolis. It is evident, then, that the consumption in the country generally had decreased, for the output of coal has been practically stationary for the last four years, whilst it had been previously advancing for a score of years at the average rate of 3,000,000 tons yearly. If the whole of the facts could be obtained, it would probably be found that a large part of the decrease is due to the intense dulness that has prevailed in the manufacturing and more especially in the smelting industries, which has been only partly counterbalanced by the growth in the consumption for gas-making purposes and for those of steam-raising. It is probable now that there has been a return of partial activity in the manufacturing trades, that the coal output of the kingdom will again resume its normal growth.

ART, HEALTH, AND ELECTRICITY.

THE recent heat, though so great in London, was far more intense in Paris, and the sufferings induced caused a renewed outcry in favour of electricity instead of gas. In public buildings, especially in theatres, the enormous number of gas-burners requisite to thoroughly illuminate these places is now, it is urged, an unnecessary evil. The electric light throws off little or no heat, it is unaccompanied by the bad odours inseparable from gas, and the danger of explosions or fire is avoided. Others urge that the injury to the public health caused by gas would also be removed, but are met by experts who say that the electric light produces a certain amount of nitrous oxide gas which is very poisonous. In spite of this, the advantage from a sanitary point of view is probably still in favour of the electric light. When noticing the electric modes of lighting exhibited at the last Universal Exhibition, we remarked on the benefits to the atmosphere of theatres, &c., that might result from the use of electricity, and we urged the importance of extensive experiments as to its sanitary advantage. Experiments must be instituted to settle this part of the question.

M. Charles Garnier loudly demands the introduction of electricity so as to preserve from destruction the works of art with which he has decorated the Paris Grand Opera. To descend from the sublime to the comic, from the Grand Opera to the Palais Royal, this latter theatre has been entirely re-decorated, and in so remarkable a manner that it merits a few words of notice. M. Bayard has been entrusted with the work, and has painted on the walls of the *foyer* or crush-room a biographical history of the theatre. On one side we have groups representing all the ancient actors in their most celebrated parts,—the Père Amant, Boutie, Déjazet, Jules Pernon, Nathalie, and Mars. To unite the past with the present there is an allegorical group of nymphs and satyrs, and then we find the portraits of all the celebrities who still convulse the gay audiences,—Brasseur, Hyacinthe, Ravel, Schneider, &c. But we are reminded that these new and elaborate decorations, which possess the double attraction of works of art and works of history, will be prematurely obliterated if they are exposed, night after night, to the blaze of innumerable gas-burners. The Gymnase Theatre has also been re-decorated, and these facts and the intense heat must account for the revival of the old contest relating to the respective merits of gas and electric light.

UNIVERSITY COLLEGE, LIVERPOOL.

THE establishment of the proposed University College at Liverpool will be an event of much more than mere local interest, for it may be fairly hoped that it will supply an educational want which exists in the populous county of Lancashire, even though Manchester has now for a good many years done much in the cause of higher education. The subscription list which has just been issued for the first time, is as remarkable a document as we have met with for a long time. Nothing can give a more vivid and practical sign of the immense wealth of this country, or of the greatest seaport of Great Britain. Nothing, too, shows more noticeably how flourishing is the position of our great mercantile towns, in spite of the depression of trade of which we have heard so much; for we find that there are no less than five donations of 10,000*l.* each, namely, that of Lord Derby, to found a chair of Natural History; of Mrs. Grant, to found one in some branch of science; of Messrs. W., S. G., & P. H. Rathbone, to endow a "King Alfred" chair of Modern History and Literature. Messrs. A. H. Brown, M.P., Crosfield, & Barrow, also give 10,000*l.* to found a chair of Ancient History and Literature; and there is another donation of a like amount to found a chair of Experimental Physics and Mathematics. We mention these gifts *seriatim*, because they seem to be of really historical interest as exemplifying the wealth of England in the nineteenth century. There are also many gifts towards a chair of Philosophy, Logic, and Political Economy, and to found a Roscoe Chair of Art, as a monument of the most durable kind to Mr. William Roscoe, the Italian historian, and the early patron of Gibson the sculptor. More than 6,000*l.* has already been collected for this object, which is one very worthy of support, for in no part of England is it more desirable to diffuse a love of art than in the somewhat hard and busy North country. And, we observe, to turn to the point of money again, in the whole list two gifts of 2,000*l.* each, and some sixteen of 1,000*l.* each, besides many of a large though lesser amount, all of which go to still further exemplify at once the wealth of Liverpool, and a spirit which by no means is unworthy of comparison with that which actuated the merchants of Venice, albeit the inhabitants of the great Mediæval seaport may have done more as a city for the direct and judicious encouragement of the fine arts.

CHRIST CHURCH, NEWGATE-STREET, CITY.

THIS fine church, one of those erected by Sir Christopher Wren after the Great Fire of London, is now being renovated and partially restored. The site it occupies, viz., reaching from Christ Church-passage eastwards to King Edward-street, is the site of about one-half of the original Grey Friars' Church, built in connexion with the monastery given by King Henry VIII. (the gift being confirmed by his son Edward VI.) to the citizens of London for a school, now the Blue Coat School.

This original Church of the Grey Friars was of great size, and occupied not only the site of the present Christ Church, but of the whole of the present churchyard opposite to it. It had a passage-way through it, almost in the centre, leading to the cloisters of the monastery situate northwards, a small portion of which cloisters still exist. This passage-way, now open to the sky, constitutes what is called Christ Church-passage.

Wren, of course, rebuilt the church in his favourite Classic style. It may be said to be remarkable for its fine, large, lofty, and airy nave, with large side-aisles, but has no chancel proper. The columns of the nave, with the clearstory windows carried by horizontal beams over them, reach, as it were, right up to the east wall. The absence of a duly-marked chancel was probably caused by the (to a certain extent) limited length of the site not allowing both nave and chancel of good proportion: hence Wren, preferring a good nave to a well-proportioned chancel with a stinted nave, designed a fine nave of good proportion, simply marking the chancel by two steps at the line of the second column from the east, and a raised floor up to the east wall.

The lofty stone columns (about 30 ft. high), formerly and of late all coloured over, have now been scraped and restored to the original stone, which is Portland; the clearstory window openings, from which the principal light to the church is derived, have been filled with new cathedral glass in lieu of the old lead lights; the vaulting, which is only of timber and plaster, has been all recoloured, with the ornamental portions picked out. The back portions of the heavy galleries have been removed, and the internal appearance of the church is thereby considerably improved. The pewing, which is of solid oak, has been all scraped, cleaned, and varnished.

It is in contemplation, should the Blue Coat School (the boys of which now fill the galleries every Sunday) be removed to the country, to take down the heavy galleries, and clear them entirely away; also to re-pew the church with pews of moderate height. This, it is thought, will much improve the interior, inasmuch as the galleries run across the lofty side-aisle windows, and were therefore erected by Wren for the purpose of obtaining a large number of seats, at that time wanted, but now no longer required, when City people reside in the suburbs.

The works have been carried out by Messrs. Hayward & Son, builders and decorators, under the supervision and direction of Mr. Henry S. Legg, of Christ's Hospital, the rector being the Rev. Michael Gibbs, M.A.

The Lord Mayor and sheriffs attended service at the church on Sunday, the first day of opening after the completion of the works, it being customary for the Lord Mayor to attend in state on St. Matthew's Day at this church every year.

NEWCASTLE PUBLIC LIBRARY.

THE first stone has been laid of a new building in Newcastle for the Public Library, and arrangements are made by means of which it will be opened with 20,000 volumes at least. The structure, it is stated, is to be "in the Corinthian and Doric orders of Classic architecture"; but, if we may judge from a fearful illustration, published in a local paper, it will have little to do with those admirable institutions. However, it promises to be a commodious building, and includes galleries for sculpture and painting. The façade will be 167 ft. in length, 30 ft. at each end being made to project. The principal entrance is in the centre, approached through a portico with Doric columns supporting an entablature which will be surmounted by a balustrade. This balustrade will be continued along the whole length of the building. Above this, in the recessed portions, panels will be formed in which subjects may be carved in relief. The centre portion will be surmounted by a pediment with attic, below which will be formed a cornice, with blocking course, terminating at the projecting ends. The bays at each end of the building will be furnished with a modillion cornice, surmounted by a balustrade. The roof is semicircular in shape, and the centre portion of the first-floor rooms will be lighted by skylights through a panelled ceiling, and by gas sunlights at night. The basement floor will be used for the ordinary working purposes of the Library. On the ground-floor there will be a lending library, 60 ft. by 42 ft. and 17 ft. 6 in. high; a library containing books for reference, 58 ft by 36 ft., semicircular on plan, and 19 ft. 10 in. high. There will also be two reading-rooms, 43 ft. 4 in. by 28 ft., and 25 ft. by 19 ft. respectively, each 17 ft. 6 in. high. The whole of these rooms will be approached from the principal entrance-hall or vestibule, which will be 43 ft. long and 20 ft. wide. On the first floor the front rooms will be appropriated for pictures and sculpture, and will be 135 ft. long by 28 ft. wide, and from 23 ft. to 28 ft. high, divided by partition-walls fitted with sliding-doors, the whole arranged *en suite*. There will be four rooms set apart for science and art classes. These will be approached from the front street by a separate entrance, and although connected with the Sculpture and Art Gallery on the first floor, the working of these classes will be carried on distinct and separate from the working of the Library. The staircase and part of the walls of the vestibule or hall will be constructed so as to admit of extensions in case of further requirements. The light will be admitted through a large window on the staircase landing and from the roof. This portion will be 24 ft. wide, semicircular on plan, and 42 ft. high from floor to ceiling. The area of the site is 1,431 square yards, and will nearly all be covered by the building. The land and structural works are estimated to cost 20,000*l.* The architect is Mr. A. M. Fowler, the borough engineer.

THE RICHMOND SWIMMING-BATHS COMPETITION.

ANOTHER muddle! The instructions limited the competitors to 1,500*l.*, and the Committee have selected and recommended a design priced by the authors at 3,200*l.* A curious mistake, moreover, was made. The design selected was marked "Natation": so an envelope thus marked was opened, and found to contain the name of Mr. F. D. Lockwood. Inquiry, however, showed that he was not the right "Natation." Two designs were sent in so marked, and the real authors of the design selected were found to be Messrs. Elkington & Son, of Cannon-street, London.

Mr. Lockwood writes to us as follows:—"A clause in the instructions issued for the guidance of architects competing for the new swimming-baths states that 1,500*l.* is to be the limit of cost to be expended upon the works. A design has been selected which the architect estimates will cost 3,200*l.* to carry out. On behalf of the remainder of the competitors, I leave it to yourself and the ratepayers of Richmond to answer one question,—Is this justice?"

The *Twickenham Times* says:—"The plans of 'Natation' are of an attractive character, and give promise of baths that will be of great benefit to the town. To begin with the basement of the front building, provision is there made for a laundry, towel washing-room, engine-room, and engineer's workshop, two boilers, and a well with two pumps. On the ground-floor there are separate entrances for the first and second-class baths, a ticket-office, and nine first-class private baths. On the first floor there are sixteen second-class private baths, some of which are so apart from the others as to be available for ladies or special baths. Apartments for the attendant are set apart on the second floor. Corridors from the ticket-office lead to the first and second-class swimming-baths. In the first-class bath the water covers a surface 90 ft. by 27 ft. the depth increasing from 3 ft. 6 in. at one end to 6 ft. 6 in. at the other, and there are fifty-seven dressing-rooms arranged along the two sides. Behind this there is the second-class bath, with water covering a surface 51 ft. by 34 ft., the depth increasing from 3 ft. 6 in. to 5 ft. 6 in., and twenty-six dressing-rooms. The cost of the works is estimated at 3,200*l.* Several other plans were sent in, the cost varying from 1,500*l.* to more than 8,000*l.*"

THE ARCHITECT OF THE PARIS PANTHEON.

POSTHUMOUS homage has just been rendered to Soufflot, the architect of the Paris Pantheon, by exposing his portrait in one of the supplementary galleries of the Louvre. It was painted by Vanloo, and in the lower part of the frame there is a gilded plaque to which are affixed two golden medals representing the Pantheon from different points of view. Soufflot is depicted by the artist in the act of designing the monument which has immortalised his name. He wears a costume of apricot colour, and this, in the eighteenth century, was considered the pink of fashion. The portrait bears the signature, *Vanloo pinxit*, and has been given to the State by one of Soufflot's descendants.

Manuscript Architectural Work. — We find the following item in Mr. Young's Catalogue (12, South Castle-street, Liverpool). As to what the real value of the work may be we know nothing:—

"248. Fowler (J.), Domestic, Ecclesiastical, and Monastic Architecture of England and Wales, from the earliest times to the present century,

SPLENDID AUTOGRAPH MANUSCRIPT,

10 vols., most clearly and beautifully written, and profusely illustrated with about 3,000 engravings from various works (some scarce), water-colour drawings, pen-and-ink sketches, &c., of churches, castles, mansions, costumes, carvings, portraits, &c., half red morocco, holland covers, *gilt*, 10*s.*, 1825-38, folio.—This unique and interesting work must have been the labour of a life-time, as well as a labour of love. It illustrates very completely our cities, cathedrals, castles, mansions, circles (such as Stonehenge, &c.), mossics, carvings, &c. &c., and a vast number of works have been destroyed to get the engravings. From Dunn-Gardner's collection."

THE TRADE-UNIONS CONGRESS IN DUBLIN.

AMONG the subjects discussed last week at the Trade-Unions Congress in Dublin was that of steam-boiler inspection. Mr. Macduff (Glasgow) moved:—

"As a great number of accidents, caused by boiler explosions, result from the inefficiency of inspection, this Congress hereby instructs the Parliamentary Committee to urge upon the Government the great necessity of compulsory inspection."

This resolution was in reference to certificates of competency for men in charge of steam engines and boilers. They found, from a cause that lately took place in Glasgow, that while there was an engineer of experience to take charge of the machinery of the establishment, the inspection of the boiler was not thoroughly attended to; and, in fact, it appeared in evidence at the trial that some of the boilers had not been inspected for ten or twelve years, and plates that had been three-eighths of an inch thick had been allowed through corrosion and the weather to rot down to an eighth of an inch. At the explosion there were twenty-seven lives lost, and one firm had some twenty-seven boilers, all more or less, in a similar condition. That was evidence that compulsory inspection was required.

Mr. Johnson seconded the motion.

Mr. Rhodes (Dunstable) did not object to the inspection of boilers, but if it went forth that the inspection of boilers was quite sufficient for their safety it might prevent the more useful practice being put into operation, of having properly-qualified men in charge of boilers. It was much safer to have a qualified person in charge of the boiler, for his own life would be in danger if he worked at an unsafe boiler.

After other remarks,

Mr. Prior asked Mr. Macduff to add to his resolution:—

"And that it shall be an instruction to the Parliamentary Committee, in dealing with this question, to endeavour to keep it separate and distinct from the equally important subject of engineman's qualifications."

Mr. Knight said Mr. Burt, M.P., who had charge of this subject in the House of Commons, absolutely refused to separate the two questions.

Mr. Macduff said he would adopt the addition to his resolution.

Mr. Coote said he was compelled to believe these inspections were almost always useless. As a rule the inspectors saw exactly what the head of the firm, or the interested party, chose to point out to them. He would sooner have the opinion of one illiterate engineman as to the condition of a boiler than that of twenty scientific theorists.

Mr. Nixon, of Newcastle-on-Tyne, joint secretary of the Miners' National Union, moved, as an amendment,

"That Mr. Thomas 'Burt, M.P., be requested to re-introduce in Parliament the resolution moved by him in 1879 on the subject of steam-boiler inspection and certificates of competency of men in charge of engines and boilers."

The amendment was carried by 48 to 28.

The Nine Hours System.

Mr. Burnett (London) moved,—

"That the Congress, recognising the vital importance of offering the most strennous opposition to any attempt on the part of employers to extend the hours of labour, strongly advises the trades of the kingdom to unite for the common protection of the existing hours of labour, and empower the Parliamentary Committee to act, if necessary, as the medium of arranging a conference of those trades who may express a desire to federate for such a purpose."

He said the trade to which he belonged (the engineers) had undergone such vast expenditure and trouble on this question that he deemed it necessary to say a few words to the other trades on the subject. The nine-hours system had been introduced into the engineers' trade of the country in 1871, and the reduction of the hours of labour which the engineers then succeeded in obtaining was extended to other trades which previously had worked longer hours, so that the bulk of the trades in the country were interested in supporting the nine-hours system. The amount of wages which a man had to receive was doubtless one of the first questions for their consideration, but he ventured to assume that the question of the hours of labour was of greater importance than the mere question of wages. Wages rose and fell in accordance with the various laws affecting the labour market, but the hours of labour remained fixed, if not for all time, for a very great length of time, and it ought to be their object in dealing with the question of hours to bring them down to as brief a limit as possible. He referred to the operations of the Iron Trades' Employers' Association, which was the greatest organisation of capitalists in the country. Its proceedings were always conducted in private, and its reports were in the first place called private copies, and then they were afterwards told they were strictly confidential. Referring to one of those confidential documents, he pointed out that the most important portion of it related to the movement for the extension of working time. It went on to show the various steps taken by their association to increase the hours of labour, and referred with triumph to the fact that in Scotland in the beginning of 1879 the hours of labour were extended from 51 to 54 per week. It also referred to the fact that a conference had taken place between employers and men with the view of still further extending the hours of labour. If a time of temporary depression should enable the employers to extend the hours of labour, they should remember that a time of prosperity might enable the men to wrest back the hours of labour. The disputes at Huddersfield and Bradford were the principal disputes on the time question in which they had been engaged. In Huddersfield several of the shops had conceded the terms of the men, and were now working on the short-hours system. In Bradford the hours had been extended from 54 to 56½ per week, and now, after a strike of nearly eighteen months' duration, their society had only within the past few weeks achieved a complete victory, and, with a few exceptions, all the shops in Bradford are working on the short-hours system. They wanted to point out to the trades of the country that although they were able to supply the sinews of war from 20,000*l.* to 25,000*l.* in addition to the ordinary benefits of the society, other societies might not be so strong and well able to resist, and therefore they urged upon them the necessity of joining in this combination to protect the hours of labour.

Mr. Guile seconded the resolution. The employers had set them such a very good example of united effort that it was just as needful,—nay, more so on their part,—that they should combine and protest against being robbed of this one hour privilege each day, as it was for the employers to enforce it again on the working men of this country. If the employers got ten hours' work out of them for nine hours' pay, they could go into the market retaining the same margin of profit on their capital as heretofore. He would say the time was coming when, if all who ought to work did work, not nine hours', but six hours' work would be sufficient to supply the wants of the country.

Mr. Ashton thought the hours of labour question was a more vital one than that of wages He held that with the improvements in machinery, which enabled work to be performed in a shorter time, the labourer should have a benefit in reduced hours of labour. He pointed out that although Mr. Burnett's trade might boast that they were working only nine hours a day, yet the members of his trade, as well as others, were always ready to work overtime when they got the chance of earning a few shillings by it. He held that if they had to work a certain number of hours per day, they ought to cease labour at that time, and refuse to work overtime under any inducement.

Mr. Thom (Edinburgh) suggested an amendment, and

Mr. Burnett subsequently put his resolution in this shape:—

"That this Congress, recognising the vital importance of offering the most strenuous opposition to any attempt on the part of the employers to extend the hours of labour, strongly advises the trades of the United Kingdom of Great Britain and Ireland to unite for the common protection of the existing hours of labour where they have been reduced, and to take the earliest opportunity of equalising them with the lowest basis which has been obtained; also to empower the Parliamentary Committee to act, if necessary, as the medium of arranging a conference of trades which may express a desire to federate for such a purpose."

Mr. J. Ward (Dublin) seconded the amended resolution which, after a long debate, was unanimously carried.

On Friday, the following resolution, in favour of apprenticeship, was carried, and is a direct confirmation of the views put forth in the article upon the subject in last week's *Builder*. Mr. Nanetti (Dublin) proposed,—

"That this Congress is of opinion that a regular system of indentured apprenticeship, extending over stipulated periods, is the best means of developing technical knowledge, and increasing the skill of workmen in the United Kingdom."

Mr. Avens (London) seconded the motion.

Mr. Clarke thought this was a question for each individual society to deal with, and not for the Congress at all.

Mr. Fitzpatrick (Liverpool) concurred with Mr. Clarke.

Mr. Davey moved an amendment, to the effect that the question could not be adequately dealt with by the Congress, and could only be dealt with by the separate trades.

After a lengthened discussion, the amendment was rejected and the resolution adopted.

The Congress was brought to a close on Saturday last, when the next place of meeting was considered, and the following places were voted for:—Durham, 20; London, 19; Manchester, 15; Belfast, 8; Swansea, 7. The final division lay between Durham and London, and the latter received 35 votes, Durham getting 30.

The subject of strikes and lock-outs was then considered, and the following resolution passed on the motion of Mr. Coote, of London:—

"That in the opinion of this Congress, the time has arrived when measures should be taken to bring into closer union the somewhat estranged relationships of capital and labour, and to place them upon a basis that will, in the future, prevent strikes and lockouts from paralysing the industry of the country. With this purpose in view, the Congress recommends to the consideration of all interested in the welfare of masters and workmen the desirability of establishing local and central courts of arbitration throughout the United Kingdom for the purpose of settling all trade disputes upon the principle of equity to all concerned."

On the suggestion of Mr. Sedgwick, who seconded the motion, the word "employers" was substituted for "masters," which was deemed offensive.

THE STATUE OF ROBERT RAIKES ON THE EMBANKMENT.

WITHIN the last few days passengers along the Embankment between Waterloo and Charing-cross have had their attention attracted to the taking down of the statue of Robert Raikes, the founder of Sunday Schools, which was erected only some two or three months ago, on the occasion of the Sunday School Centenary. The statue itself, as well as the granite pedestal on which it stood, described in our columns at the time, have been removed from the site, and the former taken away and placed under lock and key, pending the permanent foundation and basement works now in progress. The explanation offered of the removal of the structure is that its erection was only of a temporary character, in order to admit of the inauguration of the statue during the centenary week, and that for this occasion the pedestal and the statue were erected on blocks of timber. The entire structure having now been removed, the site upon which it will permanently stand in the Embankment Gardens has been excavated for the foundations to a depth of about 20 ft., and a portion of the area, about 20 ft. square, has been filled in with concrete, upon which the pedestal and statue will be permanently erected. Messrs. Mowlem, Burt, & Co. are executing the work. If the explanation given be correct, certainly it is the oddest proceeding that we have heard of for some time. Ordinary people would fancy that a temporary wooden pedestal, removable with little trouble and expense, might have been made to serve the immediate purpose.

Convalescent Hospitals.—By the aid of a generous donor (who gives 6,500*l.* conditionally on the establishment at once of a seaside branch home), the Committee of Management of the Metropolitan Convalescent Institution has secured a freehold site at Bexhill-on-Sea, near St. Leonard's, and plans for a building capable of accommodating 100 inmates have been prepared and approved by the Board. The cost of the land, building, and furnishing complete, is estimated at about 12,000*l.* The Committee of Management have already entered into a contract for the erection of so much of the building as will receive fifty inmates, and they ask for funds to enable them to fit up and furnish that portion, and also to complete the rest of the building at once. Mrs. T. Brassey has promised to lay the foundation-stone of the new building early in October.——The Princess Christian has consented to open the Convalescent Hospital for the county of Hertford, at St. Leonard's-on-Sea, on October 21st. The Marquis of Salisbury, the Earl of Chichester, and a large number of county gentry are expected to be present.

WESTMINSTER PUBLIC OFFICES COMPETITION.

ON Tuesday last, at a vestry meeting of the united parishes of St. Margaret and St. John, Westminster, Mr. George Andrew Spottiswoode in the chair, the report of the referee, Mr. Barry, on the ten designs submitted for new offices, was considered. The referee had selected three designs, and placed them in the following order:—No. 1, "Stet"; No. 2, Portcullis in circular strap; and No. 3, Black Star.

The estimated cost of the vestry offices alone (*i.e.*, exclusive of the Large Room), in each case is as follows:—

	Author's Estimate.	Mr. Barry's Estimate.
"Stet"	£16,032	£15,779
Portcullis	15,000	16,188
Black Star	15,000	16,493

After discussion, the report was adopted, and the letters accompanying the designs being opened, the respective authors were found to be—

No. 1. Messrs. Lee & Smith, 7, Queen Victoria-street.
No. 2. Mr. John E. Trollope, Elm Field, Streatham.
No. 3. Messrs. Hunt & Steward, 3, Victoria-street.

The cost of the Large Room is thus estimated by Mr. Barry:—In the case of No. 1, 6,313*l.*; No. 2, 7,547*l.*; and No. 3, 4,705*l.*

It was decided to exhibit publicly all the designs as soon as possible, and it will be then, of course, open to any of the architects to affix their names to their designs, should they so please. The matter was referred to a committee for further report.

Mr. J. E. Trollope, the second prizeman, is a younger son of Mr. Trollope, of Parliament-street.

THE CHURCH OF THE PASSIONISTS (ST. JOSEPH'S), HIGHGATE.

THIS (R.C.) church, which was opened on the 12th ult., has been elaborately decorated. The base of the nave walls is of black and gold marble; above this, to the top of the confessional arches, the walls are stencilled with the various emblems of the Passion in green on a lighter ground of the same colour, the whole being surrounded by a fretwork band of a reddish colour. On either side of the nave are recesses containing the confessionals, worked in pitch-pine and varnished. Between the tops of the Confessionals and the moulding under the windows are panels in various shades of colour. Above this are the new stained-glass windows, with ornamental panels between them, and a painting of the Crucifixion. The ceiling of the nave is panelled in various shades of grey. The cornice is decorated, and has the fascia relieved with a running pattern of passion-flowers and leaves in natural colours. The lighting is effected by means of star pendants. The font, of a carved Gothic design, stands in a chapel, which also answers the purpose of a baptistery. The Lady-chapel and the Chapel of St. Paul of the Cross stand on either side of the sanctuary, and form the transepts. In the Chapel of St. Paul of the Cross a new altar has been erected, and a stained-glass window of the Agony in the Garden fixed in the side wall. In the lady-chapel there are two more stained-glass windows, one representing Our Lady of Lourdes, and the other the Annunciation. Both chapels have paintings over the altars, and are decorated in gold and colours. The sanctuary and high altar glitter with gold and colour. On the left-hand side of the sanctuary is a pulpit of inlaid wood, and on the opposite side the altar of the Sacred Heart. The stalls and seats are of pitch-pine, varnished.

The architect is Mr. Albert Vicars, of London; the contractors are Messrs. Kelly & Son, of London. The painted and other windows, the painting of the Crucifixion, and the medallions, were painted on zinc by Messrs. Mayer & Co., and the new altar was erected by Mr. Thomas Heath.

Sanitary Prize Essay.—The Government of India has offered a prize of 100*l.* for the best "Manual of Hygiene," to serve as a text-book for the use of the British soldiers in that country. Works submitted in competition for this prize must be sent in by their authors to the Secretary to the Government of India in the Military Department at Calcutta, so as to reach his hands not later than the last day of next March.

MOULDED BRICKS: RED TERRA COTTA.

WE cannot pretend to mention all the makers of terra cotta who have sent us drawings and specimens of their ware, but it is certainly satisfactory to learn that if architects desire to use this material, or to introduce moulded and ornamental bricks, they will not find much difficulty in obtaining what they want, whether it be in having their own drawings carried out or adapting ready-made articles. As amongst the best of the specimens that have reached us, we may mention some red terra-cotta work and ornamental bricks of the same colour sent by Messrs. Arthur Gee & Co., of Stafford. The material appears to be excellent, and good taste evidently presides over the preparation of designs for stock.

THE LIABILITY ACT.

SIR,—Now that the Employers' Liability Bill has become law, in what way does it affect the liability of servants to the masters for damage done to furniture in customers' houses during the execution of works? During the past month my workmen, while decorating rooms, have broken two glass chandeliers, which, of course, I have had to replace. Can I make the workmen pay the whole or part of the cost?

Also, if workmen catch cold while repairing roofs or other outside works, and are obliged to be at home for a day or two, in order to get well, am I bound to compensate them for this loss of time? AN EMPLOYER.

GLASGOW MUNICIPAL BUILDINGS COMPETITION.

SIR,—As one of the competitors who have adhered to the condition requiring absence of colour and etching, I consider myself entitled to ask how Mr. Barry can justify evasion of this stipulation on the part of so many of the competitors. The condition was distinctly geometrical outline; and the shading of windows in first and second premiated designs and in so many of the others, violates the spirit of that requirement. I presume this was not sanctioned in reply to any query from intending competitors, otherwise the Council would have seen their way to issue amended conditions to every competitor, so that all might be on the same footing.

It is true Mr. Barry or any professional man of skill and probity would give no weight to the adventitious effect thus obtained; but it is not in human nature to avoid being influenced by effect as well as merit, and we all know there is such a matter as the art of putting things which in this age of superficial judgment is by no means to be ignored.

However this may be, the fact remains that the first and second premiated designs have had advantages which were by the conditions inferentially forbidden. Another and more important point of objection to Mr. Barry's award consists in the architecture of Mr. Corson's design, which I should imagine scarcely seconds the wishes of the Council that the style employed should be of a broad and dignified rather than florid character. The style chosen may be appropriate for a comparatively small building, but, his own design being witness, does not easily lend itself to an extensive subject.

Note the repetition of stories, none being in reality dominant, the absence of breadth, the repetition of similar parts, which of itself is calculated to destroy interest; the fact that there is neither base nor crown in the proper sense; the fact that the style does not afford a tower of the form employed, and Mr. Corson has therefore had to touch the border-land of Gothic architecture, with a resulting incongruity. The fact, however, that Mr. Corson has followed Mr. Carrick's plan in its chief features is, I think, a merit, in the light of the conditions issued, apart from the question whether that plan was the best or not. With this, as competitors accepting certain conditions, we had nothing to do. Undoubtedly, a finer plan can be produced, and has been by some of the competitors (to whom it would be invidious to refer), and so afforded them opportunity of conceiving most excellent elevations.

It is gratifying that Mr. Barry has recognised this condition, and limited himself, in choosing, to those designs which adhered to it; for it is evident that those who disregarded this stipulation, working free of its fetters, enjoyed an advantage not really conferred by the conditions, however desirable it may have been.

MENDELSSOHN.

GRAINING AND MARBLING.

SIR,—In answer to the letter in your issue for September 11th, from "A Poor Grainer," will you allow a very old hand at the trade to state what he believes to be the principal causes of the decline of what "A Poor Grainer" considers art? I have always thought that art, technically speaking, was and is something more than learning to copy such inanimate subjects as woods or marbles, no matter how beautiful the colours or forms they present.

To call such work "art" is just as much out of place as to call the thousands of very poor imitations by poor artists that we see exposed for sale artistic.

What I consider one of the causes of what was once, no doubt, appreciated is that like most new-fashioned things, it has had its day.

Your correspondent must not forget that marbling and graining is only a profession of modern growth, little more than a lifetime since first invented; but, like other trades, it may take more than a lifetime to bring to perfection. No doubt there are some really clever men in the trade who show an amount of artistic feeling for their work; but for one of that class how many hundreds are there who have not the slightest idea of what they are supposed to be imitating, never having taken the trouble or incurred the expense of procuring the smallest specimen of either the woods or marbles requisite?

There are a large number of the so-called grainers who endeavour to perfect themselves by attending a public school,—no doubt, very large and cheap, viz., walking round the shops on Sundays.

I feel quite sure that, were it not for the supposed economy in having work (graining being varnished) that would hide the dirt or bear the scrubbing-brush, we should never have had so much graining in use.

Architects and decorators seem to be getting a little better educated in such matters than they were, and are falling back on the old-fashioned honest work that was in existence before graining and marbling were thought of.

In the old style of decoration for interior work there was some really artistic work required and done, which, let us hope, may be done again, and enable the numerous artists to get a share of the employment their natural abilities and education may entitle them to.

Another very decided cause for the decline of the trade is the action of grainers themselves, who are entirely responsible for the effect; that is, the system of piece and measurement work so generally in vogue. How is it to be expected that the system of making grainers, adopted by the so-called grainers to the trade, could be otherwise than prolific in the supply of "poor" grainers? A grainer succeeds in getting a connexion among small builders, painters, and others by giving his services at a lower rate per yard than usual, and, to enable him to make a profit sufficient to live by, he has to employ at first one boy, to be supplemented by a number more, each in a few years to compete with his late master and each other, thereby overstocking the trade with a very large amount of very poor grainers in every sense of the word.

J. M. G.

GILDERS AND PREPARERS.

AN APPEAL.

SIR,—At a very crowded meeting, held in the theatre of the Charterhouse, as already mentioned in the *Builder*, on Monday, September 6th, on the very great depression in the above trade, the Rev. Stewart D. Headlam, B.A., in the chair, on a show of hands being called for, it was proved that nearly one-half of the gilders and preparers in that meeting were out of work, many of them having been out of employment for four or five months. It has been proposed to form a Gilders' and Preparers' Society for the East End of London. This will cost some amount of money, not only in forming the society, but to relieve the men out of work. We, therefore, ask for some little assistance to enable us to get over the present depression in the gilding trade. We do not make this appeal so much for ourselves as for our wives and families. We humbly ask your readers, previously to sending money to the poor in foreign nations, not to forget the poor gilders and preparers in the East End of London.

Subscriptions will be most thankfully received by the Rev. STEWART D. HEADLAM, B.A., Charterhouse, Goswell-road; or by your humble servant,

GEORGE RYAN,
Secretary *pro tem.* of the Provisional Committee.
19, *Berwick-street, Oxford-street.*

DISCREPANT TENDERS.

SIR,—I much regret seeing the tenders for Tehidy Villa made public, and consider it very bad grace on the part of the contractor, who, unauthorised, has taken upon himself to publicly expose what I believe must have been errors on the part of his fellow competitors, and which compelled me to accept an estimate my experience teaches me to be reasonable.

Considering the inconvenience caused by the limited time, &c., allowed for the preparation of the estimates, it was my last wish that any discrepancy on the part of the contractors who so kindly obliged me with tenders should have been offered to public criticism.

G. T. HOWELL.

P. S. I shall feel greatly obliged if you will allow my opinion to be known publicly.

EASTBURY HALL, NEAR BARKING.

SIR,—As the proprietor of the largest share of this family estate, I should be much obliged if you would correct the inaccuracy in the history of the title to it given in the account published in the *Builder* of September 4th last. The history is correct down to 1557, when John Keele sold the property to Clement Sisley,—not Sisby,—who probably built the house. Thomas Sisley parted with it to Augustin Steward in or before 1608. Martin Steward sold it to Jacob Price in 1628, and George Price sold it in the year 1646 to William Knightley, whose widow conveyed it in 1659 to Sir Thomas Vyner, alderman of London. In 1714 his representatives sold it to William Browne, whose nephew, William Sedgwick, parted with it to John Weldale in 1740. This is the last time the estate was sold. Anne Weldale, daughter of the above John, by her will bearing date 1773 devised it to her relative Mary, wife of the Rev. Wasey Sterry, with remainder to her issue; and the property is still in the possession of her descendants. There was a Mr. Brushfield tenant in 1796; but this fact hardly accounts for the statement in the *Builder* of September 4th, that "the manor was sold by Mr. Brushfield in 1845 to Mr. Sterry."

If I do not notice one or two other statements in your report which do not concern the title to this property, it must not be supposed that I admit their accuracy.

I may add that on the termination in the year 1875 of the farm tenancy of Mr. Whitbread, referred to in your article (which tenancy commenced in 1858), a sum of upwards of 1000*l.* was laid out by the freeholders in repairs then found necessary to the mansion-house, buildings, and fences on the farm; and during the last two years other large sums have been similarly expended by them on this estate. FRANCIS STERRY.

Poltimore Rectory, Exeter.

RAILWAY ACCIDENTS.

SIR,—Of late there has been an undue prominence of these "accidents," and there appears to be a desire to place the matter on a wrong issue.

I submit, they result in a great measure from original faulty construction, *i.e.*, sharp curves and steep gradients, and also from excessive speed,—a matter requiring attention.

As regards "faults" in construction, I can predicate on certain points where these so-called accidents from preventible causes, bad construction and high speed, may occur.

The remedy lies in these two directions, principally in the former, and to this legislative attention should be directed; all the break power in the world will be nugatory, and, in fact, it is a question whether injury to the permanent way is not effected by a too-sudden application of break power. NEMO.

PERSONAL.

SOME of our old customers having been misled by some one having started another firm in the name of J. Smeaton & Sons, at our old address, Nos. 9 and 10, Wych street, Mr. John Smeaton, so long connected with the firm of Messrs. W. Smeaton & Sons, Howland Mews, Howland-street, Tottenham Court-road, W., and 24, Moorgate-street, E.C., will be glad if you would notice in your columns that he has no connexion with any other firm than the undersigned. W. SMEATON & SONS.

Miscellanea.

Statistics of Accidents.—The manager of the Accident Insurance Company, of Bank-buildings, has published details of the accidents the company in question has paid for during the last ten years, and they furnish ample testimony of the usefulness of insuring against the casualties of every-day life, apart from those that arise from risky occupations. 11,703 claims are accounted for as follows:—5,418 in riding, driving, and walking; 2,974 in business and professional accidents; 1,555 home and domestic disasters; 417 cases in travelling by sea and land; 271 injuries through animals, birds, and insects; and 1,038 through sports and pastimes.

Ecclesiastical Art Exhibition, Church Congress, Leicester.—The Loan Collection is larger than last year, and embraces upwards of 400 separate exhibits. Embroidery, both ancient and modern, is largely represented. Mr. C. Watkin Williams Wynn shows two missals, printed at Paris in 1501 and 1503, and the corporation of Leicester have sent a copy of the Sarum Missal, belonging to the Old Town library. No one subject is so thoroughly illustrated as that embraced by Mr. William Bragge's collection of Russo-Greek "Icons," or religious pictures.

The Printers' Almshouses, Wood-green. The new blood introduced into the management of the Almshouses at Wood-green is patent, not only by the fresh vigour with which subscriptions have been raised and the necessary repairs are being carried out, but by other signs, one of which it affords us sincere pleasure to notice. However healthy and comfortable almshouses may be, the inmates will not be much benefited if their daily rations are insufficient in quantity or quality; and yet this is (perhaps we should now say, has been) the fact in some cases. The Biggs Charity is an unspeakable boon, and when added to the endowment-money makes enough for an old couple to live upon; but when, as often happens, the husband dies and leaves the widow deprived of the Biggs annuity, she may, and often does, find herself reduced suddenly to live upon 5s. or 6s. per week. Strongly feeling that no inmate of the almshouses should have less than 9s. or 10s. per week for maintenance, a few friends have subscribed together and have arranged that, for the next six months at any rate, such a state of things shall be remedied. Full investigation has been made in each case, and Mrs. W. H. Collingridge having received the promise of assistance from other ladies, has thus far kindly acted as almoner. This movement promises to lead to a systematic and friendly visitation of all the female inmates, which will result, we believe, in much good. We think that in every case where by the death of the husband the widow who remains in the almshouses has a less total income than 10s. per week, the next Biggs annuity for women should be awarded her.—*The Printing Times and Lithographer.*

Fall of a House in Oxford-street.—About half-past six o'clock on the morning of the 17th inst, the inhabitants of Oxford-street, in the neighbourhood of the Princess's Theatre, were greatly alarmed by hearing a tremendous crash. This was found to have been caused by the fall of the premises, No. 72, Oxford-street, adjacent to the theatre, in the occupation of Messrs. Cook & Burchett, goldsmiths and jewellers, which utterly collapsed. The building was a perfect wreck, and the stock of Messrs. Cook & Burchett, worth several thousands of pounds, is buried among the *débris*. Fortunately the inmates of the house had time to escape unhurt. It seems that a house on the west side of it had been demolished, to improve the entrance to the theatre (now in course of construction). To this is ascribed the downfall. The escape of the occupants appears to be due, under Providence, to their own watchfulness and energy. The aspect of the place the next day was terrible; joists and tables, partitions and chairs, "in one dread ruin blent." Such an occurrence, although fortunately no lives were lost, ought not to be allowed to pass by without a searching inquiry. Were the premises, after the removal of the adjoining house, insufficiently shored up, or had the foundations been tampered with? When we saw the ruins some of the adjoining premises seemed to us to be in a risky condition.

Art and Health at the Social Science Congress.—In the Art Department, the discussion on the first special question, "Ought there to be a School of Dramatic Art subsidised by private subscription, or endowment, or by the State?" will be introduced by a paper by Professor Fleeming Jenkin; and Mr. Hubert Herkomer, A.R.A., will contribute a paper on the second question, "How far would the revival of the old system of 'master and pupils' be of advantage, and tend to promote the growth of historical art in the country, and the fitting use of painting and sculpture in our public buildings?" Professor Jenkin will also read a paper on the following question in the Health Department, "What is the best mode of amending the present laws with reference to existing buildings, and also of improving the sanitary condition, so as to render them more healthy, having due regard to economical considerations?" And in the same department, the discussions on the special questions, "What are the best areas for sanitary purposes, and how far should there be a revision of the mode of electing and continuing the services of the officers under the Public Health Acts?" and "What are the means which should be adopted for the prevention of the pollution of streams, without undue interference with industrial operations, and for the preservation of pure sources of water supply?" will be opened with papers by Sheriff Spens, of Glasgow, and Dr. Stevenson Macadam, of Edinburgh.

University College, Bristol.—The new buildings in Tyndall's Park will be ready for use on the 1st of October. In the old buildings the complaints of overcrowding have been frequent, and must have materially hindered the progress of the college. But nothing will be heard of the complaints in future. The new buildings are, indeed, only a small part of what are required to complete the plan, but they do provide all that is necessary for health and for some degree of comfort. The experimental courses of instruction, those of chemistry, physics, and engineering, are to remain for the present in Park-row. The reason of this is that, as the new buildings would not give comfortable accommodation for all, it was thought best to retain in the old buildings the classes in those subjects for which separate rooms are required. Thus four rooms will now be set apart for chemistry, two for physics, and two for engineering. But in the new buildings each of the rooms will, as a rule, be used at different times of the day by several professors and lecturers. Thus five rooms will be made to do duty for mathematics, geology, zoology, botany, political economy, modern history, English literature, Hebrew, French, and German. But the same room will never be used for more than two hours consecutively; and all the rooms are 16 ft. or more in height, and are ventilated on Mr. Haden's system, by which the bad air is all drawn off into a high ventilating shaft; so that the students can feel that they are sure of always having a good supply of fresh air. The new buildings will be open to the inspection of the public for the first six days of October. Mr. Hansom is the architect.

Clerkenwell Workhouse.—The guardians of the Holborn Union have received a letter from the Local Government Board, stating that they had considered the proposal of the guardians to erect a new workhouse, clerk's offices, relief offices, and dispensaries, on the site of the old Clerkenwell workhouse in Farringdon-road (formerly Coppice-row). The Board say that they have given this proposal their most careful consideration, but regret that they are unable to concur with the guardians in thinking it desirable to provide on so small a site as that of the Farringdon-road Workhouse, in addition to various offices, accommodation for so large a number of paupers of the aged and infirm and acute sick classes as that proposed. It appears to the Board that on so limited an area it would be most objectionable to erect a building of such an unusual height, and to appropriate the five upper stories thereof to the accommodation of the classes of paupers above mentioned, the three lower stories being set apart for administrative and other offices. Moreover, the proposal includes in the lower stories an extensive washhouse and laundry, a kitchen, and a furnace room for the supply of hot water, &c., from which vitiated atmosphere would necessarily be conveyed, by means of the lift-shafts and staircases, to the upper part of the premises. The Local Government Board fully recognise the great care and skill which have been bestowed on the preparation of these plans; nevertheless, having regard to the large number of sick and infirm people whom it is proposed to place in so large a site, and to the fact that the site is partially appropriated to other purposes, the plans appear to the Board inadmissible. The Board feel that they have no alternative but to request the guardians to look out for a more suitable site.

Fever at Wormwood Scrubs Prison.—Evidence was given at a recent inquest that prisoners at Wormwood Scrubs have been suffering from typhoid fever, attributed to the pollution of the air by piggeries in the neighbourhood in a shocking state of filth. These piggeries have long been known and condemned, but their agency in the present case is by some denied. How is the prison drained?

Royal Institute of British Architects.—The last published part of "The Transactions," No. 12, consists of notices of deceased members, all foreign with the exception of the late Professor Edward M. Barry, and including J. P. Cluysenaar (Brussels), Pascal Coste (Marseilles), and Joseph Louis Duc (Paris). They are very well done, and very interesting.

Church Restoration at Sheffield.—The parish church of Sheffield, which has been closed for several months for the purpose of undergoing restoration, has been enlarged and beautified at a cost of 20,000*l.* The church will be re-opened on the 26th of October, when the Archbishop of York will preach.

Accident on the South-Western Railway.—When one accident happens others are always heard of. The terrible accident at Nine Elms on Saturday night (the 11th inst.) was followed by another early on Tuesday morning, on the London and South-Western Railway, between Brookwood and Farnborough, and about two miles from the former, which, however, was happily unattended with loss of life, though much damage was done to the rolling stock. The *Surrey Advertiser* says,—At a portion of the line near the Aldershot Junction, and close to Curzon Bridge, the Basingstoke Canal and the railway run parallel, and the canal being on a higher level they are separated by a brick wall, 12 ft. high and 300 or 400 yards long. The canal is being cleaned out, and in order to render the operations practicable was dammed up at this part. On Monday night the rain was very heavy, and, it is supposed, caused the canal embankment to give way. Nearly 40 yards of the wall was broken down by the sudden rush of water, and the *débris* fell on to the up-line, whilst the rails for some little distance were covered with about 9 in. of water. About half-past one the 5·15 p.m. up goods train from Yeovil, made up of an engine, two guards' vans, and upwards of thirty trucks, laden with general goods, one cattle-truck, carrying some eight or nine beasts, came along, and the night being very dark, the engine ran right into the fallen brickwork, being lifted bodily from the metals and sent on to the embankment, where it rested on its side. Twenty of the trucks, with one of the guards' vans, were also thrown off the rails.

The Art of Old Japan: its Uses and Abuses in England.—A lecture was delivered on Monday evening, at the Masonic Hall, New-street, in connexion with the Birmingham School of Art, by Mr. C. Pfoundes, of London (for many years resident in Japan), the subject being "The Art of Old Japan: its Uses and Abuses in England." Mr. J. H. Chamberlain presided, and there was a large attendance. The lecturer, in the course of his very interesting address, said, that the true Japanese art was greatly abused, there being in the imitations gross errors, not only of misconception, but also in the adaptation of Japanese design, resulting in one mass of heterogeneous incongruities, that had only the merit of being novel and "the fashion." There was nothing patchy or "scrap" in Japanese true works of art when they thoroughly understand the subject, but there was a great deal that was patchy and "scrap" in that copied Japanese ware which came from Stafford and Worcester. It was not desirable that they should become mere copyists, and he was not going to point out a royal road to pilfering novelties from an alien art while their own faculties were permitted to lie dormant. He appealed to them rather to take to heart a lesson from the Japanese, and rouse themselves to original thought, to the study of the great book that was always open before them, and, whilst carefully bearing in mind the precepts of their art instructors, to avoid blindly following paths they knew not of; to do as the Japanese had ever done,—train their minds, and exercise their natural faculties to be observant of the beauty that always surrounded them.

George Stephenson.—A marble tablet was placed with ceremony in the Turin Railway station on the 10th inst. to commemorate the fiftieth anniversary of the opening of the first railway between Liverpool and Manchester.

Wood-working Machinery in Australia. We notice that in addition to the medals awarded at the Sydney Exhibition, Messrs. F. W. Reynolds & Co., of Acorn Works, Blackfriars, have received a special prize at the Brisbane Exhibition.

Inner Temple.—The greater portion of the old block of buildings on the east side of Tanfield-court, Inner Temple, is now in course of demolition to make way for extensive additions about to be made to the library of this society. Plans have been prepared by Mr. Edis, and the works will be commenced immediately.

Tunnelling the Alps.—The boring of the Arlberg tunnel through the Alps is in active progress on the Austrian side of the mountain, and ground will shortly be broken on the Swiss side. The St. Gothard line in its entire length is expected to be in running order in April next.

Frome.—A stained-glass window has been placed in Holy Trinity Church, in this town, in memory of the late Mrs. W. C. Cruttwell. It is by Mr. Morris, and consists of one light, containing a full-length figure of St. John the Divine.

TENDERS

For erecting two warehouses at Homerton, for Mr. W. Chapman. Quantities not supplied:—

Tooley	£1,123	10	0
Trench	862	0	0
Oovart	797	10	0
Brown	772	10	0
Child	748	0	0
O'Keefe	710	0	0
Russell & Cowley	698	0	0
Evans & Lewis	670	0	0
Jones	650	0	0
Baxter	650	0	0
Vaughan	635	0	0
Haines	629	0	0
Taylor	620	0	0

For alterations and additions to No. 84, Carlisle-street, Marylebone, for Messrs. Evans & Davies. Mr. E. Monson, jun., architect:—

Millson	£348	0	0
Trench	298	0	0
Beach	295	0	0
Sawyer	291	0	0
Ternley	285	0	0

For house for Mr. Kaye, at Woodford, Essex. J. T. Bressey, architect:—

Reed	£2,054	10	0
Harper	2,049	0	0
Brown	1,675	0	0
C. & F. Crosker	1,358	0	0
Shepherd	1,340	0	0
Wells	1,295	0	0
North, Bros.	1,245	0	0

For forming roads, &c., George-lane, Wanstead. Mr. J. T. Bressey, surveyor:—

Pizzey	£589	0	0
Jackson	555	0	0
Mundy	550	0	0
Bell	487	0	0
Cardus	475	0	0

For house for Mr. A. Miller, at Wanstead, Essex, Mr. J. T. Bressey, architect:—

Harper	£1,020	0	0
Bragger	986	0	0
Arber	943	0	0
Mundy	835	0	0
Willmott	795	0	0

For sewerage works for the Arnold Local Board of Health:—

Cook & Bennett, Spalding	£9,972	0	0
Bell, London	9,181	0	0
Pearson, Hull	9,110	11	7
Smith, Manchester	9,043	12	0
M'Kenzie & Co., London	8,600	0	0
Coupe, Ripley	8,306	0	0
Rushworth, Nottingham	8,289	7	8
Dawson, Bury	8,169	0	0
Thumbs, Nottingham	7,950	0	0
Knight, Loughborough	7,875	15	7
Greaves, Arnold	7,798	10	9
Tomlinson, Messrs., Derby	7,770	0	0
Meats, Bros., Nottingham	7,538	2	4
Johnson, Jun., Derby	7,533	5	8
Dobb & Gummer, Rotherham	7,447	0	0
Jeffries, Conway	6,967	5	4½
Smart, Nottingham	6,924	0	0
Dovenor & Quesuel, Stoke-on-Trent	6,871	1	0
Cordon, Nottingham (accepted)	6,680	0	0
Wayte, Arnold	6,400	0	0

For the erection of three new houses adjoining (one with gateway), and a new warehouse at rear of, No. 140, Abbey-street, Bermondsey, and the conversion of present house (No. 140) into two smaller houses, for Mr. Wm. Wilkins. Mr. Edward Crosse, architect. Quantities supplied:—

Friggens	£3,128	15	6
Preston (too late)	3,015	0	0
Almond	3,008	0	0
Eldridge & Gee	2,990	0	0
Kipps	2,988	13	3
Bullers	2,895	0	0
Wells	2,785	0	0
Rider & Son	2,743	0	0
Croaker	2,723	0	0
Greenwood	2,709	0	0
Downs & Co.	2,636	0	0
Parrant & Son	2,636	0	0
Battley	2,499	0	0
Wimsor (accepted in part)	2,414	16	0
Brockwell	1,893	0	0

For eight warehouses, Edmund's-place. Mr. George Vickery, architect:—

Scrivener & Co.	£13,783	0	0
Hart	13,386	0	0
Morter	12,947	0	0
Colls & Sons	12,790	0	0
Brass	12,713	0	0
Ashby, Bros.	12,620	0	0
Lawrence	12,375	0	0

For foundstone to warehouses in Farringdon-street. Mr. George Vickery, architect:—

Hart	£2,630	0	0
Crabb	1,990	0	0
Brass	1,973	0	0
Lawrence	1,883	0	0

For additions and alterations at the Rectory at Hornsey, and works connected with the glebe lands, &c., for the Rev. James Jeakes. Messrs. Wadmore & Baker, architects:—

Condor	£1,735	0	0
Clarke & Bracey	1,735	0	0
Scrivener	1,710	0	0
Ashby, Bros.	1,697	0	0
Shurmur	1,683	0	0
Dove, Bros.	1,585	0	0
Mattock, Bros.	1,407	0	0

For building a detached cottage, St. Mary's-grove, Barnes, for Mr. H. Wood. Mr. Charles Turner, architect:—

Tozer (accepted)	£1,200	0	0

For rebuilding No. 8, King's-road, Chelsea, for Mr. R. W. Livingston. Mr. George Fagg, architect. Quantities supplied:—

Thorne	£2,100	0	0
Hoare & Son	1,998	0	0
Lathey, Bros.	1,973	0	0
Macey & Sons	1,962	0	0
Clark & Bracey	1,832	0	0
Smith	1,795	0	0
Richardson	1,779	0	0
Craske	1,730	0	0

For the erection of New Town Schools, Devizes, for girls, cooking-school, and third-grade school. Mr. Henry Wearer, architect. Quantities supplied:—

Light & Smith, Chippenham (too late)	£1,187	0	0
W. & F. Long, Bradford-on-Avon	1,150	0	0
Chivers & Son, Devizes	1,095	0	0
Ash, Devizes	1,091	0	0
Webb & Powney, Bromham (accept.)	1,020	0	0

For house and farrier's shop at 156, High-street, Shadwell, for Messrs. Worrow. Mr. A. B. Hudson, architect:—

Faulkner	£1,227	0	0
Nixon	1,124	0	0
Moyle & Son	1,100	0	0
Wilson & Erton	1,049	0	0
Spencer & Co.	1,015	0	0
Hearle & Son	893	0	0

For the erection of a detached house in Netherhall-terrace, Hampstead, for Mr. Thomas Fall. Messrs. New & Son, architects:—

Bird	£4,426	0	0
White	4,400	0	0
Keys & Head	4,361	0	0
Phillips & Son	4,328	0	0
Harris & Sons	4,294	0	0
Scrivener	4,293	0	0
Mark	4,235	0	0

For carrying out the first section of the roads at St. Peter's Park, St. Alban's, including drainage, curbing, channelling, &c. Messrs. J. & S. Flint Clarkson, surveyors:—

		Extra for Gravelling.
Bottom, Park-street	£1,682	4s. per yard.
Coker, Luton	1,650	—
J. & W. Savage, St. Alban's	1,100	4s. per yard.
Mardell, St. Alban's	1,083	3s. 10d. ,,
Capper, St. Alban's (accepted)	855	3s. 9d. ,,

For pair of houses at Wanstead, for Mr. Bradley. Mr. T. Bressey, architect:—

Harper	£1,218	0	0
Arber	1,149	0	0
Mundy	1,149	0	0
Willmott	910	0	0
Bragger	849	0	0

For new shop-front and back additions, for Messrs. Airey & Pearson, at 20, Rye-lane, Peckham. Mr. John Farrer, architect. No quantities supplied:—

Rosenberg	£235	0	0
Daws	154	0	0
Smith	125	0	0

For house at Maybury, Woking, Surrey, for Mr. E. Prior. Mr. E. P. Loftus Brock, architect:—

Williams	£2,590	0	0
Shearburn	2,458	0	0
Mattock, Bros	2,193	0	0
Shears	2,180	0	0
Morris	2,100	0	0
Haynes	1,999	0	0
Writhara	1,980	10	0
Brass	1,947	0	0

For the erection of new market-house for the corporation of Over Darwen. Contract No. 3: Superstructure. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove:—

Booth, London	£14,903	0	0
Hughes & Stirling, Bootle	13,390	0	0
Clegg, Accrington	13,250	0	0
Abbott, Blackburn	13,148	0	0
Holt & Co., Blackburn	13,095	0	0
Bridge, Burscough	12,896	0	0
Herd, Manchester	12,587	0	0
Holdsworth, Bradford	12,400	0	0
Armitage & Hodgson, Leeds	11,900	0	0
Lloyd & Milward, Darwen	11,579	0	0
Riley, Fleetwood	11,407	0	0
Orrell & Sons, Darwen (accepted)	11,395	0	0
Whittaker, Blackburn	10,950	0	0

For the erection of new market-house for the corporation of Over Darwen. Contract No. 4: Ironwork. Mr. Charles Bell, architect:—

Allsup, Preston	£3,244	0	0
Stevens, Bros., London	3,117	0	0
Woolstenhalmes, Rye, & Co., Oldham	3,006	0	0
Clayton, Preston	2,875	0	0
Handyside & Co., Derby	2,649	0	0
Gilmour, Glasgow	2,568	0	0
Patent Shaft and Axle Co., Wednesbury	2,545	0	0
Tildesley, Wolverhampton	2,393	0	0
Dew & Co., London	2,385	0	0
Thornton, Bradford	2,379	0	0
The Tank and Boiler Co., Wolverhampton	2,323	0	0
Jukes, Coulson, Stokes, & Co., London	2,195	0	0
Woodall, Dudley	2,136	0	0
Hill & Smith, Dudley	2,043	0	0
Goddard & Massey, Nottingham*	2,022	0	0

* Accepted.

For new bakehouse, flour-store, and other works, Well-street, Bedford, for Mr. G. Hopper. Mr. F. T. Mercer, architect:—

Moore	£235	0	0
Laughton	230	12	6
Lilley	207	0	0
Corby & Son	205	0	0
Foster	198	0	0
Harrison (accepted)	184	0	0

For the erection of the new Leadenhall Market, for the Corporation of the City of London. Mr. Horace Jones, architect. Quantities by Messrs. William Reddall & Son and R. L. Curtis & Sons:—

Martin, Wells, & Co.	£58,226	0	0
Crockett	57,290	0	0
Garlick	56,000	0	0
Shurmur	55,980	0	0
Webster	55,000	0	0
Shaw	53,500	0	0
Conder	52,214	0	0
Garrud	52,033	0	0
Bull & Sons	51,637	0	0
Mowlem & Co.	50,950	0	0
Drake	50,650	0	0
Bangs & Co.	49,995	0	0
Trollope & Son	49,877	0	0
Perry & Co	49,776	0	0
Holland & Hannen	49,734	0	0
Morter	49,493	0	0
Vernon & Ewens	48,240	0	0
Devlin	48,148	0	0
Nightingale (accepted)	47,618	0	0

For sundry works at offices, City of London Union, Bartholomew-close:—

Ayres	£690	0	0
Larke & Son	663	0	0
Healing	645	0	0
Staines & Son	644	0	0
Shorey	610	0	0
Thomas	610	0	0
Howard	587	0	0
Weekes & Son	579	0	0
Merritt & Ashby	575	0	0
Jones	567	15	0
Pitman & Son	556	0	0
Phillips & Son	553	0	0
Conder	551	0	0
Shurmur	549	0	0
Sawyer	540	0	0
Coombe	529	0	0
Johnson & Co.	525	17	6
Ball & Wickes	523	15	8
Marsland	518	0	0
Patten	500	0	0
Lamb	490	0	0
Benson	488	0	0
Barber	483	0	0
Derby	474	0	0
Taylor & Son	463	0	0
Robb	450	0	0
Wadsworth	450	0	0
Bulford	413	8	3½
F. G. & R. Vigor	415	0	0
Prescott	410	0	0
Spencer & Co.	409	0	0
Grimshaw	383	0	0
Fernley	375	0	0
Lewis	374	11	6
Cocks	357	0	0
Powell & Co	350	10	0
Pitman & M'Carthy	293	0	0

For new school-buildings for the parish of St. Clement Danes (exclusive of fittings). Mr. C. W. Reeves, architect:—

Wagstaff & Son	£3,157	0	0
Wall	3,150	0	0
Hobson	3,037	0	0
Macey & Son	2,948	0	0
Howard & Darrell	2,947	0	0
Scrivener & Co. (accepted)	2,919	0	0

For the restoration of St. Nicolas Church, Abingdon. Mr. Edwin Dolby, architect:—

Groves	£2,566	0	0
Kingerlee	2,284	13	6
Allen	2,235	0	0
Selby	2,103	0	0
Claridge	2,145	0	0
Jones	1,888	0	0
Wheeler	1,857	2	6
Williams (accepted)	1,856	0	0
King	1,792	0	0
Holland	1,734	0	0

For alterations and additions to Brighton New Club King's-road, Brighton, Sussex. Mr. Thomas Lainson architect. Quantities by Messrs. Fowler & Hingman:—

Nurcombe	£6,014	16	6
Kirk & Randall	5,895	0	0
Jones	5,660	0	0
Barnes	5,640	0	0
Lockyer	5,630	0	0
Cheeseman & Co.	5,560	0	0

For new Board Schools, Tottenham. Messrs. Ellis & Son, architects. Quantities supplied:—

Field	£10,957	0	0
Child	10,940	0	0
Pocock	9,998	0	0
Cass & Co.	9,990	0	0
Humphrys	9,847	0	0
Sawyer	9,822	0	0
Knapp	9,715	0	0
Dowsley	9,688	0	0
Colls & Sons	9,372	0	0
Hunt	9,323	0	0
Bell	9,285	0	0
Staines & Son	9,234	0	0
Linsell	9,000	0	0
Mattock	8,993	0	0
Julian & Co.	8,990	0	0
Brown	8,950	0	0
Ashby, Bros.	8,814	0	0
Nichols & Co.	8,749	0	0
Linfield	8,644	0	0
Wall	8,500	0	0
Taylor & Co.	8,258	0	0
Ireson	7,995	0	0
Garrard	7,983	0	0
Beale	7,451	0	0

For the erection of a drill-hall and other works, on the site of the late East London Theatre, Whitechapel-road, for Mr. Morris Abrahams. Mr. John Hudson, architect:—

Read & Son	£3,314	0	0
Little	2,791	0	0
Bangs & Co.	2,533	0	0
Hearle & Son	2,530	0	0
Morter	2,453	0	0
Bentley	2,182	0	0

For the erection of offices, &c., at 35 and 36, Lime-street, London, for Mr. G. H. Powell, Mr. Edward Sharman, architect. Quantities supplied:—

Carter & Son, Lime-street	£5,000	0	0
Underwood, Wellingborough	4,685	0	0
Williams & Son, Islington	4,446	0	0
Greenwood, Tooley-street	4,300	0	0
Roberts, Islington (accepted)	4,189	0	0

TO CORRESPONDENTS.

Dispute Between Architect and Builder.—If the case be precisely as stated, responsibility would not attach to the builder. A builder who carries out instructions given by specification and drawings, under the eye of the architect, and who, moreover, expressed his dissent from the course ordered, would certainly not be held liable for the consequences of that course. As to the second question, we may discuss it on some future occasion.

Centrolinead (information on this subject will be found in Mr. W. F. Stanley's Descriptive Treatise on Mathematical Drawing Instruments, p. 171, except that lines are drawn by the side of the drawing at right angles to the horizontal lines on which the studs are placed at equal distances apart. By fixing the arms with the rule on the horizontal line, of course they will exactly connect with this. To make them correspond with other lines to the same vanishing point may be soon attained by making the arms of more or less acute angles, always setting them on the horizontal line. It takes a practical draughtsman about a minute or so to do it).—J. M. S. (very few modern examples. Look to drawings of some of the Moorish remains. See court of the Alhambra at the Crystal Palace).—Constant Reader (should look to the published account of the memorial).—Juvenis (we cannot decide bets, though they do relate to sizes of buildings).—R. & R. (not in our journal).—W. S. E. (we do not remember it sufficiently).—Civis.—Competitor.—Mr. F.—C. E. D.—S. & B.—H. & O.—G. W. D.—H. J. N.—J. J. & Son.—S. F. C.—F. D. L.—O. S.—Constant Reader.—W. B.—J. U.—J. D.—J. S.—C. S.—F. E. J.—M. P.—E. L.—F. & H.—H. L.—R. G. M.—W. W. & Sons.—W. H. H.—P. J. W.—J. F.—J. T.—C. S.—W. & E.—H. W.—J. T. B.—G. V.—C.—W. O. B.—M. Bros.—F. H.

All statements of facts, lists of tenders, &c, must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

The Builder.

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ILLUSTRATIONS.

CONTENTS.

Architects and Sanitation.

CHARGES have been made against the architectural profession at the Sanitary Congress in Exeter, as well as elsewhere previously, which a large proportion of the profession will do well to consider seriously. It has been asserted, and the assertion has been accompanied by circumstantial statements, that certain buildings erected in quite recent years are no better off in sanitary provision than those of what may be called the pre-sanitation period: that buildings of a class which ought to have presented specially healthful conditions,—hospitals or convalescent institutions, public offices, and other large establishments of that description, built under the superintendence of architects of standing,—have been found so deficient in the requisite provision for, amongst other things, efficient drainage, that they have had to be closed, and the drainage system reconstructed within a very short period from the time of their being built, to prevent them from becoming institutions for fostering and spreading disease rather than contending against it. We have not the names of the architects given, and it is quite possible that if we had them, we might find they were not among those who are recognised as leading members of the profession; though we must not feel too sure even of this. When we hear, as we have done, of an eminent "art-architect" declining to visit the site of an intended house before planning it, as it was a matter of no consequence, we can hardly refuse to believe any statements of the kind we have alluded to on the ground of inherent improbability. It appears, at any rate, that there were recognised architects employed in the cases brought forward by Mr. Burdett in his communication, and that in two of these cases, at all events, the architect had unlimited funds at his disposal, and was free to do as he pleased. Yet we are told (and Mr. Burdett, a member of Council of the Sanitary Institute, made himself responsible for the truth of the statements) of drain-pipes beneath the building, soil-pipes inside, baths, lavatories, and sinks opening directly into the sewer, many of them untrapped; and no plans of the drainage existing. Drains laid with irregular falls, and in some cases falling the wrong way, formed other items in the indictment. This latter defect (one of very frequent occurrence) is, however, not one of those which in general can be rightly charged upon the architect. He, almost as a matter of course, will direct that the drains be laid with a 'proper" fall, if not a specific minimum fall; but for the observance of such directions he is necessarily at the mercy of workmen and clerks of works. An architect cannot examine and test the levels of all drains in a large building as they are laid; and if clerks of works are negligent, or if workmen will do things clumsily or dishonestly, the fault is with them, and not with the architect, who is entitled to expect at least a decent amount of common honesty and comprehension of their business on the part of the contractor's foremen and labourers, and proper attention on the part of the clerk of works to ensure that his orders are properly carried out.

In such matters as the latter, therefore, the architect may be, and often is, unfairly blamed for what is due in reality to bad or dishonest workmanship. But in regard to other charges brought in Mr. Burdett's paper, those which involve the employment of a right or wrong system in the contrivance of drainage, the architect is unquestionably the responsible person, and we fear he is in many cases very responsible indeed for a great deal which he ought to have prevented. We may say that we do not very much doubt the general correctness of the facts mentioned by Mr. Burdett in regard to the three specimens of building which he mentioned. It would, however, have been more thoroughly in the interests of truth to have specified the buildings by name, so that charges might have been met or answered where there was good ground for answering; but this might have made the reader of the paper answerable for libel in the eye of the law. A man making statements in regard to a case which is not named or defined is under great temptation to "put it strong," and to make charges in a sweeping manner which may in reality be only true partially and in detail; and we must allow for this in regard to the remarks we are now commenting on.

Statements such as those made were, of course, followed by a general abuse of architects, an amusement which sanitary reformers, editors, and leader-writers never want much encouragement to enter upon. We may be allowed to caution indignant sanitarians and their audiences, however, against supposing that all architects are ignorant or careless about sanitary arrangements, because very bad charges have been preferred against "some person or persons unknown" in the profession. In reply to the general persuasion that seemed to be adopted by the members of the Sanitary Institute, that the architects are at the bottom of all the bad drainage and ventilation, or are at best indifferent about it, we may be allowed to say that a large proportion of the sanitary reforms of the day were originally inaugurated in the pages of this journal, conducted by an architect, and that many of them were urged by us over and over again, through long years, in the strongest terms, before any notice whatever was taken of them. And if those newly-enlightened enthusiasts among the press and the public who think they are empowered to lecture the whole architectural profession on their duties, were to be a little more careful about facts and justice in their accusations, they would find that there is a proportion at least of the architects who are fully alive to the importance of sanitation, give it every attention, and are the inventors of arrangements bearing upon it. But they are always forgotten or ignored when the subject comes up, and the whole profession are attacked as if they were all alike indifferent to the subject.

This is certainly not the case, and it is only our duty to our natural clients, the architects, to say so plainly. But, on the other hand, we should be equally wanting in duty to them and the public if we did not also say that there is obviously among a proportion of the profession a lamentable and almost culpable indifference in regard to this important branch of practical architecture. The reason for this is, to a great extent, to be found in the turn for the picturesque in architecture which has been developed in so marked a manner of late years. There has been a curious series of changes in the way in which the practical and the picturesque have been regarded by architects at different periods. During the time when what we now call picturesque architecture was being produced,—when castles and monasteries were built,—the picturesque was probably hardly in the thought of the designer, in the case of castles more particularly; the building was simply the best that could be done, and the sanitary arrangements were probably also the best that could be provided with the slight knowledge and rude means which the period allowed. There is evidence that, in conventual buildings, great regard was paid to sanitary arrangements as far as the removal of refuse is concerned (though personal cleanliness may have been little regarded), and the very absence of our contrivances of traps and pipes obviated also some of the dangers against which we have to guard. In the flat period of architecture which followed the fall of Mediæval art, the picturesque, conscious or unconscious, for a while disappeared; but there was, during this period, more sound and honest building, on the whole, than at any other time, and the sanitary side of the question seems to have been properly taken into account still, so far as the knowledge of the period extended. In the present generation we find a conscious effort at picturesque architecture, combined with a frequent indifference as to sanitary provisions, at a time when far more knowledge and experience, and far better machinery, are available for sanitation than at any time previously.

The root of this indifference to so important a part of the architect's work is to be traced, we really believe, in a great measure to the taste for "picturesque" and imitative architecture which has possessed so large a portion of the profession, and which is much fostered and encouraged by the portion of the public who profess to have a taste. With those so influenced, architecture, instead of being the study how to build best for practical needs and for appearance combined, is the study how to turn to account a number of sketches from old buildings, and

how to realise their peculiar effect most faithfully. Those who make this the one object find a large public to encourage them in it, a public which is very indifferent how a house is planned, drained, or ventilated, so long as it presents the peculiar kind of picturesqueness which is desired; and a public which displays this taste can hardly complain if its demand is supplied, and must at least share some part of the blame with the architect, though it is true that the latter ought to endeavour to educate his public rather than be led by them; but that is easier said than done.

In short, the want of attention to sanitary conditions on the part of some architects is simply one of the many ill results of looking at and practising architecture from a radically wrong point of view, from the sentimental and not from the practical point. If the young architects who fill sketch-books with bits of picturesque building for "home consumption" would, before running after this ornamental part of the profession, however commendable in its turn, fill note-books with practical and sanitary observations; if they went abroad to see where to get hints for improving construction, arrangement, ventilation, and drainage, instead of merely to obtain new "notions" in the picturesque of gables and turrets, there would be some chance that the former would receive proper attention when the results of study came to be put into practice. As it is, the study is merely on the picturesque, and when facility in that has been acquired, sanitary matters have to be looked to as a more afterthought, or trusted to the experience of the builder. This sounds very hard, but we repeat that the public who demand the seeming rather than the real in architecture, and make no demand for sanitation, cannot reasonably complain if they get what they demand. But the remedy is that architecture should be regarded as it always was in the best times of its cultivation, as a matter of practical building in the first instance, and of beautiful expression in the second instance only. The idea of turning over sanitary questions to engineers or specialists, and leaving the architects in undisturbed possession of the picturesque, which has been suggested, is the very worst that could be entertained, and the most utterly suicidal thing which the architectural profession could do. People may get tired of the picturesque, or change their ideas and tastes about it; but they are likely to become increasingly exacting about sanitation, sound construction, and economic requirements; and these are considerations which will always remain the same. Let the architects be content to relegate the picturesque to its proper place, and direct their minds towards attaining well-placed, well-planned, well-built, well-drained, and well-ventilated buildings in the first instance, as the *sine quâ non*, after satisfying which they will be at liberty to look after the picturesque with a clear conscience. Unless they restore this true balance of professional work, and do it speedily, they will have reason to repent of their shortcomings; for the public are gradually being awakened to the pressing need of improvement in the sanitary construction of buildings, and they will insist on having it.

A Big Picture in Guildhall.—The Lord Mayor last week ordered a painting, 100 ft. long and 30 ft. deep, containing over 1,000 figures, to be hung in the Guildhall. It was painted by Sir R. Kerr Porter, and presented to the Corporation in 1819. Porter was born in 1775, and in 1790 obtained admittance as a student of the Royal Academy through Sir Benjamin West, then president. In 1792 the boy artist received a commission to paint "Moses" and "Aaron" for Shoreditch Church. In 1794 he presented an altar-piece of "Christ allaying the Storm" to the Roman Catholic Chapel in Portsea, and in 1798 he gave to St. John's College, Cambridge, a picture of "St. John preaching in the Wilderness." In 1800 he exhibited an immense picture, 120 ft. long, in the Lyceum Great Room, representing the Storming of Seringapatam, and in the same place, in the following year, another gigantic battle-piece, "The Siege of Acre." These were followed by a third colossal work, "Agincourt," which he presented to the City of London, and which is the picture now disentombed. Some years ago it hung in the Guildhall, where it is now again exhibited in three portions, and in a somewhat ragged condition. A committee has been appointed to consider as to cleaning and restoring it.

A NEW CHAPTER IN ART.

The discoveries made by Sir Henry Layard in Assyria and Babylonia opened up a new chapter in the history of art, and they have since been supplemented by the discoveries made in Cyprus, Phœnicia, and on the sites of Troy and Mycenæ. These discoveries have shown us that Greek art, long believed by some to be like its great patroness, Minerva, a full-born product of the land of Zeus, was but the culmination of a long series of art developments extending over centuries of time. Just as we see in geology some lofty table-land which seems, as it were, to be a huge altar of nature's God, built up layer by layer by the slow bricklaying of centuries, so the art which culminated in the divine sculptures of Phidias and Polycletus was but the last of a stratified series of art periods, each one developed from its predecessor.

The more we regard the discoveries of the last few years in almost every branch of research, either of the historical or natural sciences, the more we see the extent to which the law of development and evolution is applicable. The application of the doctrine of comparison, and the birth of the comparative sciences, is establishing each day more surely our knowledge of the laws which govern and guide the growth of art and religious culture.

Some two years ago * we pointed out the importance of following out the new evidence thus afforded to us of the westward spread of art and culture, and we indicated at the same time that there were other than Phœnician channels which conveyed the art, mythology, and civilisation, the "learning and wisdom of the Chaldees," to the shores of the Ægean sea and to the early seats of Greek civilisation.

The important explorations made by Dr. Schliemann at Hissarlik and Mycenæ have revealed to us the substrata of pre-Hellenic, and the first strata of Hellenic, culture which underlie the acropolis of Greek art. In these treasures of early Trojan and Greek art we find forms and modes of decoration similar to those current in Babylon, and evidently borrowed from the Chaldean artists. The presence in Greek mythology of legends of the gods and goddesses which are manifestly echoes of the mythology taught in the schools of the Babylonian prophets again is a point which needs explanation. Whence comes this similarity? Was there any historic contact? Is there a chain which connects Troy and Mycenæ to distant Babylon?

The ancient historians all agree in stating that long before Greek influence had penetrated into Asia Minor there had existed a comparatively high degree of civilisation among the states of the barbarians. The Teucrians, Mysians, Dardanians, the allies of the Trojans, were all skilled in the art of war, and were no mean contrast to the beleaguers of Troy. The Lycians, Carians, and the tribes of Solymes and the Cilicians had come in contact with the mariners of Sidon, and thus may have contracted many germs of culture; but in the interior of the peninsula, on the banks of the rivers Sangarius and the Halys, there were tribes who had developed some degree of civilisation, and attained to a fair standard of culture, as shown by their monumental remains. These were the tribes of Phrygia and Galatia, and the precursors of the Lydian empire. Whence came the civilisation of these tribes, and what part did they play in the westward spread of culture?

The annals of the kings of Egypt and Assyria, which have been recovered from the graves of buried temples and palaces, have not only restored to us the history of their own lands, they have also thrown much light on the history and civilisation of the neighbouring nations with whom they were brought in contact. These copious annals from temple and palace wall, from lengthy papyrus rolls and polygonal cylinder, are moreover, supplemented and illustrated by a vast picture-gallery of painted or sculptured tableaux, all of which help the more to bring before us the types and characters of those with whom the great kings warred. The long and accurately-compiled lists of spoil and tribute which defeated barbarians rendered to the conquering king furnish us with important data as to the products, both natural and artificial, of the lands of the defeated ones.

From these monuments we learn that more than eighteen centuries before the Christian era the highlands of Syria, the fertile districts to the west of the Euphrates, and the plains watered by the Sadjur, Ifrin, and the Orontes, with the slopes of the Amanus and Taurus mountains, were occupied by a powerful confederation of tribes. These people, known to the Egyptians as the Kheta, and to the Assyrians as the Kattai, are the Khittim, or Hittites of the Hebrew writers. They were a race who had been almost obliterated from the roll of history, and yet we find them a civilised and highly-cultured race, and no mean factor, not only in the politics of Western Asia, but also in the spread and development of civilisation.

The earliest record of these people is in the astronomical and omen tablets of the time of Sargon I., the king of Agane, a district of Babylonia. This monarch warred in Syria, and even carried his arms as far as "the land in the midst of the sea of the setting sun," by which we may recognise the island of Cyprus. Scanty as are the fragments relating to the history of this energetic and warlike king, we shall find that his reign was an important epoch not only in Babylonia, but in Western Asiatic history. From the Hebrew book of Genesis we learn that at the time of Abraham's settlement in the land of Canaan, the Hittites had a settlement at Hebron, and Abraham purchased the cave of Machpelah from Ephron the Hittite. The record of this transaction, as recorded in the twenty-third chapter of Genesis, is very important, as it would seem to indicate that contact with Babylon had left its impression in the adoption of the commercial code of Babylon. The minute specification of the land, and the details of purchase, read remarkably like the text of a Babylonian contract tablet.* The silver tariff, and the market-place being the gate of the city, all seem to indicate that Babylonian commerce, and with it the laws and precedents of trade, had been brought into Syria, and were familiar not only to Abraham, the native of Ur, but also to Ephron the Hittite. The chief city of the Hittites was the city of Carchemish, called by the Egyptians Qir-Qamash, and by the Assyrians Kar-Gamis or Gargamis. This city was situated on the Upper Euphrates, about ten miles above the month of the tributary Sadjur, the Sagur of the inscriptions, and on the west bank. The importance of the site was first recognised by Mr. Skene, the English consul at Aleppo, and afterwards by Mr. George Smith, upon whose recommendation the trustees of the British Museum commenced a series of explorations of the site, which have brought to light many antiquities of the Hittite founders. The modern name of these extensive ruins is Jerablûs, a name which is manifestly a corruption of the Greek name of the city, Hierapolis, "the sacred city" of Atargatis, the Asiatic goddess. The ruins are over 8,000 ft. in circumference, and there are distinctly to be traced the walls, gates, and citadel or acropolis, all marked by lofty ramparts of earth, the graves of fallen Carchemish. The city was bounded on two sides, the north-east and south-east, by the broad stream of the Euphrates, which washed the quays, now some distance from the water, owing to the rapid growth of the alluvial. The city was protected on the land side by lofty walls and gateways in the strong flanking towers. In many respects the site chosen is one admirably fitted to be occupied by a great city such as the Hittite capital was. The river affords a broad highway, down which passed the rich mineral and other products from the regions of the upper Euphrates. At Carchemish was gathered all the wealth of Syria, Phœnicia, and Asia Minor to be transmitted by the Euphrates to Babylon and the cities of the Chaldees. Here a mile or so south of the city is the ford where the caravan which passed to Nineveh and the cities of the Tigris crossed the stream, and from its position we can plainly see how fitted Carchemish was to be the emporium of Syria. Not only from the above considerations is the spot fixed on suited to be the seat of a great city. From a military and strategical point of view, few sites were better fitted to be the capital of a nation. Situated as it is on a promontory jutting out into the Euphrates, from its lofty Acropolis which towers a hundred feet above the water, an extensive view is obtained of the course of the river and of the country on either bank. An inspection of the ruins at once shows them to be the work of a people who were skilled not only in offen-

* See vol. xxxvi., p. 1161, "Syrian Archæology."

* There are contract tablets dated in the reigns of Eriaku (Arioch) and Kudur Lagamar (Chedorlaomer) in the British Museum.

sive but also in defensive warfare. The most important feature in the topography of the city is the mound-built Acropolis, which is on the north-east face of the city. It is interesting to find these mound-built citadels forming so important a feature in the topography of the Hittite cities, as we have long been familiar with them in the plains of Babylonia, where in every city they are to be found; and we may suppose that in both systems of building they had a similar origin. In Babylonia we know they were the work of the Akkadai or mountaineers, who, when they descended to the plains of Babylonia, built these lofty towers in remembrance of their mountain home, and there are many facts which lead us to assign a similar origin to the towers of the Hittites. Excavations on the sites of most ancient cities, such as Troy, Mycenæ, and others, have shown that, as in geology so in archæology, the *débris* is, to a certain extent, deposited in regular strata. We referred to this in a former article, and suggested that when explorations should be made on the site of the Hittite capital we should find ruins of many occupants. The city, whose foundation was probably as remote as that of Nineveh, has had for its occupants and possessors almost every one of the great nations of antiquity. Egyptian and Assyrian, Babylonian, Persian, Greek, and Roman, have planted their banners on the walls of the city, and each has "thrown down and dug up" the palaces and temples of his predecessors. It is, therefore, not surprising that we find the ruins of a most chaotic nature. Standing within the inclosure, the ruins can be described by no other term than "confusion on confusion heaped." Here an open excavation reveals to us the relics of the early Hittite founders, in quaint bas-reliefs; close adjacent are the bases of Roman and Greek columns, and the remains of an ancient Arab town cover a portion of the ruins. Amid such a sea of *débris* no plan can be traced with any degree of certainty, but, nevertheless, excavations have shown that through all disturbances, relics of the Hittites have been preserved to tell of those who, centuries ago, built on this spot the "city of Kemosh."

To pass now to the excavations which have been made, and to relics of the past which have been recovered. The chief and most extensive excavation has been made on the south-east face of the great mound, a short distance from the base, and within the *enceinte* of the city. Here the workmen have laid bare a long narrow corridor resembling those in the palaces at Nimrod uncovered by Sir Henry Layard. The portion uncovered is about 60 ft. long, and from 18 ft. to 20 ft. in width. It appears to have been a long flight of steps leading down from the palace mound to the city. The west wall can be distinctly traced by the plinth which remains, and on which some sculptures are still found *in situ*. The east wall has been destroyed, and many fragments of broken and crushed sculpture are found on that side of the excavation, but the line of the wall could not be traced. Near the southern extremity of this corridor a doorway is found in the line of the east wall which admits into a small chamber only partly excavated, in which is a fine sculpture standing on its plinth. Before proceeding to describe the sculptures found in these excavations, it will be necessary to say one word about the material used. In the majority of cases these Hittite sculptures and inscriptions are cut in hard black basalt, which has been brought from considerable distances. The stones bearing the so-called Hamathite characters, found at Hamah, the sculptures at Carchemish, with two exceptions, and the work at Tel Arjad, the ancient Arpad, as well as the Hittite remains at Eyuk in Galatia, are all cut in this hard stone. The cutting is of a peculiar character; it does not present an appearance of tooling, and there are but few marks of the chisel; the stone has a peculiar pulverised appearance. This is especially noticeable in the inscriptions which are cut in relief. As there are now examples of this sculpture in the British Museum, it may be of interest if they were examined by some expert, as they certainly exhibit a surface-working different to any yet seen. It is strange, indeed, to note this preference for the hardest material which is exhibited by the monument-makers of primitive nations. The Egyptians present us with the Sphinx carved out of solid granite, so hard that the best English tools turn upon it. The early Babylonians cut statues in black basalt and black granite of the hardest possible texture. The great statue of Gudea, one of the earliest kings of Babylon, whose date is probably nearly contemporary with the reign of the eleventh Egyptian dynasty, is carved in solid basalt, so hard that after more than four thousand years of wear hardly a character in the inscription is illegible. Among the sculptures at Carchemish are two cut in limestone, but there does not seem to be any difference in date of any great importance between the art periods of either class of sculpture.

The first sculpture to which we will direct attention is a large limestone bas-relief, measuring 9 ft. by 7 ft. 6 in. when perfect, but now unfortunately broken in half. The sculpture, when perfect, represented two figures,—deity, and an attendant priestess who adores or worships the goddess. We see here a very interesting tableau, evidently illustrative of the worship of the great goddess of Carchemish Dea Syria,—Atargatis or the Asiatic goddess. This is evidently the Hittite goddess whose name is given in the treaty between Rameses II. and the Kheta as "Astartha of the Kheta." The figure is nude, and full face to the spectator. The goddess wears the Hittite headdress, which consists of a lofty conical cap, the apex of which is decorated with a horned crescent, and in some cases with the solar disc in the centre of the crescent. From the shoulders rise a pair of wings. The hair is braided in two long plaits, and falls over the breasts and shoulders. The arms and hands are well carved, and the latter support the breasts of the goddess, which are represented as full. The face is much mutilated. The priestess who ministers to the goddess is represented as clad in a long kind of robe, which covers the head and the body, being confined at the waist by a girdle. This dress appears to have been the ordinary costume of the Syrian or Hittite women, as we find it frequently represented in the Assyrian sculptures.* The girdle which circles the waist is the most curious feature in the sculpture. It consists of two cords, or a double cord, which circles the waist, and is fastened behind. This was evidently the sacred cincture or girdle of the priestesses who were dedicated to the worship of the goddess. Both the priestess and goddess wear long locks and bracelets on the arms. The sculpture now recovered explains the source whence came the cult of the Asiatic goddess which the Greeks found established in Asia Minor, and which they identified with the worship of Artemis. The chief centre of this worship in classic times was Ephesus, where the Ephesian Artemis, Diana of the Ephesians, had her temple. It has long been known that originally the cult had its origin in Babylon, in the worship of Anat, or Anatis, the consort of Anu, the Babylonian Zeus. In her temple at Babylon we learn from both Greek† and Hebrew‡ writers that the women sat in the courts with cords about their waists, and burning bran,§ awaiting release by sacred prostitution from their vow to the mother goddess. It was this distinctive cord which we see worn by the priestess of the goddess here represented. Istar, "the goddess," was the daughter of Anat, and in time usurped many of the attributes of her Babylonian mother. Under the Assyrians, however, the worship of Istar received a mythology far more elaborate than either that of Istar of Babylon or Anat, and many of the stories which were current of the Phœnician Astarte and the Cyprian Venus were of Assyrian origin, and essentially related to Istar as the goddess of love and pleasure.

Still, however, we find Istar intimately relates to one important cycle of Babylonian legends, namely, the stories of the hero Gisdubar, of Nimrod. In her war against Gisdubar and the chieftains of Erech we have a proof that she was the soldier queen. In this character she appeared to Assurbanipal, and presented him with the sacred bow which was to lead him to defeat his enemies. Here she resembles very closely the Amazon queen, Omphale, the companion of Heracles. We now see, by this brief *résumé* of the myths of Istar and Anat, the importance which this Hittite sculpture receives, because, by its presence, we may consider that, as the worship of the Babylonian goddess came to Carchemish, so did many of the myths relating to her.

The question now arises, what historic connexion is there between the Hittites and the tribes of Asia Minor, which would lead us to assign to them the introduction of the worship of the Asiatic goddess into Asia Minor?

In the reign of Rameses II., the Sesostris of the Greek writers, a powerful confederation of Syrian and Western Asiatic tribes opposed the advance of the hosts of Egypt through the gateway of North Syria, the valley of the Orontes and Litany. From the Third Saltier Papyrus,* we gather an account of the great battle which took place near Kadesh, and ended in the total defeat of the allies. The papyrus also gives us a full catalogue of the forces of the Hittites and the allies. We have "the chief of the Airatu, the chief of the Masu, the chief of the Iruna, the chief of the Leku, the chief of the Tautani, the chief of the Kaskash, and the chief of the Kairkamash and the Khirahn, the allies of the Kheta all banded in one, 2,500 chariots"; and from other fragments we learn that there were the tribes of Patasu, Asi, and the land of Maton.† The researches of M. Lenormant and the Vicomte de Rouge have done much to identify the people who thus were allied against the Egyptian conqueror. We find the Arvadites (Airatu), the Mysians (Masu), the people of Ilion (Iruna),‡ the Lycians (Leka), the Dardani (Tautani§), the people of Asos (Asi‖), and Pedasos (Patasu), with the Matieni (Maten‖). These are the tribes which we see united with the Kheta, the people of Carchemish and Helbon (Khirabu). This identification would seem somewhat uncertain were it not substantiated by an interesting monumental discovery that proves the presence of the Hittites in Lydia, near Sardis. During a tour in Asia Minor last year, Professor Sayce saw on one of the pseudo Sesostris which are carved on the rocks in the woody pass of Karahel, on the road between Ephesus and Sardis, an inscription written in curious hieroglyphic characters. The inscription consists of seven characters, and of these seven six are to be found on the monuments from Carchemish. There are two of these figures, but on only one does the inscription remain. Herodotus records these statues, but the good and credulous old man seems to have confused his notes regarding them. He states with regard to the statues that he was unable to tell who had erected them until he came to Egypt, then all was made clear to him, and he assigned them to Sesostris. Oh, strange reversion of fact, when archæology now proves them to have been erected by the opponents of the mighty Egyptian, the vile Kheta or Hittites. A broken bas-relief of Hittite soldiers and a figure of an archer in the British Museum, all from Carchemish, furnish every detail of the statues at Karabel. The conical or Phrygian head-dress, the turned-up shoes, the short kirtle, and the peculiar form of bow, are all found in Carchemish sculptures. Thus on the very meeting-ground between Greek and Asiatic culture we find a statue of these Hittites, whose capital was one of the chief seats of worship of the Asiatic goddess.

From the classic writers we know that the Ephesian Artemis was represented as having many breasts, and to which were represented clinging lions, cows, stags, bees, and crabs. This was but an exaggerated form of the full-breasted "mother goddess" of Babylon, whose statue we find at Carchemish. Many statues of this goddess are found in Babylon, where they were deposited as *ex votos* in the temples of the goddess. The whole cultus of the worship of the "Asiatic goddess," or of the Ephesian Artemis, exhibits many peculiar features, all indicative of its non-Hellenic origin, but none are more striking than the strange construction of the hierarchy attached to the temple of the goddess.

From Pausanias¶ we learn that the chief priest attached to the temple of the Ephesian goddess had the title of Essen (Εσσήν) "the king bee," while the priestesses, the prototypes of the Amazons, had the title of Μέλισσαι, "the bees."

It is evident that this hierarchy was a sur-

* Botta, pl. 92, b.; and Layard's Mon. Nin., series 1.
† Herodotus.
‡ Baruch, c. vi. 43.
§ Theocritus states that burning bran was one of the love potents of the Greek women. Horace also refers to it as being a charm used by the Roman women.

* Translated by Professor Lushington in "Records of the Past," vol. ii., pp. 65–78, and Brugsch, Hist. Egypt, vol. ii., p. 53.
† Tribes on the east bank of the Halys.
‡ The pronunciation of l, n, and r in the hieroglyphic syllabary render this identification possible,—Iluna, or Iruna.
§ Dardanai, *ibid.*
‖ These tribes appear in the annals of Thothmes III.,—two centuries earlier.
¶ Pausanias, book viii., xiii.

vival from pre-Hellenic times, and we see that it has left its mark on the art of Ephesus, by the bee, as the sign on the coins of that city.* Many attempts have been made to explain the origin of this hierarchy and symbolism, but, until now, no satisfactory explanation has been afforded. The discovery of Hittite art and inscriptions as applicable to the early civilisation of Asia Minor has afforded us a solution.

It will be remembered that one of the most interesting, and, at the same time, most prolific classes of Western Asiatic art remains are the small engraved cylinder signet seals.† From Babylon, Nineveh, Phœnicia, and Cyprus we have obtained examples of this class of art-workmanship. Among the specimens of this work in the British Museum are some of Hittite persons, probably merchants trading in the marts of Assyria. In the possession of Signor Tomassini, at Aleppo, there are several very interesting specimens of this class of gems, and as these have been mostly obtained from Arabs and merchants in the locality, they are the more important.

The gems have been arranged in three classes, Babylonian and Assyrian, Phœnician, or composite. There is a class of these gems which exhibit a curious blending of the styles of art in vogue in both Egypt and Assyria. We find this incongruous fusion of the arts of two or more countries chiefly in the gems of Phœnician origin, and examples of these are found in most museums. Some very curious ones were discovered by Gen. di Cesnola in Cyprus. In this class of gems the skill of the artist would seem to have been employed to the utmost extent in producing as strange and *outré* a mixture as possible. In one case a Babylonian cylinder has been the basis, but Egyptian griffins and figures have been introduced into the scene, and by a process of conventionalising a cuneiform inscription has been turned into an artistic border. In another example an Egyptian inscription is treated in a similar manner. It has been usual to class all these complex or mixed style seals as the work of Phœnician artists, as we know they were in the habit of producing most bizarre fusions of styles to suit their patrons, as shown by the bronze bowls from Nineveh, Cyprus, and Palestrina. But some of the gems in Sig. Tomassini's collection exhibited symbols and forms not hitherto met with in their class, and thus furnished us with a new division. Several of the seals contained scenes illustrative of the adventures of the goddess Istar, the type of the Hittite Astartha. In one we see the goddess nude, with pendent locks and hands supporting the breasts, standing on the back of a couchant bull. She is placed in a species of shrine, above which is the winged solar disk; on either side stand a priest and priestess in adoration. The priestess is clad the same as the figure from Carchemish. She has the long locks, and the sacred girdle showing her dedication to the worship of the goddess. The figures here are almost exactly similar to those met with at Carchemish. We now pass to a second gem of Hittite origin. In this we have represented the adoration of the sacred tree,—the palm in Babylonia, the pine in Assyria and Syria. Here the tree is represented with the winged solar disk above it, and a group of attendant priests, priestesses, and worshippers attend it. The priest wears the lofty head-dress similar to that worn by the goddess at Carchemish, and by the Pseudo-Sesostris at Karabel. He has turned up shoes, and *is standing on the back of a bee.* It will be remembered that one of the forms of worship which the Asiatic goddess assumed was that of Cybele, whose worship, like that of the Ephesian Artemis, was of pre-Hellenic origin, and whose great temple was at Sardis. As the nature goddess, the Asiatic "mother goddess" had the tree for her symbol, and the early statues of the Ephesian goddess were the trunks of trees, and her shrine in the hollow tree; while Atys, the Phrygian and Lydian Adonis, who offended Cybele, was changed by her into a fir-tree. Again, we note that the early statues, or symbols, of Ashtaroth, the Sidonian goddess, were pillars of wood or trunks of trees. We therefore find here in the Hittite country a seal representing one important phase of the worship of the Asiatic goddess as current at Ephesus under the form of Artemis, and at Sardis as Cybele, while the symbol of her priesthood is that of the Hittite priesthood. The discovery of these art-remains opens up a new chapter in the art of pre-Hellenic Asia Minor, and throws new light on the discoveries at Troy and Mycenæ.

We are not going to review the war which has raged over the heads of Hera-Boopis and Athene Glankopis, but there are some points connected with the worship of the former on which these new-found Hittite antiquities throw additional light.

We have shown that the worship of the Asiatic goddess was a compound of the two systems of Anat and Istar, which had been blended by the Hittites into one, and those myths relating to either goddess became the property of the Asiatic goddess. Hera, the wife of Zeus, corresponds to the Babylonian Anat. In the war between the gods and the giants, when the former took the form of animals, Hera took the form of a white cow.*

When Istar waged her war against Gisdubar, the Babylonian Hercules, the father of giants, Anu and Anat created for her a bull which should destroy the hero.† In the gems, both Babylonian, Assyrian, and Hittite, we find Istar represented standing on the back of the sacred bull. In the temple of the Asiatic goddess at Eyuk, in Galatia,‡ the bull appears as a symbol. In Mycenæ, the seat of the worship of Hera, Dr. Schliemann has found a fine work of art in the head of a bull,§ and also a number of statuettes of Hera, with full breasts and a polos on the head. May not this worship have had its origin in the assignment of the bull as a symbol of Istar, and he a survival of the bull created for her by her mother Anat, the Babylonian Hera? At Ilion, again, the cow or bull-headed emblems of the Asiatic goddess were found by Dr. Schliemann. So it may be that the Iruna, or Inana, allies of the Kheta, may have borrowed the symbol from them. Among the objects of tribute received by Thothmes III. from the Kheta was a "silver vase in the shape of the head of a bull."

The stag, the emblem of Artemis, and, possibly, the descendant of the gazelle, which attends the Babylonian Istar, appears on the whorls found by Dr Schliemann at Troy, as does also the fir-branch pattern found on the robes and in the inscriptions from the Hittite country; while on the seal found by Dr. Schliemann, at Mycenæ, we have an interesting representation of a feature in the cult of the Asiatic goddess; but this will be best considered when, in another article, we deal with the questions of the introduction of these legends into Asia Minor.

On the data which have thus been gathered from the art-remains furnished us by explorations in Carchemish and other primitive cities, we may conclude that certain phases of Babylonian and Asiatic culture were communicated to the Greeks by other channels than the Phœnician,—by whom, and through what channels we hope to consider in our next article, which will form the continuation of this new Chapter in Art.

* Head's Coins of Ephesus.

† The cylinder seal was introduced in Egypt about the time of the 12th dynasty, and was probably of Asiatic origin.

* Ovid, Metam. v. 330.

† In the sixth legend or labour of the hero Gisdubar (W. A. I. iv., pl. 45).

‡ See Perrot and Guillaume, "Exploration de la Bithnye et de la Galatie."

§ The head discovered by Dr. Schliemann is undoubtedly that of a bull, not a cow.

A PATRICIAN VILLA.

Perhaps few more remarkable instances of the successful collaboration of the architect, the painter, and the sculptor,—a custom of the past too much neglected in the present day,—exist than is to be found in the Villa Barbaro in Venetia; for here the sister arts have all combined to produce that general effect which it should be the endeavour of every work of art to attain.

The Villa Barbaro is a building not unfamiliar to many members of the profession: it has more than once been cited as a specimen of the luxurious life led in the sixteenth century by the Venetian nobles; not a "villa" such as seems to be the ideal home striven at by successive generations of builders for the residence of equally successive and successful generations of honest *bourgeois*, but a villa many of whose practical features are worthy of consideration and adoption at a time when it is evident in every city that the number of persons who desire to live out of town is largely on the increase.

It is at no great distance from Venice, this villa of which we speak, and only a comfortable drive from the town from which we at present write, on the fine old high road which runs from here to Montebelluno, and so into the Venetian mountains, on whose southern slopes the villa is delightfully situated.

Nor is the approach less enchanting as one reaches the skirt of the plain and gradually ascends. When the visitor has left the gently-rising hill of the dark and now bare Montello, he spies in the distance, duly pointed out, the villa at Maser. It is a luscious country side, for here are the vineyards that produce the famous Rosolio, which the last generation held in such esteem. Soon appears, growing more and more distinct, the villa Giacomelli, the gardens, surrounded by their low walls, adorned with numerous statues, the hill-side covered with trees and vines, from which peep out here and there the white houses of the peasants, forming a landscape so varied that the mind and eye alike are charmed with the skilful union of nature and of art. In the midst of this ideal scene one is carried back in imagination to the period when Paul Veronese, Palladio, and the humbler, though no less gifted, Vittoria, aided by Marc Antonio Barbaro, were completing their united work. Andrea Palladio had drawn out the plans, had guided and inspected all the architectural portion of the work; Alessandro Vittoria had wielded his skilful chisel among the varied ornaments; and Paul Cagliari had beautified the walls with his master hand.

From the extraordinary pleiad of artists which Venice in the sixteenth century contained, Marc Antonio Barbaro and his brother Daniele, the patriarch of Aquileia, — that intensely Roman colony to whose past grandeur the modern town, or rather village, offers as striking a contrast as perhaps exists,—had chosen Paul Veronese, Palladio, and Vittoria to build and decorate for them a villa in the Venetian hills, and the work promised additionally to be a masterpiece of taste and design, for both the patriarch and his brother were fervent patrons of the arts; Daniele had, indeed, translated and commented on Vitruvius, while his brother Marc Antonio possessed no mean plastic powers.

The spot chosen for the erection of their villa by the brothers was on the southern slope of the last range of Venetian hills, the very range of gently undulating eminences on which the old town and castle of Asolo are situated.* It was a lovely spot, with the shallow blue Piave placidly flowing past on its way to the lagoons at no great distance, at the foot of the then well-wooded Montello, and slightly raised above the dead level of the great Trevisan plain. Here more than once the patriarch and his brother must have come to reconnoitre the future situation of their pleasant summer dwelling, in company with Palladio and Paul Veronese, whose handsome dogs gambolled round him, or followed the exciting scent of some frightened hare, disturbed in this then almost untouched solitude.

At length, after all due consideration, the site was settled, for no hasty affair was then the building of a house, and soon Palladio and his band of men were hard at work. Their first care completed,—the cutting in the hill-side (on which the site had been chosen) of a large step, so to speak, the height of the first story,—the house was built on this in such a manner that both stories had one side at least on a level with the ground, the first on the front, the second on the rear.

To the south, the sun darting his genial rays directly on the façade, the warmth and light were concentrated in the autumn days. To the north the shadow of the house was thrown upon the hill-side, protecting it from the sun, and here in the midst of the greenest and freshest grass plays the sparkle of the fountain, refreshing the whole air around. In this ingenious manner warmth was obtained on the cold days, and cool shade for the hotter; and so successfully has this intention been carried out, that while before the house rise, in summer, in all the varied and delicate shades of their green, the oleander, the olive, and the aloe, in the rear of the house prosper more than one retiring and shade-loving plant, and thick moss brightens the trunks of the dark green pines, wandering through which, by the paths winding amidst the overarching trees, one gradually ascends the mountain-slope, at whose summit lie stretched before one the superb panorama of the whole of the Venetian hills and the great plain far below.

* See *Builder*, vol. xxxvi., pp. 1166, 1259; and vol. xxxvii., p. 385.

Nature and art thus agreeably called upon to help each other, Palladio's next duty was the disposition of the interior in accordance with the varied needs of villa life, the apartments for the family, for the guests, for study, and for general gathering; then the arrangements for the out-houses, the kitchen, the pantries, the servants' rooms, the cellars, the granaries, the stables, and the hay-loft. Each was situated by Palladio's care with due regard to the requirements of all. Pure water from the mountain springs was conducted to the kitchen for domestic use, whence it was led partly for purposes of irrigation, partly to the well-stocked fish-pond. The principal building he extended in the form of a cross, so as to obtain a large room from which the whole panorama of mountain and plain scenery could be enjoyed. Externally an Ionic character was given to this; and flanked with two galleries, through which runs a long file of rooms; each gallery is terminated with a pigeon-cote, completing the design and harmonising with the whole, the charming occupants enlivening the scene by fluttering round in clouds or grouping cooing together on the cornices. Nor is the interior less grandiose than the exterior; the cruciform *sala* is lighted with ample windows, to the south overlooking the wide space of the plain, on the north looking on to the towering mountains; and a semicircle in the midst of which rises a Neptune's grotto and a fountain ornamented with various figures and *jets d'eau*, which play upon the flowers and grass around. At the same time as the villa, was erected the temple or church which meets the eye at the entrance, further decorated with fountain and statues, with festoons of flowers and fruit modelled and chiselled by the fantastic hand of Vittoria.

Palladio's work completed, his friend, Paul Veronese, came in to decorate the wall-spaces he had left him for his designs, and there we may imagine the figure of the painter of the "Marriage of Cana," on the simple scaffolding, with masterly decision, placing on the walls those superb colours which infused such life into the inventions of his genius. The magnificence of the Barbaro family, the sumptuousness of their dwelling, the criticisms of Palladio, Vittoria, and Marc Antonio, awoke in him all his best powers, and his facile brush peopled the walls of the villa at Maser with all the mythical personages of poetry, with loves and nymphs, and gods and goddesses, and flying Cupids perched upon the cornices, showering flowers heaped high in their rosy laps; overlooked by graver figures, Nobility, Power, Honour, and Magnificence, emblematical of the family of the Barbaro; Flora, Bacchus, Ceres, and Vertumna, representative of the products of the soil; the elements personified; and the rural arts, all ending to the joyous country life.

In the great *sala* are eight figures in various positions; these Count Algarotti has believed to represent the Muses, while between the columns may be seen, placed there as if by chance, lances and numerous other arms. From half-opened doors peep at one persons who seem alive. On the chimney-pieces, huge as furnaces, are heaped, in painting, various mythological groups; in each room new pictured marvels strike one, of that luxuriant taste which squandered magnificence on everything it touched or used; superb stuffs, scarlet velvets, golden cups, chiselled ewers, vases of perfumes, pearls, gems, flowers, fruits, and leaves adorning the hair, the bosom, and the arms of his lovely painted dames, resplendent in their decorous nudity. The painter loved contrasts, and he employed them with judicious skill, and more than once by the side of muscular heroes, with their rugged features, we see placed the graceful form of some pale goddess. But it was to the painting of the Olympus that he gave especial care, and here has introduced, with all the wealth of colour of which he was so profound a master, the most familiar of the numerous gods and goddesses.

While thus the architect, the decorator, and the sculptor were intent on their several portions of the work, the owner of the house, Marc Antonio Barbaro, was modelling the statues which were to figure in the fountain of Neptune; and when the evening sun set under the dark-blue haze of the horizon, in the direction of Padua and Vicenza, the workers met round the hospitable table of their host, and it is not difficult to imagine how the cultured wit flowed under the excitement of the honest wine of the hills, and more than one sharp Boccaccio-like jest must have waked the laughter of the group.

Many generations have passed away since those friends and professors met, till at length the gorgeous Villa Barbaro fell into the hands of the last Doge of Venice, the unfortunate if not guilty Ludovico Manin. Here this ruler of the already defunct republic enjoyed a few years of happiness; but after his death, the villa fell into hands, alas! unworthy of its possession. The abandoned home fell to pieces, the fountains played no more, the fire in the noble hearths died out. The loves and nymphs and all the gods of Olympus vanished under a thick veil of dust, and the descendants of Arachne, and Mahomet's kind spider friend, spun their magic nets across and over the beautiful cornices and statues; the squalor of neglect threw its curse over the abandoned house, and as the twilight descended, the bats flitted capriciously round the shades of Andrea, Paul and Alessandro, with their patron Marc Antonio, still sitting round the silent table.

But human vicissitudes are obliged to follow the stern laws of nature, and after the long darkness of ignorance broke the day-spring of appreciation. Signor Giacomelli purchased the Villa di Maser, and, making it his home, restored to his country and the world a precious jewel of the art of the new learning.

A new colony of artists met again at Maser; the dust and cobwebs disappeared, the gods of Olympus shone out again in all their glory, and in every part the villa was restored to its original freshness. Angelo Giacomelli, entrusted by his uncle with the supervision of the work, prevented any touch of Paul Veronese's hand from being injured, and the work was simply washed, re-appearing in all its original beauty, though mellowed, as one would say of ordinary pictures, but of frescoes, chastened by the patina of time.

Again the gardens shone with flowers, among which played the old fountains; the hills were planted with new vines, and the orchard resembled its description by Palladio, when it was "full of the most excellent fruits and various shrubs." The doves returned to their nests; again the welcome flame shot up in the old kitchen-fire; new artists sat round the table of the new proprietor in the room hallowed by the memories of their more famous predecessors, to whom they drank more than one toast, rendering homage to the intelligent generosity of those who employ nobly their wealth, restoring to works of genius their antique splendour, and thus causing to re-flourish those fine arts which act so potently in refining the manners of a nation, and in making life agreeable.

Treviso.

EMPLOYERS' LIABILITY AND WORKMEN'S SAFETY.

We have recently been silent on the subject of Employers' Liability. Our silence has been due, not to any undervaluing of the great importance of the question, nor yet to any hesitation as to the counsel we might have been able to offer, but to the fact that the discussion had passed into another arena than that of literature, and that one in which other considerations than those of calm reason were for the time but too likely to be predominant.

Now, however, that the strife of party has, for the moment, been brought, as far as regards legislation on this subject, to a close, and that a new departure is attempted by certain self-styled advocates of the interests of labour, without waiting to test the outcome of the change really effected in the law, silence is no longer needful, nor we think, altogether becoming. If the steady and wide-spread support which is given by so many members of the industrial classes to the *Builder* be a source of satisfaction to us, it imposes on us, at the same time, the weight of a great responsibility. And all the more confident do we feel that the disinterested, and we trust consistent, advice of an old friend will have more permanent weight with our industrial brothers than that of any violent advocate of extreme and one-sided courses.

The point now before us is the attempt made to induce the working-men so to deal with this new position as to make it only a step in a course that is based on the dangerous fallacy that the interest of the owner of live labour is opposed to that of the owner of stored-up labour; or that, in any trade, the interest of the workman is opposed to that of the employer, or should be urged without any regard to the effect it may have on that of the latter. Any counsel or any action based on this dangerous fallacy can only, as far as it has any effect at all, have an effect altogether disastrous.

In the discussions that have so widely taken place as to the mode of adjusting fairly the subject of the liability of the employer in case of injury to his servants, it has not, as far as we are aware, been brought forward with proper clearness that two totally distinct principles are involved in the question. These are, that of penal infliction, and that of compensation for injury. Each demands attention; but when the two are, as has hitherto been the case, jumbled together, it is little to be wondered at that accord between the different parties concerned has been found to be so difficult.

We are not of opinion that penal infliction is altogether an evil. On the contrary, although the cost to an employer of any serious catastrophe in his works is in itself a penalty for want of care, we think that the law cannot be altogether indifferent to the protection of human life and limb, and that its protection should be afforded to the workman, not only in giving him compensation for injury, but in directly punishing neglect. In the same way should that neglect be punished if it be that of the workman himself. Thus in any case of the conduct of large works under inadequate precautions, or with inadequate machinery, as well as in any case of disobedience to precautionary orders, we think penalty should follow. We would punish the owner of a mine who used a rope when it was no longer safe, just as we would punish a miner who unlocked a safety-lamp in a fiery mine. And we should rejoice to see an efficient penalty inflicted in each case, or in any similar case, entirely irrespective of the question whether any serious mischief did or did not ensue from an act of negligence or foolhardihood. And thus far, we think, the law should be penal.

On the other hand, as to the compensation that should be given in any case of injury to the sufferers, the question of penalty must be laid aside. Not, as we before said, absolutely; for it should be settled on its own merits. But as far as the provision of the compensation itself goes, the only question is, How shall it be made most easy, most adequate, most certain, and most just?

It is certain, whatever any one may say to the contrary, that all such compensation must ultimately come from one source,—the profits of the trade. From no other quarter is a penny to be expected, except from the ever-flowing and sometimes much-abused fountain of public charity. But the pension of the wounded, the widow, or the orphan; or the compensation,—whatever be its form,—to the sufferer by an explosion, or collision, or any other casualty, must come out of the profit of the business in which the sufferers are engaged.

This simple fact is overlooked by those who now hastily counsel workmen "not to consent to contract themselves out of liability." Such counsel is surely, in the first place, premature. It would be time to give it, if any proof were at hand that injustice is meditated. Above all, it is narrow and short-sighted, because it looks at only one portion of the question. It is based on that most false of all assumptions, that in any particular trade a certain quantity of work *must* be done, and that the workmen, by declining to work more than a certain time for a certain pay, can fix the price of their work. No view can be more Utopian, more idle, or more false. Insurance, some of the friends of the workman say, will be a tax upon wages. But the rate of wages will not depend on whether they are nominally taxed or not. The net wage,—that which the man will receive clear of all deductions,—will depend on two things, and, in the long run, on these alone. These are, the profit of the trade, and the relation between the labour offered and the labour supplied in order to carry it out. And these two elements must be regarded together, as influencing one another. If we look at one alone, we shall be liable to err. Thus regarded, it is certain, first, that any compensation to the workman must come out of the profits of the trade; and, secondly, that such compensation will be the fullest, and the most readily obtained, when it is charged and divided in the most regular and provident way upon those profits.

We are not now about to suggest in what manner this should be done. It is possible that different expedients may best suit different occupations. But it is to the solution of this important question that the best efforts of the ablest men in the different departments of our

productive industry should now be directed. In these efforts we should like to see the workman take an intelligent part. His hasty counsellors urge him either to take no part at all, or to take an unintelligent part. "Don't put a finger to the wheel," they say; "throw the whole onus on the masters. They are now liable; don't remove the liability from their shoulders." Can anything be more foolish? Can anything more surely tend to the ruin of a trade than the effort to throw as much stress as possible on one portion,—and only one portion,—of the machinery? Is there any difference in the solemn folly of the man who says, "Make capital bear all the risk," and that of the other who says, "Let the labourers look out for themselves?" If a trade has to be carried on at all, it will only be continued so long as it makes a certain profit. No one manufactures for the sake of manufacturing; no one,—for long together,—carries on a business only for the sake of paying so much wages. The moment the profit of a trade declines, the shoe begins to pinch all round. Interest on the capital falls, rate of wages falls; expenses contract themselves in one way or another, until either a living profit is made, or the trade is given up. Out of this living profit casualties have to be paid for. What may be the form in which the payment is made will matter little to the amount in the long run. The more certain be the mode adopted,—the less room for dispute or for litigation,—the better for the workman and the better for all parties.

Let us suppose the case of an exceptionally dangerous business,—say, a year or two hence. Let us imagine one employer who says, "I pay such and such wages, and in any case of accident on my works the men may take legal advice, and I shall do the same. I shall, of course, do my best to resist any claim on me, and I give you fair notice to that effect." Another employer says, "I pay such and such wages, out of which so and so is put by for an insurance fund, to which I contribute so much myself, and in any case of injury compensation will be made out of the fund at rates fixed and published." Can there be any doubt which employer would have the pick of his men? Whether the second would pay nominally higher or lower wages than the first would depend more on the anxiety of men for work than on anything else. The workman would feel certain in the one case, he would be quite at sea in the other. Bearing in mind the item of lawyers' bills, there can be little doubt that the second of the two supposed masters would be able to pay higher wages than the first, and that he would, at the same time, find men ready to come to him at lower wages. For the second business, in the long run, would pay only the ascertained and agreed cost of casualties. The first would have to pay, more or less accurately, for the cost of casualties; it would also have to pay the cost of fighting for the apportionment of the same; and it would be likely to have more casualties for which to pay in consequence of the less harmonious working of all the members of the establishment, as compared with that secured in the other case.

We say, then, to the working men, "Turn a deaf ear to those who, from whatever motives, advise you to meet the new law as to employers' liability in a narrow and antagonistic spirit. See what is proposed, ponder what is best, listen to the promptings of your own good sense and good feeling. But distrust all who would hound you on to an unreasoning and improvident hostility to whatever may be proposed in the common interests of your trade."

Artisans' Institute.—Technical classes for the practical and scientific instruction of apprentices and workmen in various trades, such as carpenters, joiners, bricklayers, masons, modellers, and metal-plate workers, will be opened on Oct. 4th, at 29, Castle-street, St. Martin's-lane. This is the seventh year during which the Institute has been in operation, and the special value of the instruction afforded has received increasing recognition from workmen, employers, and educationists. The City and Guilds of London Institute for Technical Education have given it their special support. Mr. Samuel Morley, M.P., Sir Harcourt Johnstone, M.P., and Mr. Hodgson Pratt are the trustees, the last-named acting as treasurer, with a general supervision over the management. Mr. C. T. Millis is the secretary, and information may be had from him at the Institute.

OLD LESSONS REVIEWED AND NEW LESSONS CONSIDERED.*

Sanitary science may be said to be both old and young. It is so old that we know nothing of its commencement, simply because we know nothing definite of the origin of the human race. The cave inhabitants were skilled in art; but at how distant a period they lived, or in what other respects they were skilled, we have little means of knowing; of this, however, we may be certain, that they would suffer from disease, and would use medicines and enchantments in some form to relieve their suffering.† At whatever period of this earth's history intelligent man appeared, diseases would afflict him; and when remedial measures were invented and applied, then *sanitary science commenced*.

There are problems in natural history which can only be speculative; as, the origin and constitution of matter; the origin of life; the origin of disease. The human intellect is powerless to fathom these profound mysteries, and if revelation is rejected, there can be nothing but a blank impenetrable darkness. There is minuteness below the search of the best microscope, and a range in magnitude very far beyond the combining power of the best telescope. One law alone is clear and certain, namely, the universal law of motion, which is change—combination and disintegration these never cease. That we call life or death pervades the universe; and the life of a system—sun and planets—though extended to millions upon millions of years, is, in the roll of eternity, no more than the life of an emmet, which is born and dies in a summer's day. As old systems perish, new systems replace them, to run their appointed course from birth to maturity, and from maturity to decay. I have neither time nor inclination to attempt to summarise ancient and modern theories as to ultimate atoms, if, or, if not, such exist; as, also, if or not, each atom is sensuous, and that, as a consequence, all bodies have developments of sensuousness in a degree—the combination of atoms in man developing sensuousness in the highest degree; matter combined in living forms other than animal life develops properties very like consciousness, as plants shrink from poisons, and, with apparent avidity, seek wholesome food, in this respect showing an intelligence superior to many forms of animal life. I, individually, should like to believe that plants can think.

But to the purport of this paper,—"Old Lessons in Sanitary Science Revived, and New Lessons Considered." The most reliable starting point I will take may be found in Leviticus xiv., beginning at the thirty-third verse, where the plague of leprosy is described afflicting the house. Without extracting the whole, the sanitary engineer will recognise "the walls with hollow strakes, greenish or reddish, which, in sight, are lower than the wall." Here is vividly described a tainted subsoil, wet and rotten with saturated filth. The modern remedy would be, entire removal of the tainted subsoil, to be replaced by lime concrete, removal of the tainted walls, underpinning with new material, and the introduction of a damp-proof course. Leprosy (or the equivalent of leprosy) affects houses at this day in all parts of the world inhabited by man, from European palaces to the hut of the Esquimaux.‡ In this malarrangement the savage fares better than the civilised man, as nomad tribes can leave a tainted site, whilst dwellers in villages, towns, and cities remain fixed on sites filth-tainted to supersaturation. Seeds of disease ripen in the polluted huts and houses of India, China, and Europe, and the North American cities have not escaped this general contamination. Australia and New Zealand have already polluted the sites of their cities to a dangerous extent, so that the mortality returns are no better than those of the old country.

In England we have apparently banished plague, which, however, prevails in the East,—Russia, Egypt, and the cities of Asia; but England has ripened the "*germs*" of cholera very recently, and typhus, typhoid, and other forms of fever commonly prevail. That these diseases can be prevented our model prisons bear witness, and modern sanitary works have also materially improved entire town communities. I have used the word "*germ*" as applicable to disease, without in the least being enabled to explain satisfactorily what is meant by it. That types of disease can be introduced and spread will be readily admitted; but that the origin, in each case, is a *germ* is not so easy of proof. It has been suggested that cholera must be conveyed to the human system in water; as, also, that tainted water and tainted milk produce typhus and scarlet fevers; and some say that fluids are necessary to the introduction of those forms of disease into the human system, periods of time being fixed for incubation. There are, however, some facts against this theory being received in its entirety; as, for instance, troops and travellers on the march into a virgin country previously unoccupied by man, develop these forms of disease much beyond the assigned period of incubation, and which, under the surrounding conditions, cannot be due to man-tainted earth, air, or water; so that the germ theory fails, unless we can imagine that germs of every form of disease which can afflict men or animals are as eternal as matter, and are dormant in matter until conditions for development are brought about. According to this idea, soil, water, and air, and every human body, must contain germs of every disease, but dormant, until brought into contact with conditions favourable for development.

The cleanest-looking places are not necessarily the safest. A clean looking country house or village, surrounded by pure air free from coal smoke, may have hidden dangers worse than any in a town. Visible dirt is not always the most dangerous, as the rain washes it, the wind blows over it, and the sun dries it. The presence of rats, either in country or in town, is a certain indication of danger, as rats live on garbage. They are usually diseased, and can convey the seeds of disease. It is not possible to predict, in all cases, as to what shall cause disease in excess in any given locality, as filth under peculiar and unknown modifications, or plus an unknown factor, may be sufficient to cause typhoid, without the so-called specific germ from a previous case. A telluric influence or an atmospheric influence, which we can neither control nor analyse, in combination with great elemental disturbances, may produce disease in excess. . . . . .

Past history has, for the most part, consisted of details of the birth, life, and death of kings, of their wars and conquests, with a very slight glimpse of the state of the people. In the future, true history will note and record the condition and doings of the people, as constituting the power of the state; but at present the world is very far from this condition. When in this age of general improvement in arts, manufactures, and commerce, we find Europe in arms to a greater extent than at any former period, and the people under a load of expenditure the heaviest in the world's history, thoughtful men must pause, wonder, and look for some practicable solution. The taxes now being levied and expended on soldiers, armaments, arms, and ammunition, would more than serve to abolish every city slum and wretched town tenement, admit of the re-arrangement of every city sewer, and pave every street, drain every house, provide a full supply of pure water at high pressure and constant service, and pay for daily scavenging. When history can detail these things as accomplished facts, it will be worth reading. Sanitary science is new, but it is not, as yet, popular. To remove filth, to promote health, and to prolong life, gain little of a statesman's notice in the battle of politics; the work has, however, commenced, and is being taken up, both at home and in our dependencies. The Americans are also becoming earnest sanitarians.

There are poverty, vice, and crime in Great Britain which, when contemplated in detail, are quite appalling; and these are the outcome of defective statesmanship,—and this after years of political freedom and so-called enlightened government. We sanitarians, however, hold that statesmanship which leaves the largest numerical mass of the population in hopeless misery must be defective. This condition of society is not a sound one; and, consequently, is not a safe one. To see the results of despotism and neglect in their most aggravated forms, we must, however, cast our mental vision over the empires of China and Russia, where millions of men know nothing of political and civil freedom,

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* From a paper by Mr. Robert Rawlinson, C.B., read at the Exeter Congress of the Sanitary Institute.

† There are dwellers in caves at this day in parts of Great Britain and Ireland, as, also, in other parts of the world,—probably as many as ever in any age occupied such places for residence.

‡ It may not be strictly proper to use the word "leprosy" as being common to houses; the meaning is, that houses are filth-tainted to an extent which causes rottenness capable of producing disease.

the results being civil commotione, rebellione and civil slaughter, wholesale arrests, wholesale condemnatione, wholesale transportations, and wholesale decapitations, which effect nothing worth the trouble. Because the wretched people have no cessation to their persecution, they exist in misery, and have no hope.

True sanitary science recognises the unit, men,—looks at the individual, the single family, the single house, the village, the town, and the city, as these constitute nations, and as are the individuals, so must be family, town, and nation. If, therefore, there is ignorance, wretchedness, and vice amongst the lower orders of the people, the leaven pervades the entire nation.

These questions may be termed political, and it may be said that sanitarians have nothing to do with politics. Our reply, if questioned as to this, must be that to govern men is the prime duty of a statesman. But what are the definitions of the word "govern"? To a deepot there is only one definition, and that is, repression; which implies every form of cruelty which man ever devised and practised. To a British statesman I hope it means to care for the whole people, to educate and protect them in all honest dealings, to repeal all laws which tend to the commission of crime, to abolish class legislation, and to know nothing of party if it leads to faction.

The domestic side of sanitary science deals with home comforts, and the unit in this case is the house, then the village and the town. Houses must be planned, constructed, and regulated to afford means of health and morality to the occupants. Villages and towns must be so arranged, built, sewered, paved, and scavenged, as to preserve the purity of the soil below and the air above for the benefit of the inhabitants. To secure such ends there must be sewers, drains, pavements, scavenging, and a water supply. Sewering is ancient beyond written records; sewering scientifically is, however, modern, very modern, as some of those who presided at the birth of the modern system of town sewering are happily now living. Edwin Chadwick, C.B., though not a civil engineer, has, through the aid of engineers, done more to found and promote the true principles of town sewering than any other single individual in this generation.

There were sewers and drains in the cities of Asia which are now heaps of ruins. As in these days, so then, where large areas were covered with buildings, and men were aggregated, there would be sewage; and this would be removed by open channels and covered conduits, necessity having been the mother of invention. These ancient cities were, however, not wholly sewered, but only partially. It is very easy to be positive on this point, namely, that sewers and drains were not general, as there are no remains beneath great areas covered by the common people, and the ruins of which would have been found if sewer and drain-pipes had ever been laid.

Rome sewered and drained her cities, public buildings, baths, and palaces from a very early period of her history, and the ruins are there to this day. Pliny describes sewers in some of his letters to the Emperor Trajan. There were not only sewers, but there was also river pollution. The great cloaca sewer of Rome emptied sewage into the Tiber; and Pliny directs the attention of the emperor to a case in a provincial city, where certain banished men resided, apparently living in ease and idleness. There were sewers in the district, and a polluted stream flowed through it, which had become a great nuisance, and was complained of by the inhabitants. Pliny, in this case, suggests that the idle, easy-living, banished men should be more fittingly punished by being made to cleanse the foul sewers, and for the future prevent river pollution. Trajan at once consents to so reasonable a proposition. These letters by Pliny are most interesting in showing how actively he performed his duties, and how minutely informed he kept the great Emperor.

At Sinope, on the Black Sea, money had been advanced to the municipality for a theatre. A bad site was, however, chosen,—a swamp,—and the building became a ruin before completion, and the money was wasted. Subsequently, a memorial was sent to Rome petitioning for money to construct waterworks. Pliny, in this case, cautions the emperor, and advises that, if the request is entertained favourably, an engineer be sent with the money, that the local authorities may not job it away, as in the case of the ruined theatre. I suppose the emperor did send an engineer, as, in 1855, I saw the ruins of the service reservoirs, which, but for man's destruction, would have been as entire as on the day of their completion, the walls now remaining being sound and massive as when first constructed.

The making of earthenware vessels by means of the potters' wheel is of very ancient date; and the work of the potter has, amidst all the ruins of ancient cities, been the most enduring. The vast collection of bricks, tiles, tablets, pipes, and vases placed in European museums testify to this fact. At some early period earthenware pipes were thrown on the potter's wheel, having sockets for jointing similar to those now made in England. I saw samples in Asia Minor, in 1855, evidently new. They were about 13 in. in length, and 5 in. internal diameter, having a socket of about $1\frac{1}{2}$ in. in depth. They were being laid at Kulali, situate on the Bosphorus, to form a conduit to bring water to the barrack hospital. The natives were at work laying the pipes on a contour line, a considerable length of trench being open. I did not at first see any arrangements for ventilation and wash-outs, and was questioning the engineer officer upon these points, as to whether or not they had been provided for, and making a rough diagram, scratching on the ground with a stick to illustrate my questions. The engineer officer could give no information; but one of the native workmen, who had been listening to and watching us, touched me on the shoulder, and, with a sparkling countenance, said "*bono, bono*," immediately taking me along the line of aqueduct, and pointed out the structural means I inquired about, both for ventilation and for wash-out.

Aqueduct making is a very old Eastern practice, aqueducts, fountains, and wells being common all over the inhabited parts of Asia. Water, as one of the elements necessary to life, was, in a warm climate, sought for and stored carefully. A very meagre history of springs and wells would form a large book, and might be as interesting as the most vivid romance. There are holy wells throughout Asia, and there are also holy wells and fairy wells in Europe, novelists having with great effect availed themselves of these superstitions, and woven them into their descriptions of supernatural phenomena. There is, in fact, an enormous amount of superstition, romance, and poetry connected with springs. Magical virtues are attributed to many waters, a belief in which leads to incalculable injury.

There are shrines in India within which are reputedly sacred waters, to be washed with, and to be drunk by the pilgrims to secure eternal salvation. On certain days in the year thousands of the natives assemble and encamp round these sacred shrines. The approach to the holy water is by a flight of marble steps, down which perspiring natives, many of whom are crippled and diseased, throng to have a cupful of the fluid. The practice is to pour a cupful over the head of each native, to flow back to the tank, and this hundreds of times repeated during the day, so that it ceases to be water and becomes a vile compound,—the washings from the bodies and feet of natives, and this horrible decoction the priests in attendance administer to be drunk by the poor besotted votaries. Cholera usually breaks out amongst the pilgrims at these gatherings, and it would be contrary to the known laws of sanitary science if it did not do so.

Recently there has very properly been a rage for water analyses, many thousands having been made in Great Britain and in British India, and very startling conditions have been revealed. Water which has been considered pure by the inhabitants of English towns has been found to contain a dangerous proportion of polluting matter, to the effects of which they appear to be stupidly apathetic; but the researches in India reveal a state of things almost too terrible to contemplate. The natives of India are expert diggers of wells and formers of tanks to supply and store water for use; they are also careless of life, committing suicide with apparent avidity, death by drowning being common. It had been observed that at certain Indian stations British soldiers were liable to be afflicted with virulent types of disease,—as cholera, fevers, and, at Delhi, carbuncles and sores, the Delhi sores having become a recognised affliction. Inspection was ordered, when it was found that within the province there had been about 1,700 carcasses of human beings removed from tanks and wells, the water from which had been regularly used for human consumption. Some of the worst wells were ordered to be cleansed, when many human bones were removed from them. The tanks in use are open, and the surrounding ground slopes towards the water; over the surface human excrement is spread, and the natives both wash clothes and bathe in the water they use for cooking and drinking. High caste apparently affords no protection, but acts in a contrary direction. Calcutta is supplied with filtered water, but high-caste natives decline to use it. A native water-carrier was observed filling his skin at a stand-pipe with filtered water, but when about three-parts filled, he went to the nearest puddle, and with his hands proceeded to fill his vessel. An Englishman, observing him, asked what he was doing, when he replied, "Making Ganges water for master."*

Some medical men state that pure water is absolutely necessary to health; others send their patients to drink the most abominable compounds at English and foreign spas. Pure water is a rarity in nature, and where it is found it must be protected with great care, as it is a powerful solvent and greedy of impurities. The solvent property of rain-water, which is the nearest approach in nature to pure water, is probably amongst all the elements the most powerful agent in moulding and disintegrating the solid earth. By way of illustration, the river Thames may be taken. The water of this river contains, in round numbers, about one ton of bicarbonate of lime in each million of gallons, when the water is clear, bright, and sparkingly transparent. The daily supply pumped into London is now about 135,000,000 of gallons, so that 135 tons of bicarbonate of lime is combined with the supply of each day's water, or upwards of 49,000 tons per annum. The average flow of water down the Thames may be taken as 1,000,000,000 gallons per day; so that about 365,000 tons of bicarbonate of lime is washed down per annum from the Thames alone. About four-fifths of the dry land of the earth contain lime, or are limestone, upon which this dissolving action of rain-water is unceasing; so that the whole of the solid earth above sea-level may be silently washed and wasted down into the great salt ocean. Soft water being so powerful a solvent, is economical for washing, but it is vapid for drinking, and it is liable to produce diarrhœa when peat-tainted. It has not been proven that hard water (hard as Thames water) is injurious to health: it has, however, been demonstrated that it is a great protection to health when it has to be brought into contact with metals,—lead, zinc, and some other substances. It is the duty of the sanitarian to obtain clean water, and to preserve it fresh, cool, and clean; but pure water,—in the full sense of the word "pure,"—I do not believe to be necessary to health,—as spring, stream, river, and well waters necessarily contain salts of the rocks they come into contact with, and these are the waters which are the most largely obtained in nature, and in by far the most cases can alone be obtained, and must, therefore, be accepted. Contaminated water must be dangerous, and should always be avoided. Contamination is not, however, the most dangerous when the water is most visibly polluted. The turbid waters of the Nile, in Egypt, and of the Ganges, in India, are taken for use in preference to all other water. These mighty rivers are, however, usually turbid, the suspended silt acting as a disinfectant.

The filthiest and most dangerous water to drink is well-water, human excreta tainted, which water may be clear and sparkling. Surface-water flowing down brooks and rivers, though visibly polluted, does not appear to be as injurious as tainted well-water, earth and air being purifiers of surface-water. Water, when included and stagnant, as in wells, pipes, or small unventilated tanks, and especially when affected by liquid or gaseous impurities, becomes stinking and unwholesome. In water-works the water to be impounded in reservoirs should be gathered from the cleanest possible sources, and should be preserved clean. Sand-filters should be close to the service-reservoire, which should be covered and fully ventilated. The supply from the reservoir and the supply-mains should be direct, and the mains should be so laid and connected as to produce continuous circulation, as water retained a long time dormant in "dead-ends" rapidly becomes deteriorated. The best water-supply will be one which secures the

* Great improvements have been made at stations throughout British India in improving and in guiding water-supply sources, both tanks and wells, to prevent pollution; these improvement works are now going on.

purest source, and by the works of storage and distribution preserves it the purest up to its delivery for use.

Bathing and washing are necessary to health, but there are many towns in Great Britain and Ireland without adequate means for bathing and washing; and, as a consequence, the people do not bathe and are not clean. Baths are common in better-class houses, though by no means as common as they should be. The "tub" is, however, used as a substitute. The poor cannot provide their own baths. These ought, therefore, to be provided for them by the municipal authorities in the best and cheapest form, and in the most convenient positions. With the baths should be wash-houses, where water, soap, and all the apparatus necessary for clean and rapid washing, drying, mangling, and ironing should be made available at the least practicable cost, and if sites are judiciously selected, and there is no extravagance in the construction and management, there need be no loss. But a small rate in aid, if required, will be a saving indirectly in promoting cleanliness, sobriety, and improved health.

A writer I have before quoted remarks that in Japan bath-houses exist in great numbers in the towns, where warm water is provided at a small cost. These baths are for the benefit of the poorer classes, who use them in great numbers; as regularly as evening comes crowds of Japanese men and women go to bathe. There are ranges of box-shelves where the clothes are placed, whilst the individual steps into the bath, emerges from it, well rubs the skin, dresses, and departs clean in person. In Great Britain, at this day, thousands upon thousands of the poor are never washed clean from their birth to their death, unless they go to prison or to the workhouse. There is no bathing accommodation provided. At all schools there should be baths, and complete washing should be a part of education, as those who are accustomed to regular personal washing in youth will not subsequently abandon it.

Sanitary science has, during the last half century, probably made most progress in England; but then this island is a very small spot on the globe; and even England,—free, rich, compact, and educated as it is,—only progresses slowly. It may, however, be interesting to this meeting to learn that there is an Association of Municipal and Sanitary Engineers and Surveyors to the number of 205, and that 197 towns and districts are represented by the members. The extent of work executed might be indicated by the make of earthenware pipes and other sanitary articles, if a reliable return could be obtained. The Messrs. Doulton are making about 1,300 miles of drain-pipes per annum, besides many thousand soil-pans; and this may be about one-tenth of the entire English make of sanitary articles. There is not time in a public address to deliver a closely-reasoned essay, and a popular address is not, I assume, expected to be other than discursive. The following remarks may interest the public, though they may not teach much to the educated engineer.

Sewers and Drains.

There are good and bad sewers and drains, and the public should know some of the reasons why this is so, and then they may refrain from condemning sanitary works in general. Sewers and drains have been formed which are so defective as to be a cause of serious nuisance: they are too large, have wide and flat bottoms, the materials are bad, and the construction worse. It is possible to damage a town by defective works, and so bring discredit on sanitary science. I will attempt to describe how a town ought to be sewered, and how houses ought to be drained, to fully answer the purposes intended. Correct plans and sections are required upon which to lay out the system of sewers and drains to be constructed; the depths of the cellars should be figured on the sites of houses; the relative levels of the streets may be indicated by contours, and on the sections the strata should be shown by colours. A careful engineer will test the strata by boring and trial holes. Full details how to lay out sewers in right lines, both on plan and in gradient, are given in the "Suggestions" published by the Local Government Board.

An engineer should settle at the commencement what duties the sewers will have to fulfil. If the town has manufactories consuming and polluting much water, the question may arise, if or not this polluted water is to be removed by the town sewers; there will also, in some cases, be a question of injurious fluids, such as tan-pit refuse and pickle-waste from brass-founders, lacquer manufacturers, and tin-plate workers; there are also dye waters, and soap-waste from woollen manufactories,—some of these fluids can be treated on the premises to precipitate the solids and disinfect and clarify the fluids, and, consequently, where there is no land available for sewage filtration, the manufacturers may reasonably be called upon to clarify their polluted liquids,—and not pass them in their crude state to the sewers. There are wet and dry subsoils. Sewage will, upon good gradients, flow to any point required by gravity; in other cases there may be a flat area with a wet subsoil, and a swamp for an outlet, or this may be below the river or sea level. In such cases pumping may have to be resorted to, and then it is desirable to reduce sewage to a minimum. The subsoil should have independent drainage, and the sewers and drains should be water-tight, surface water, including rainfall, being otherwise provided for.

To construct water-tight sewers and drains requires the best materials and the most careful workmanship, but these, indeed, are necessary under all conditions. In a wet subsoil land-water should be excluded; in a dry subsoil, the sewage should be prevented from leaking out of the sewers. In the foregoing remarks extreme cases of wet and dry are contemplated. If sewage has to be pumped, and has to be clarified by irrigation, the volume to be dealt with should as near as practicable be a constant quantity. If, however, there is a free outlet by gravity, the sewers may be allowed to partially receive both subsoil and surface water; only, however, to some known and limited extent. It is an advantage to have a wet sewer rather than a dry one. Sewage flows intermittently during portions of each day, when the inhabitants are using most water; if there is no subsoil water, the sewers at intervals may be comparatively dry, admitting of deposit. A steady continuous flow of water through sewers sufficient to maintain a regular current, and not more than a few inches in depth in the main sewers, will be an advantage. Main sewers should ordinarily be laid at a depth sufficient to admit of the deepest cellar being effectively drained, the invert of the branch drain being at the least 1 ft. below the cellar floor, the fall of the house-drain being not less than one in sixty, and entering the main sewers not lower than half its diameter. These remarks are of course general, and cannot in all cases be acted upon, as many towns have low sites which cannot be effectively sewered and drained without special means (air-valves) to prevent cellars being flooded by back-water from the sewers, or by special pumping. House drains, as a rule, should be outside the basements of the houses. But where houses are built in streets, and the kitchens are at the back, the drain must cross the basement, unless back drainage is adopted, when no drain need enter the basement. Much has been written and said both in favour of back-drainage and against it. I have had twenty years' experience of back-drainage, and know nothing but good of it. It has been said that it is an interference with the rights of private property; that the drains will choke, and then there must be trespass to find out the point of failure. My reply is that back-drains may be so laid that nothing but gross usage, amounting to wilful action, can choke them; and even in such a case they will be freed and cleansed without trespass, as manholes and flushing will enable them to be so cleansed. To enable sound sewers and drains to be constructed, the trenching must be true, and the bottom to receive sewer or drain must be absolutely sound and solid. There must be no mistake here, or the work will soon be a nuisance and a ruin. Sewers and drains may become broken-backed; then there will be leaking joints, or saturated subsoil, and a choked sewer or drain will bring discredit upon sewering. If the bottom of a sewer or drain-trench is not sound, it may be made so by cement concrete, and in loose wet quicksandy ground sewers and drains should be covered with concrete. Sewers and drains will work better, and be maintained in better order, if subjected to regular and properly-graduated flushing at short intervals. It is possible to overflush, and so injure the sewers. As much water as will give a velocity of about 6 ft. per second may be admitted; greater force, to give a quicker velocity, will be liable to injure brickwork, and blow or force open pipe joints.

Waterclosets and sinks should be against outer walls; should not have continuous flue-like connexions with the sewers, but have a severed connexion, and means for full external ventilation. Every public building, however large, and every house, however small, should be so drained as to afford no possibility of sewage-gases entering, and they should stand absolutely free from the sewers, though perfectly connected with them; this might be a law without any exception. At present almost every public building and house in London is in direct communication, by the drains, with the sewers, so that sewerage-gases pervade them; there are open sewer ventilators in the streets, which serve to dilute the sewage-gases, and the enormous number of houses perform a similar purpose, and it is this dilution which prevents the full amount of mischief from being experienced; but there is a danger in it, and this ought to be avoided. This is to be done by absolute isolation, and external ventilation above the roofs of the houses. In Leeds, for a population of 320,000, there are upwards of 20,000 openings from the sewers acting as ventilators, which have been in use more than seven years. This is an example other towns may follow with advantage. Perfect sewering requires perfect street-paving and perfect street-cleansing. Scavenging must, in all cases, be a work of the municipality, or other local governing body. Contract work should be avoided. The work of scavenging should be paid by rate, and this rate should be general.

Waterworks should, in all cases, be in the hands of the local governing body. The service should be constant and at high pressure, with fire-service provided for. Water should be laid on to every house and to every tenement; there should be no exception. The service-pipes may be of wrought iron, with screw joints, and all the taps should be "screw-down." If the services are taken within the houses and tenements, and the service is high-pressure and constant, there will not be much wilful wasting of water, and house-taps will not be stolen, as waste of water, when at high pressure, will be very disagreeable within a house. Fix stand-pipes in streets and roads, as is done now, and the waste will continue to be unceasing, because it will not inconvenience any one, as when it is within doors. The poor cannot have a full and fair use of water if it is alone obtainable from external stand-pipes, as this involves carrying and storing within the tenement. It should also be remembered that one gallon of water weighs 10 lb., and that fifty gallons weigh 500 lb., and this will be only ten gallons per head for a family of five persons. The labour required to carry 500 lb. of water each day, or eighty tons per annum, will simply be enormous, and ought not to be expected from the poor tenant. Serve the water within the house, have necessary supervision, and take charge of repairs; the inhabitants will then be properly supplied with water, and cannot easily waste it. Before closing these brief and imperfect remarks I may glance at a few works recently executed, or which are now in progress.

Calcutta has been partially sewered, Bombay is now in course of being sewered, and preparations are in progress for sewering and draining other Indian cities. Sewerage works at Berlin are also in progress, to be completed with sewage irrigation. Dantzig has been completed, with sewage irrigation added; and main sewerage plans are being prepared for other Continental cities. At Warsaw, with a population of 350,000, the estimate for sewers is 600,000*l*. Buda Pesth, population 270,000, main sewering under consideration. St. Petersburg, population 670,000, estimate for sewers 3,000,000*l*., to include pumping and sewage purification. Munich, population 250,000, estimate for sewering, 600,000*l*. Düsseldorf is to be sewered by Messrs. Liudley, of Frankfort. Messrs. Lindley have sewered Frankfort-on-the-Maine, population 125,000, cost 380,000*l*. Out of 6,800 houses, 5,200 have been completely drained, and in the town there are about 22,000 water-closets. At present, the sewage goes into the river Maine, but it is to be intercepted and clarified. The Prussian Government insists on sewage clarification, which, at present, is stopping sewering on the Rhine cities, where it is very much needed. The water of the Rhine is, however, used for domestic purposes by the population on its banks, and it ought, therefore, to be preserved free from sewage.

French and Belgian towns remain with cess-

pools; even Paris and Brussels, with their enormous and costly main intercepting sewers, are cities of cesspools, and I do not know of a single well-drained city in Italy. We are met here in this ancient city of Exeter to discuss sanitary science and preventive medicine, engineering and sanitary construction, meteorology and geology—to give information and to receive information on subjects which we consider to be of vital importance to each individual man, to each town, and to each nation; but when we read the current newspaper literature of the day, we seem as men beating the air. Statesmen pay very little attention to our subjects, but starve labour by conscription, impoverish populations by taxation, and, at enormous cost, provide the most refined and terrible weapons for human destruction. We are in the midst of a war *furore*, and sanitary works can have no solid and satisfactory progress under existing conditions. There is over the length and breadth of Europe a rampant military spirit; armies, armaments, ironclads, and 100-ton guns, attract most attention. The people are summoned from far to witness autumn manœuvres conducted by emperors, as if soldiers were the beginning and ending of human progress and civilisation. The Americans appear to be the only sane nation. The governments of the Old World are drunk with military ambition.

WOMAN AS A SANITARY REFORMER.*

Two of the wisest of men, and by necessity, therefore, both of them sanitarians, Solomon and Xenophon, have laid down rules bearing on the duties of women who rejoice in being called wives as well as women. "A good wife," says Solomon, "worketh willingly with her hands." "She is like the merchants' ships, she bringeth food from afar." She is an early riser, and sees that every one has an early breakfast. "She riseth while it is yet night, and giveth meat to her household, and a portion to her maidens." By exercise she strengthens her limbs. "She layeth her hands to the spindle, and her hands hold the distaff." She knows that where there is poverty there can be neither health nor happiness. "She stretcheth out her hands to the poor; yea, she reacheth forth her hand to the needy." She provides against the cold. "She is not afraid of the snow for her household; for all her household are clothed in scarlet." In clothing herself she combines artistic taste with usefulness, as every woman is bound to do. "She maketh herself covering of tapestry; her clothing is silk and purple." "She maketh also fine linen and selleth it." "Strength and honour are her clothing." She combines common sense with gentleness. "She openeth her mouth with wisdom; and in her tongue is the law of kindness." She is watchful and busy. "She looketh well to the ways of her household, and eateth not the bread of idleness." And these, says this wise sanitarian, are her rewards:—"She shall rejoice in time to come." "The heart of her husband doth safely trust in her." And, light of perfected happiness! "Her children rise up and call her blessed." The second of the wise sanitarians, Xenophon, tells his story of the good wife in somewhat different terms and manner, and indeed with difference also of detail. He makes Socrates and Critobulus hold a discussion which comes to this general understanding,—that the ordering of a household is the name of a science, and that the science becomes the order and the increase of the house. Socrates, the master, recounts to his pupil that he once held a communication with a man who, indeed, might be called a good and honest man. He had already seen and studied the works of good carpenters, good joiners, good painters, good sculptors, and had seen how they attained to excellence; and so he desired to find out how those who had repute for goodness and honour attained their excellency. He looked for such a one first amongst those who were handsome, but it would not do; for he found that many who had goodly bodies and fair visages had ungracious souls. Then he bethought him to look for a man who by general sentiment was reckoned upon as good, and at last he found Ischomachus, who was generally, both of man and of woman, of citizen and of stranger, called "the good." Socrates is made to discover Ischomachus sitting in the porch of a temple, and, discussing with him many subjects, asks him how it is he is called a good and honest man. At this Ischomachus laughs. "Why," he replies, "I am called good when you and others speak of me I cannot say. I only know that when I am required to pay money for taxes, priests, or subsidies, they call me Ischomachus; and indeed, Socrates, I do not always bide in my house, for my wife can order well enough whatever is wanted there." "And did you yourself bring your wife to this perfection," asks Socrates, "or did her father and mother teach her?" "As she was but fifteen when I married her," returns Ischomachus, "she had seen very little, heard very little, and spoken very little of the world; and therefore,"—he continues some way further on,—"I questioned, and then instructed her." "Methinks," says Ischomachus, "that the God hath caused nature to show plainly that a woman is born to take heed of all such things as should be done at home, and these are the reasons for the belief. He, the Maker, hath made man of body, heart and stomach, strong and mighty to suffer and endure heat and cold, or privation, to journey, and to go to the wars. Wherefore, He hath, in a manner, charged and commanded him with those things that he done abroad, and not of the house. He, also, remembering that He has ordained the woman to bring up young children, has made her far more tender in love towards her children than the man. And, whereas He has ordained that the woman should keep those things which the man getteth and bringeth home to her, and knowing also that to keep a thing safely it is not the worst point to be doubtful and fearful, He has dealt to her a great deal more fear than He did to man; while to man, who must defend himself and his own, He has dealt out more boldness. But because it behoveth that both men and women should alike give and receive, He has bestowed on them alike remembrance and diligence, so that it is hard to discern which of them has most of those qualities. He has, moreover, granted them indifferently, the power to refrain from doing that which is wrong, so that whatever either of them does better than the other is best for both; and because the natures and dispositions of them both are not equally perfect in all these things, they have so much the more need the one of the other; for that that the one lacketh the other hath. Likewise the law shows, and the God commands, that it is best for both to do their part. It is more correct for a woman to keep house than to walk abroad; and it is more shame for a man to remain skulking at home than to apply his mind to such things as must be done abroad." Some lessons of economy are first to hand. The wife is to have that that which should be spent in a twelvemonth be not spent in a month. The wool that is to be brought in is to be carded and spun, that cloth be made of it; and the corn that is brought in must be most carefully examined, that none which is musty and dirty be eaten as food. Above all, the same instruction that Solomon insists on is enforced with special fervour. The wife is to be most particular, if any of the servants fall sick, that she endeavour herself to do the best she can, not only to cherish them, but also to help that they may have their health restored to them. A little further on the Philosopher touches on the importance of perfect order in the house as connected with the health and wealth of it. From these lessons he teaches his wife, and thereby all wives, matters that are more particularly of a sanitary kind. A house, he says, has an ordination. It is not ordained to be gorgeously painted with divers fair pictures, though these may be excellent, but it is built for this purpose and consideration that it should be profitable and adaptable for those things that are in it, so that, as it were, it bids the owners to lay up everything that is in it in such place as is most meet for the things to be put. Therewith he disposeth of places for things in due form, and assigns the uses of the various parts of the establishment, in such manner that the woman who presides over the whole shall know the parts in a truly scientific way. The inner chamber or room, because it stands strongest of all, is to be the strong room in which the jewels, plate, and every precious thing in the belongings of the house must be securely located. The driest places are to be places for wheat; the highest places for such works and things as require light. The parlours and dining-places, well trimmed and dressed, are to be cool in summer and in winter warm. The situation of the house is to be towards the south, so that in winter the sun's light may fall favourably upon it, and in summer it may be in goodly shadow. The wearing apparel is to be divided into that intended for daily use, and that required for special or grand occasions. Everything belonging to separate service,—to the kitchen, the bakehouse, the bath-room,—is to be assigned to its own place and use. All instruments which the servants use daily are to be shown to the servants in their right places, and are to be kept there when they are not wanted. Such things as should not be made use of except on holydays and rare occasions are to be left in special charge of an upper servant, who should be instructed beyond the rest of the servants to observe the same rules as the mistress herself would carry out. "At last, good Socrates," said Ischomachus, "I did express to my wife that all these rules availed nothing unless she took diligent heed that everything might remain in perfect order. I taught her how in commonwealths, and in cities that were well ruled and ordered, it was not enough for the dwellers and citizens there to have good laws made for them, unless they chose men to have the oversight of those laws. In like manner, then, the woman should be, as it were, the overseer of the laws of the house as the Senate and the Council of Athens oversee and make proof of the men of arms." Finally, Ischomachus touches on the mode by which his wife should maintain her own health. He observed about her, as a very strange habit, that upon a time she had painted her face with a certain unguent that she might seem whiter than she was; and with another unguent that she might seem redder than she was; and that she had a pair of high shoes on her feet to make her seem taller than she was. Whereupon, "Tell me, good wife," said he, "whether you would judge me worthier or more beloved if I explained to you what we are precisely worth, keeping nothing secret from you, or if I deceived you by declaring I had more than I really had, showing you false money, chains of brass instead of gold, counterfeit precious stones, red instead of scarlet, and false purple instead of pure and good?" She replies, "The gods forbid that you should be such a one." He then recalled to her her own deceptions, and when she inquired how she should be fairer in reality, and not appear so only, he gave her as counsel, that she should not sit still like a slave or a bondwoman, but go about the house like a mistress, and see how the works of the house go forward; look after all the workers and sometimes work with her own hands, by which exercise she would have a better appetite for food, better health, and better favoured colour of her face. While likewise the sight of the mistress, more cleanlily and far better apparelled, setting her hand to work, and, as it were, striving at times with her servants who should do most, would be a great comfort to them by leading them to do their work with a good will instead of doing it against their will. For they that always stand still like queens in their majesty will be only judged of by those women who are triumphantly arrayed. "And, now, good Socrates," continued Ischomachus, in conclusion, "be you sure that my wife lives even as I have taught her, and as I have told to you." Good wives of the type of the wife of Ischomachus would, in one decade, make domestic sanitation the useful fashion and order of the nation they purified, beautified, and heatified. I quote this basis of wifely work and duty, because I feel more deeply, day by day, that until it is admitted, and something more built upon it, sanitary progress is a mere conceit, a word and a theory, instead of a thing and a practice. It is in those million centres we call the home that sanitary science must have its true birth. It is from those centres that the river of health must rise. We men may hold our congresses year after year, decade after decade; we may establish our schools; we may whip on our law-givers to action of certain kinds; we may be ever so earnest, ever so persistent, ever so clever; but we shall never move a step in a profitable direction until we carry the women with us heart and soul. Adam had no paradise in Paradise itself until Eve became the helpmeet for him. We ought not to blame woman-kind because it seems that women are behindhand in the work. They are not, in point of fact, behindhand at all; they are rather the forerunners in the race. Long before the word "sanitation" was heard of, or any other word that conveyed the idea of a science of health, the good, cleanly, thrifty housewife

* By Dr. B. W. Richardson. A lecture delivered in the Victoria Hall during the Exeter Congress of the Sanitary Institute.

was a practical sanitary reformer. Nay, if we come to the question of organisation itself, we have in this country, in that admirable Institution, the Ladies' Sanitary Association, the first of the great sanitary societies, which by its publications, its practical aid to mothers, its out-door recreative parties to the stived-up children of the metropolis, and by various other means, has set an example which will one day be historical as a part of the great movement in the promotion of which we are engaged. There is not, therefore, one single difficulty in the way of making the woman the active domestic health reformer. The only thing that requires to be put forward is the method of bringing her universally into the work, and, if I may so express it, making the work a permanent custom or fashion, to neglect which would be considered a moral defect. There are in England and Wales alone six millions to be influenced. The first suggestion is that the beginning of the crusade shall be a beginning that shall not drive, but lead; that shall not dictate, but patiently suggest.

"Women should ne'er be taught a thing unknown,
It should be credited as all their own."

Nor can any finer or nobler occupation be imagined than is implied under this head of domestic care and nourishment of health. There are women who think it the height of human ambition to be considered carers of human maladies, content at best to take their place with the rank-and-file of the army of medicine, and not perceiving that the only feature in their career is its singularity,—a feature that would itself become lost if the wish of the few became the will of the many. I press this office for the prevention of disease on womankind, not simply because they can carry it out; not simply because it pertains to what Xenophon describes as their special attributes, their watchfulness, and their love; but because it is an office which man never can carry out; and because the whole work of prevention waits and waits until the woman takes it up and makes it hers. The man is abroad, the disease threatens the home, and the woman is at the threatened spot. Who is to stop it at the door, the man or the woman? The house is her citadel. The majority of women will ask hy what process of training can we help towards a triumph of science so beneficent? I devote myself from this point of my discourse to give some answer to that question.*

THE ROADWAY OF THE THAMES EMBANKMENT, AND THE NEW CITY OF LONDON SCHOOLS.

Simultaneously with the commencement of the works on the site of the intended new City of London Schools, on the Thames Embankment, the Metropolitan Board of Works are at present constructing the additional width of roadway which is to be thrown into the Embankment for some distance westward of the Royal Hotel. The roadway will be widened to the extent of about 20 ft. at the western boundary of the hotel, gradnally tapering along the Embankment to the extent of about 180 ft., until the curve, at that distance, works itself ont into the present footway of the Embankment. The widened roadway is being formed on the strip of land adjoining the Embankment, immediately in front of what will be the boundary-wall of the new school gronnds. It will rest on a series of piers and walls, or arches, erected upon the walls and arches of the Metropolitan District Railway, which rnns immediately under it about as far as the hotel, as the railway is carried nnder and across New Bridge-street, Blackfriars. There will be twelve of these piers and vaults, besides a number of wider openings near the hotel, of a special construction. Several of the piers have already been erected, and the roadway will shortly be completed, and the new wall dividing it from the gronnds of the City of London Schools built, but it is not expected to he opened for public traffic until the long-standing dispute between Mr. De Keyser and the Corporation has been settled, and the unsightly hoarding in front of the hotel removed. The roadway is being constructed by Mr. Webster, under the superintendence of Mr. Rowell, as clerk of the works.

Messrs. Hill & Higgs, the contractors for the foundations of the City of London Schools, are actively proceeding with this preliminary portion of the works. The greater portion of the excavations at the west side of the site have already been got out, and a considerable area of the concrete foundations has been laid. Several hundred cubic yards of earth work have been removed, and shipped away in barges from the wharf immediately under Blackfriars Bridge, the tramway under the Embankment, between the old gasworks and the banks of the river, having been utilised for the purpose; it is likewise used for conveying the concrete materials to the site.

* The conclusion in our next.

THE BEDFORDBURY AND GREAT WILD-STREET IMPROVEMENTS.

NEW PEABODY BUILDINGS.

A large portion of the two areas lately cleared in the neighbonrhoods of Bedfordbury and Drury-lane, and known as the Bedfordbury and Great Wild-street improvement schemes, will shortly be covered with new blocks of industrial dwellings, erected by the Peabody trustees, who have taken possession of the land and are now proceeding with the buildings. The making of the new and widened street in Bedfordbury, between Chandos-street and New-street, has for some time been in progress, and is now nearly completed, the greater portion of the paving and curbing having been laid. The sewerage of the street was one of the heaviest portions of the work. The thoroughfare is now nearly double its former width, the carriage-way, exclusive of the foot-paths, being 30 ft. wide. We understand that upon the site, which until recently was occupied by narrow confined alleys and repulsive hovels, of which we gave particulars long ago, there will he four blocks of industrial dwellings extending the greater part of the distance between Chandos-street and New-street, nearly the whole of the east side of Bedfordbury heing ocenpied by the west walls of the several blocks, one of which is already in an advanced state. Messrs. Cubitt & Co. are the contractors. Similar blocks of buildings are likewise in course of erection on the extensive area lying between Drnry-lane and Great Wild-street, where such a large number of old and dilapidated dwellings were some time ago demolished. The buildings will extend from east to west between Great Wild-street and Drury-lane, and the foundations of the several blocks are now being got in. When completed the buildings on the two sites will contain a very large number of tenements, having accommodation, it is stated, for a population of more than 3,000 persons.

NEW PANORAMA BUILDINGS IN LEICESTER-SQUARE.

A large circular building is at present in course of erection at the rear of the north side of Leicester-sqnare, a site long unoccupied, immediately opposite the gardens, and between Leicester-street and Leicester-place, which is intended for panoramic purposes. It is designated the "Royal Panorama," and will shortly be opened for exhibitions of this character. The architect of the building is M. L. Dumoulin, of Paris, Messrs. Cubitt & Co. being the contractors. The building is covered in, and nearly ready for occupation. It is lighted from the top of the dome. Tho principal entrance will he along a wide corridor, approached from the Square.

THE BUILDING TRADE IN GLASGOW.

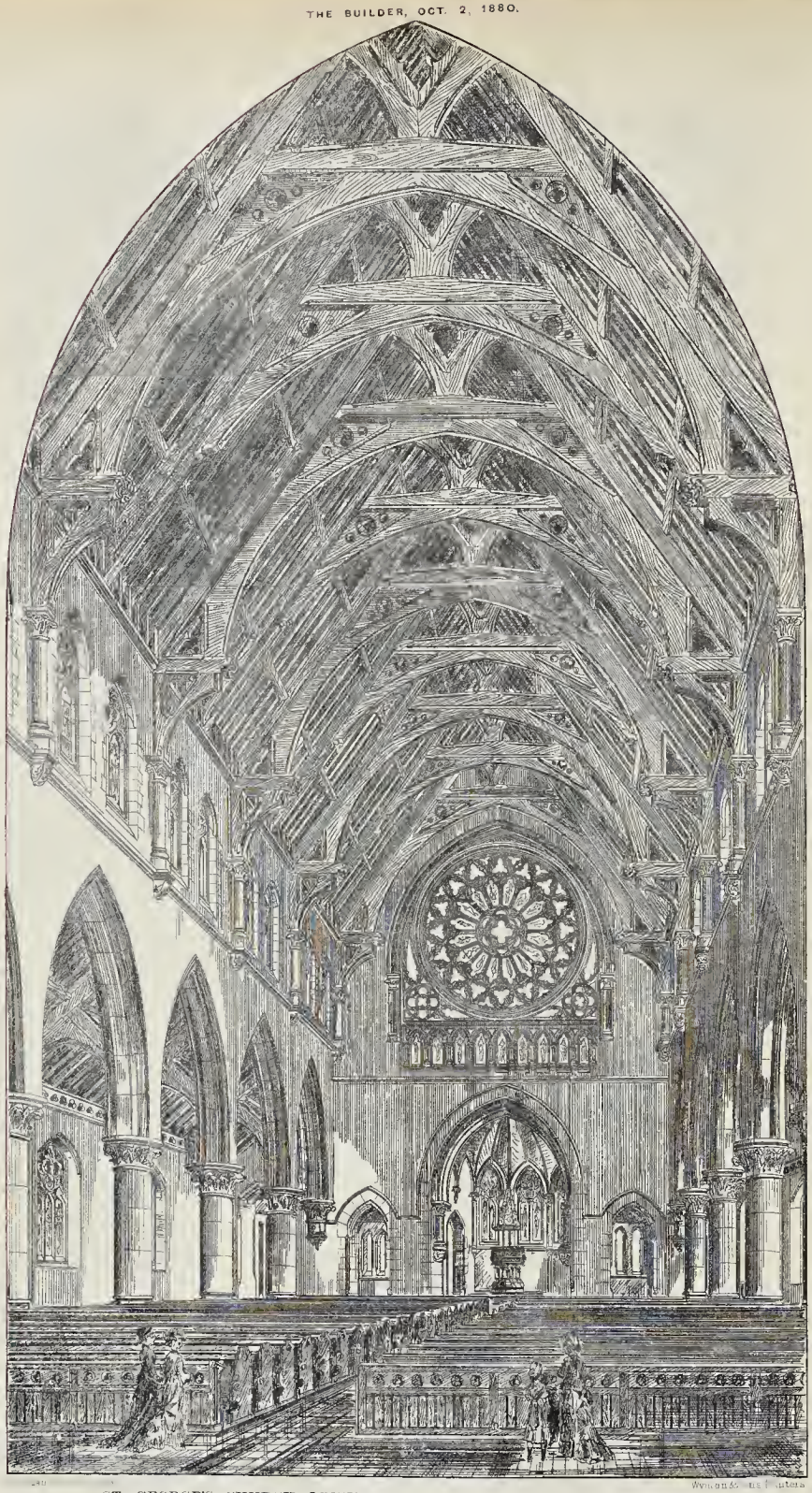
The statistics which Lord Dean of Guild Mirrlees, of Glasgow, gave in his annual statement last week present a fair idea of the poverty of the building trade in the commercial metropolis in Scotland during the past three years. The trade had had a long spell of prosperity, which was not in any sense diminished by the passing of the School Board Act. But too much prosperity is often a had thing, and so it proved in the building trades. Tho success of ono man pnt another on the *qui vive;* and in a very short time a building mania commenced in Glasgow, and lasted for several years. Even Edinburgh people, who have no reputation for money-making qualities, joinod in the speculation, and helped the builders of the West on to temporary ruin. Glasgow got over-built, and one adverse circumstance after another, crowned by the City Bank failure, brought about a complete collapse at the end of 1876 and the beginning of 1877. Rents havo fallen, and in some instances undertakings, commenced years ago, are not yet completed. But for a few public buildings, the trade, indeed, has been almost at a standstill, and there is no sign at present of a revival. In every corner of the city there are numerous blocks of empty honses, and in somo parts of the suburbs complete rows of shops are untenanted. We get at the facts by consulting the Dean of Guild Court's figures. Mr. Mirrlees makes out that the last was the worst of the three years of depression, Two years ago the estimated value of the buildings for which "linings" were granted was 755,717*l.*; while last year it was 431,970, and this year, 355,430*l.* The average of these three years came to 514,000*l.*, whereas the average of the five years preceding came to 1,612,000*l.* In other words, the entire value of the building operations in Glasgow, during the last three years, did not come np to the average of a single year of the five years preceding that time. These figures have a deep significance, and though Mr. Mirrlees is uncertain as to the cause of the great falling off, there can be no question that speculative building by non-capitalists, backed up as these gentlemen too often were by legal firms, had a great deal to do with the state of chaos into which everything fell. The greatest diminution during the past three years has been in the rearing of shops,—a now too common commodity in Glasgow; and next come houses for the working-classes. We hope for a revival in the building trade as well as other trades, but we are afraid some time must elapse before there can be room for any great impetus. A curious fact is that, ahout two years ago, more than a half of the debtors in Glasgow prison had been connected with building speculation, and a significant fact was that the great majority were the builders themselves.

THE PUSCHKIN MONUMENT, MOSCOW.

The monument erected in memory of Paschkin, the well-known Russian poet, which was unveiled not long ago hefore a vast concourse of spectators, is after the model of the Academician Opekuschin. The bronze figure,—the head slightly inclined forward, the features lighted up hy a scarcely perceptible smile of sadness which plays round the half-opened lips, the right hand hidden in the breast, while the left holds behind the back a wideawake hat,—stands npon a pedestal of polished red and dark grey granite, rising 18 ft. above the pavement. Besides festoons, which wind round the base, the latter is adorned hy a laurel wreath, with a pen, round which a ribhon is twisted. The front of the monument bears but one word, "Puschkin"; the hack has the inscription, "Erected 1880." The total cost of the monument is said to have been 83,000 roubles.

The Black-hole of Hammersmith.—Dr. Hardwicke, the coroner, has properly directed the attention of the Fulham District Board to the rider to the verdict of a jury on the body of Matilda Marchant, who had died in Clerkenwell prison after being confined in the cells of Hammersmith Police Court. The rider was to the effect that the Medical Officer of Health for the district should be requested to inspect the cells. Dr. Collier reported that he had complied with the request, and had also inspected the Police Court. He said—"It appears that the woman Marchant was retained in the police cells at a time when some sanitary alterations were heing carried out; but I cannot say whether she contracted the fever of which she died at that time. There are only five cells for the reception of all the prisoners taken to the Court. Each cell contains an area of 481 cubic feet, which is not more than sufficient accommodation for two persons, whereas as many as eight prisoners are at times confined in a cell. There is literally no ventilation except a small iron grating over the door, which is quite inadequate for the purpose. With eight persons confined in a cell, there would be only 96 cubic feet of air space for each prisoner. . . . . There is an apartment termed the 'strong room.' It contains an area of 6,655 cubic feet. It is used at times for the reception of as many as 94 prisoners and 60 constables. This gives only 79 cubic feet of air-space to each person. Such an amount of overcrowding is highly prejudicial to health. The Court itself is quite inadequate for the purpose for which it is used."

THE PUSCHKIN MONUMENT, MOSCOW.—M. Opekuschin, Sculptor.



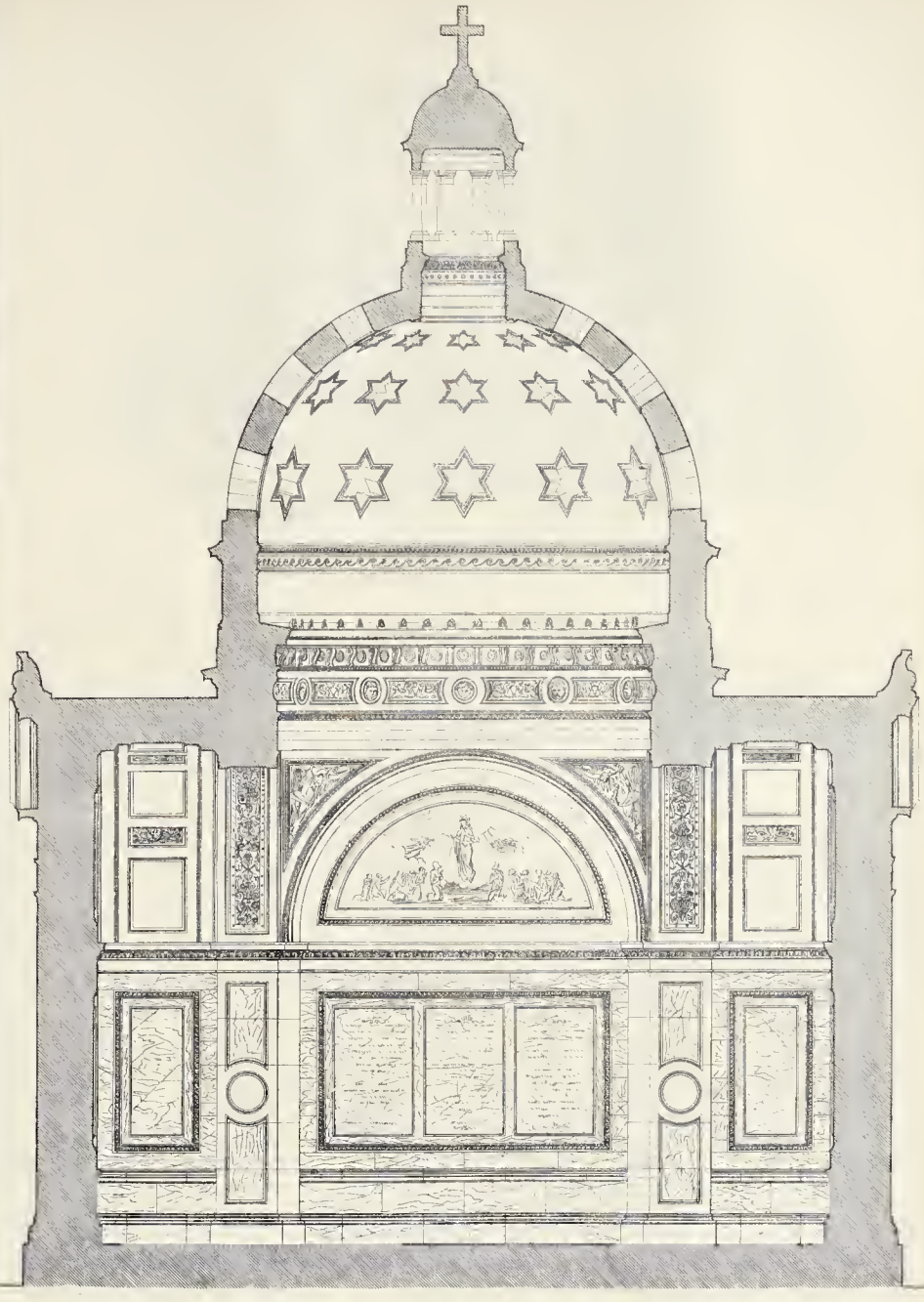
ST. GEORGE'S CHURCH, LEWISHAM: INTERIOR VIEW, LOOKING WEST.

THE BUILDER, OCT. 2, 1880

View of West End

View of East End

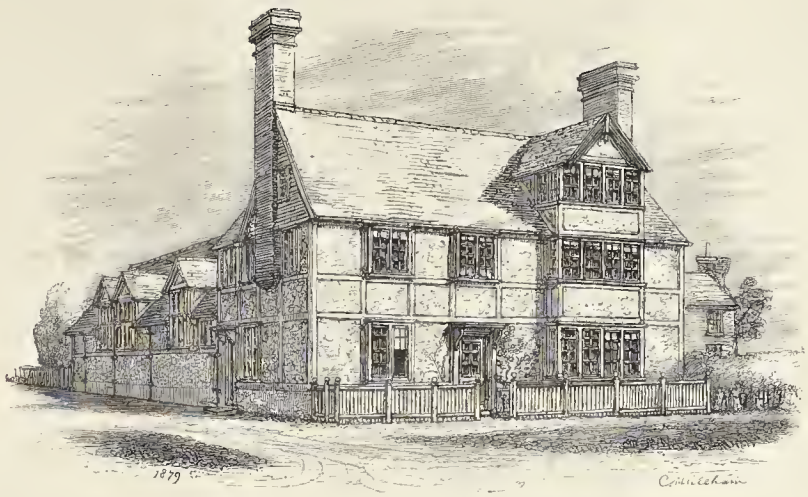
Wyman & Co. Printers, Queen's



THE MAUSOLEUM AT WINDLESTONE HALL, DURHAM: SECTION.

Mr. J. Dick Peddie, Architect.

Whiteman & Bass *Photo Litho* 236, High Holborn



ALL SAINTS', HIGHGATE: NEW MISSION HOUSE.

CHURCH OF ST. GEORGE, PERRY-HILL, LEWISHAM, KENT.

This church was consecrated early in the present year, and was erected at the sole cost of the patron, Mr. George Parker, J.P., of Lewisham House. The tower is about to be raised, and the exterior views show it as it will then appear. The cost of this will be defrayed by Mr. Parker, thus making the total outlay about 9,000*l*. The church consists of a nave 85 ft. in length, with clearstory of two-light windows in couples, and north and south aisles, with a three-light traceried window in each bay; these are divided from the nave by piers and moulded arcades, the pier-columns being of red Mansfield stone, and the bases and caps moulded and carved. The seating for the congregation in the nave and aisles is of yellow deal, and will accommodate about 600 persons. The choir and clergy seats in the chancel are of oak.

The baptistery is placed at the west end of the nave, and is an octagonal apse in plan, with a two-light traceried window in each bay, and wooden groined and ribbed roof, with a moulded arch leading to the vestibules on either side, communicating with the inner and outer porches on the north and south sides of the west front, and these latter communicate with the nave and aisles, and, together with the somewhat unusual treatment of the circular west window, produce an original effect. The arms of the patron, and a figure of St. George and the Dragon, are carved in vesicas in the porch gables.

The font is thus placed at the extreme west, and immediately opposite to the Communion-table. It is formed of Caen stone, enriched with marble shafts and jewels, with carved caps and emblems.

The pulpit is placed on the north side of the chancel-arch, and is also of Caen stone, arcaded, and with marble shafts, with a figure of St. George and the Dragon in a central niche.

The chancel is 40 ft. in length, and the same width as the nave, viz., 27 ft. 6 in., and is multi-angular at end in plan, with timber-groined roof, supported on marble shafts, with symbolical carving in the caps. It is approached from the nave by three steps, with four additional steps to the sacrarium, including the altar-pace. In the north wall is a credence, and in the south wall a sedilia.

The vestries are spacious, and are placed upon the south side of the chancel, that for the choir communicating with the south aisle, and the other with the chancel. The clergy vestry contains a piscina.

On the north side of the chancel is placed the organ-chamber, with furnace-room beneath, and tower rising above it to a height of about 90 ft. (when completed), with a pinnacle at each angle; that over the belfry-stairs rising to a further height of about 33 ft.

The outer walls are faced with Kentish rag-stone, laid in horizontal, though drop courses, the dressings being in Bath stone. The style adopted is early fourteenth-century English Gothic, and is consistently embellished. The builder is Mr. B. E. Nightingale, of Albert Embankment. The architect is Mr. William C. Banks, of Gracechurch-street, London. The tile paving was executed by Messrs. Hawes & Co. Mr. Robert Smith executed the pulpit and font, and Messrs. C. P. Kinnell & Co. supplied the heating apparatus. Some stained-glass windows have been set up in the church by Messrs. Lavers, Barrand, & Westlake.

MAUSOLEUM, WINDLESTONE HALL, DURHAM.

We give a sectional view of the Mausoleum which has been erected at Windlestone Hall from the designs of Mr. J. Dick Peddie, architect. The dome is supported by deeply recessed arches, and the whole light comes from the lantern and the piercings in the dome. The upper portion of the recesses is intended to be decorated with wall-paintings or mosiacs, the space below being reserved for mural monuments. The mason was Mr. Jas. Harkness, and the cost about 3,400*l*.

ALL SAINTS', HIGHGATE: NEW MISSION HOUSE.

The woodcut shows the view from the North Hill of the new Mission House for the district of All Saints, Highgate, which was dedicated by the Bishop of Bedford on July 21st of this year. Hitherto the work of the mission has been carried on in a small hired house, which for some time past had proved insufficient for the purpose. The work of the sisters in charge is to visit the sick and poor, and to dispense all the relief required in the district. Classes and guild meetings are also held here under the direction of the sister in charge, and the vicar, the Rev. Edgar Smith. Here is also a small convalescent ward for children either from the neighbourhood, or from poor parishes in London. The one-story building at the back is not yet built; it is intended for an assembly-room to be used for guild and parochial meetings, Sunday-school, &c., its place being at present occupied by a temporary building, which has long been used for these purposes.

The house contains, on the ground-floor, a sister's sitting-room, common-room, waiting-lobby, kitchen, scullery (fitted with soup-boiling apparatus, &c.), pantry, larder, stores, and other offices; on the first floor an oratory, four bed-rooms, and water-closet; and above, a small convalescent ward and dayroom for children, with nurses' room and lavatory.

The walls are of stock brickwork, faced throughout externally with Portland cement rendering and rough-cast panels and smooth margins. The plinth and chimney being of red brick, and the roofs tiled. The whole has been substantially built at a cost of about 1,300*l*. by Mr. Wheeler, of Highgate, from the designs of Mr. C. H. M. Mileham, of Gower-street, London.

SIR JOSIAH MASON.

AN ENCOURAGING CAREER.

The Josiah Mason College in Birmingham, of which we have before now given some particulars, will have been opened for work when this reaches our readers, and in a succeeding number we shall show what the building is like. In the mean time, a Birmingham correspondent sends us a sketch of the founder's remarkable career, the perusal of which may give heart to many a struggling brother. The moral of it is, Persevere.

Josiah Mason was the son of a journeyman carpet-weaver at Kidderminster, whose wife eked out the slender resources of the family by keeping a small shop, and by making and baking tea-cakes, in which art she possessed much skill. Josiah's first employment was assisting his mother in the shop and carrying round the cakes morning and afternoon to the houses of his mother's customers. The school-teaching he had was but slender, but it was supplemented by his mother's wise teaching and by the instruction he received in a Wesleyan Sunday-school, at which he was a regular attendant. When of sufficient age he became a Sunday-school teacher, and it was at this time that his peculiar mental acuteness of perception and his manipulative skill were first manifested. Writing was taught in connexion with the schools, and of course in those days the writing had to be done with quill pens. The attrition of the pen

and paper soon made the points of quill pens so blunt and rough that fair and good caligraphy required that the pens should be frequently "mended." This was an operation that few persons could manage successfully, but Josiah Mason soon became noted as a skilful pen-mender. So much was this the case that the pens from all the Wesleyan schools for miles round were sent regularly to Kidderminster for "Si" Mason to mend.

Josiah Mason's earliest mechanical employment was as a shoemaker, in which trade he acquired some skill, and in which he embarked in business on his own account while still a mere boy. For some reason, he abandoned this occupation and came to Birmingham at seventeen years of age in search of something different. He does not appear to have been successful, for he returned to Kidderminster and worked as a carpet-weaver for a year or two. He finally threw up that trade also, and came again in search of fortune to Birmingham, being then about twenty-one or twenty-two years of age.

At first Mason seems to have been singularly unfortunate in his endeavours to obtain employment. At length, however, he was engaged as a labourer at the Bagot-street Glassworks, where he was employed for some months wheeling-in coals and emptying the "caves," or tunnels under the furnaces, of ashes. Although employed in this menial capacity, he kept himself respectable, and having made the acquaintance of the daughter of one of the book-keepers of the establishment, he married her, and commenced housekeeping in one of a row of small houses, still standing, opposite the old glasshouse in Bagot-street.

Opportunity shortly offering, he left this uncongenial employment and worked at the gilt-toy making. Here his acute powers of observation, his delicacy of touch, and his manipulative skill, soon made him a superior workman, enabling him to earn good wages, and to make his little home comfortable. But after a time there came a period of commercial stagnation and a coincident change of fashion, so that Josiah Mason, in spite of his great skill, could get nothing to do, and became almost penniless. Wandering one day in a listless manner, a thought of his earlier days occurred to him, and he remembered his mother's skill in making tea-cakes. Going home and addressing his wife by the familiar name of "Tet," he asked "What coppers she could raise." Between them they "raised" 9d., which capital he thereupon invested in the purchase of materials for making some tea-cakes. Following her husband's directions, "Tet" made the cakes, which "Si," taking a basket, went out and sold, realising sufficient to double the invested capital, and to provide some food for himself and his wife. The next day, having a larger stock, his journey was extended, and he persevered until it was exhausted. Continuing this from day to day, he soon secured a "connexion," who looked for his daily coming, and bought his cakes readily. The frugal couple saved money.

Trade revived, and Mason went back to the gilt-toys, devoting his attention mainly to chains, rings, and other fittings for watch appendages. For these purposes he required a large number of split-rings, both of steel and of brass, for gilding, and those he had to purchase. He always bought them of a Mr. Samuel Harrison, a maker of these goods. Mr. Harrison was a man of most kindly and generous disposition; of simple and unobtrusive habits; of sterling integrity and of large mental endowments. He united great mechanical skill with considerable scientific knowledge. Dr. Priestley soon found out his capabilities, and for that great philosopher Harrison made an improved air-pump, and other elaborate scientific appliances. This brought Priestley frequently to Harrison's place, and the acquaintance between the two men ripened into a friendship so cordial that they generally spent two or three evenings a week in each other's society.

Mason's frequent purchases of rings brought about a degree of friendliness between him and Harrison, and the latter acquired a liking for his active and intelligent customer. In the course of conversation, Harrison one day told Mason that, having secured a competency, he was desirous of retiring from trade. Mason, with characteristic acuteness, caught at the idea, and a day or two afterwards told Harrison that he should like to have the business, but he had no capital. Harrison advised him to look up his friends, particularly his wife's father, to see if he could get assistance. Mason did so, and returned to Harrison to say that his father-in-law declined, and that he found it impossible to find a friend who would help him with a shilling. "Never mind, Mason!" said Harrison, "I've taken a fancy to you, and I've made up my mind you shall have the business; you shall pay me when and how you can." This was soon ratified, and the year 1823 saw Josiah Mason, without giving bond or other security, settled in Lancaster-street in succession to Harrison as a maker of split-rings.

Amongst other "odds and ends" left by Harrison, Mason found some curious bronze and steel pens which had been made half a century before by one Richard Parkes, a highly-skilled artificer, to whom Harrison had been an apprentice. He also found the duplicate of a pen made by Harrison himself for Dr. Priestley.

Some little time after this discovery, Mason, walking in Bull-street, saw in the shop-window of Mr. Peart, a stationer, a steel pen exposed for sale, which he bought at the price of two or three shillings, and took home. His early experiences as a pen-mender enabled him to estimate the deficiencies of this hand-made steel substitute, and the idea occurred to him that he could produce by mechanical means a far better pen at much more reasonable cost. Quietly and secretly working out this idea, he at length produced a pen which satisfied his ideas of completeness, and with which he found he could make a cleaner up-stroke than he had ever seen before. How to make his invention profitable to himself by bringing it before the public was his next difficulty.

At that time James Perry, a Manchester man who had removed to London, was actively engaged in agitating school reform, and in urging the employment of improved school books and appliances. He had already produced some pens, shaped by hand from ribbon-steel, which were on sale under the name of "Perry Pens." Josiah Mason, taking a few of his pens in his pocket, went to London and showed them to Mr. Perry. At that time Mason had no conception of any other use for his pen than as a school adjunct, but Mr. Perry, with commercial acuteness, saw at once that it must eventually supersede the quill. Arrangements were soon made by which Mason was to be supplied with ample capital; the pens were to be called "Perryian" Pens, and Messrs. Perry & Co. were to have the exclusive sale in England. This was in 1828; and the connexion then formed has been continued, with occasional modifications, ever since.

Josiah Mason continued in the penmaking business, the trade gradually extending, until the year 1876, when, being eighty years of age, he sold his business to his old friends, the Perrys, who combined with it two or three manufacturing firms, and formed a limited liability company under the name of "Perry & Co., Limited." This company has greatly extended the productive capabilities of the concern, their present production of steel pens being between forty and fifty thousand grosses per week, or something like a million of pens every day!

About the year 1840 Mr. G. R. Elkington took out his first patents for electro-plating, and in 1842 Mr. Josiah Mason, who by that time had become a rich man, joined him in partnership, introducing capital to the amount of 30,000*l.* The name of the firm of Elkington, Mason, & Co. is known all over the civilised world. Mr. Elkington died a few years ago, but Mr. Josiah Mason had previously retired from the partnership.

Mr. Alexander Parkes, the well-known inventor of "Parkesine," was at the time of the establishment of the firm of Elkington & Mason engaged by them in a series of experiments connected with electric deposition. In the course of his researches he made some discoveries which led him to think he could greatly improve upon the methods of producing "vulcanised" India-rubber. In the joint names of Parkes, Mason, and Elkington, a patent was taken out for these improvements, to which the name of the "cold" process has been given. Mr. Parkes, — who singularly enough is the grandson of the Richard Parkes who was the originator of the split-ring business, and nephew of Harrison, Mason's predecessor,—sold his share to Elkington & Mason for 5,000*l.* Soon afterwards they sold the patent to Mackintosh, of Manchester, for 80,000*l.*

One way or another Mason, in the course of years, became enormously rich. He was not blessed with children, and the question as to what was to become of his vast possessions became an anxious one, which was often discussed between him and "Tet."

At the time of the electro-plating and india-rubber experiments Mr. Parkes was a frequent visitor at Mr. Mason's house, sleeping there two or three nights a week. One evening, in Mason's absence, Mrs. Mason mooted the question of the ultimate disposal of their property, mentioning that Mr. Mason desired to do something for the elevation of women. Parkes, without much time for consideration, suggested that as orphan girls were often left in great destitution, and were exposed to peculiar temptations, something might be done for them. Within a fortnight of that evening the plans for the original orphanage in the village of Erdington had been prepared by Mr. Isaac Newey, and the project was set on foot.

Notwithstanding his many benevolences, riches poured in upon Mr. Mason from all quarters, and the great Orphanage at Erdington was at length determined upon. About 320 orphans, of whom 200 are girls, are boarded, lodged, clothed, and educated at this noble institution.

It is unnecessary to repeat in this place the details which have been published in connexion with Sir Josiah's last great institution, now opened. The Scientific College, entirely erected and endowed by Josiah Mason, is a fitting crown of his many munificent works. They were noble words that he spoke at the laying of the first stone:—"I have great and, I believe, well-founded hopes for the future of this foundation. I look forward to its class-rooms and lecture-rooms being filled with a succession of earnest and intelligent students, willing, not only to learn all that can be taught, but, in their turn, to communicate their knowledge to others, and to apply it to useful purposes for the benefit of the community. It is in this expectation that I have done my part, thankful to God that he has given me the means and the will to do it; hoping that from this place many original and beneficial discoveries may proceed, and trusting that I, who have never been blessed with children of my own, may yet, in these students, leave behind me an intelligent, industrious, truth-loving, and truth-seeking progeny, for generations to come."

GLASGOW MUNICIPAL BUILDINGS.

A NOTE.

Daniel Defoe visited Glasgow in 1727, "a large, stately, and well-built city," he remarks, and in reference to the Tolbooth, the municipal building of his time, says,—"Here the Town Council sit, and the magistrates try such causes as come within their cognisance, and do all their other public business; so that it will be easily conceived the Tolbooth stands in the very centre of the city. It is a noble structure, of hewn stone, with a very lofty tower and melodious hourly chimes." The "grand stane" foundation of the above building was laid on the 15th of March, 1626, on the site occupied by the old Tolbooth, for the taking down of which the wrights and masons received the sum of 250 marks. The work went on without break or hindrance, the civic power grudging no reasonable outlays. There was no stint of drink-money. John Neill contracted to supply the Tolbooth with a great new clock for 600 marks, but on the finish of the undertaking, the Council, finding Neill was a loser, added 300 marks to the sum, for "the clock was worth the whole sum." For "brass and copper to be the cock and vanes to the Tolbooth," 47*l.* 6*s.* were given, and William Duncan received for the "workmanship," 20 marks and the clippings. "One hundred pounds money" is given to James Colquhon in part payment of working the king's arms in stone "gilting"; and Valentine Ginkiug receives "thirty pounds" for gilding the cock, the thistle, crown and sceptre above the king's arms, and also gilding the town's arms above the entrance to the gable of the Tolbooth. One of the contracts connected with the Tolbooth is peculiar. In three weeks after the laying of the foundation stone, "Gabriel Smith undertook to sharpen the whole mason irons [chisels] during the time of the building of the Tolbooth and steeple thereof until the work be ended, for forty pounds money," and in case he should be a loser, "he refers himself to the will" of the council.

Morer, writing in 1689, says, "Glasgow has the reputation of the finest town in Scotland";

and Defoe, thirty-eight years later, writes of it, "In a word, 'tis one of the cleanliest, most beautiful, and best-built cities in Great Britain."

Doubtless, when John Boyd, maissoun, "bewed" out the town's armos 250 years ago, as he traced out the motto "Let Glasgow Flourish," he looked forward to the growing prosperity of the western capital of Scotland, which years after strives to maintain its olden reputation,—"the finest town in Scotland."

THE CAMBERWELL PROVIDENT DISPENSARY BUILDINGS.

At the bottom of Camberwell New-road, with a second frontage and entrance in Camberwell-road, facing the Green, a new Provident Dispensary is in course of erection, from the designs of Mr. Dank, architect, of Leadenhall-street. The building is being erected with red Berkshire brick. The windows and principal entrance in Camberwell New-road have arched heads in red Mansfield stone, and the elevation is surmounted by a carved cornice in Portland stone, above which is an ornamental parapet. The interior of the building contains a large central waiting-room, octagonal in form, lighted from the roof by an octagonal dome, above which is one of Boyle's ventilators. The other apartments in the building consist of consulting-rooms, and private rooms for medical men, together with drug-stores and dispensing-rooms at the rear of the building.

Messrs. Rider & Sons, of Union-street, Borough, are the builders.

RECLAMATION OF WASTE LANDS IN SCOTLAND.

Recently, the members of the Glasgow Town Council, on the invitation of the Cleansing Committee, paid a visit of inspection to the reclamation operations at Fulwood Moss. During the winter of 1879, when great distress prevailed among the working classes of Glasgow, and when extensive arrangements were being made for the relief of the unemployed, the question was mooted whether the Corporation could not find some work for those who had been so suddenly thrown idle. Among the many proposals made was one for the reclamation of Fulwood Moss, near Houston. A more unpromising piece of ground could scarcely have been selected. It was really and truly a large peat-moss, over which it was almost impossible to walk with safety. The idea was, however, taken up, and, after negotiations, Lord Dunglass granted a lease of that portion to the north of the Caledonian Railway, a short distance west of Houston Station. The lease is for thirty years, at a rent of 1s. per acre for twenty years, and 5s. per acre for the remaining ten years. It was looked upon principally as a shoot for the mud and surplus manure which was lying in the various scavenging depôts and threatening to be a nuisance to the city. It would also, it was urged, give employment to a large number of unemployed, who were then thronging the streets, and whose relief was a problem of difficult solution. As soon as all the preliminary arrangements were made, upwards of 300 of the unemployed were taken down to Houston and set to work on this most unpromising task. Thirteen acres next the main line of the Caledonian Railway were first operated on, the idea being to have this part planted with potatoes, so as to secure seed for the next season. In this Mr. James Young, who had charge of the works under the Cleansing Committee, was successful; for not only did he secure a crop sufficient to seed the 95½ acres to be cropped next season, but was able to sell a considerable quantity. During last summer a service railroad was laid, and this has been so placed that all parts of the extensive moss can be easily reached. Draining was also accomplished, and this has been so successful that already the moss is 2 ft. lower than it was before operations were commenced. In the course of the work a staff of men were employed reclaiming the remaining part of the moss, the average number so occupied, from February, 1879, till the 25th of May this year, being seventy. Since the work of reclamation was commenced no fewer than 1,882 wagons, or fully 12,000 tons, of Glasgow rubbish have been placed on the moss. The railway and its adjuncts cost 1,214*l.* 19*s.* 4*d.* A movable bogie railway for the purpose of facilitating the spread of the manure and the ingathering of the crop cost 99*l.* 12*s.* 11*d.* There was spent in ditching and draining 1,784*l.* 5*s.* 10*d.*, and for trenching and hoeing 956*l.* To these items have to be added 483*l.* 16*s.* 7*d.* paid for the fares of the workmen to and from the moss, so that the total sum expended on the reclamation of this ninety-eight acres of moss has been 4,538*l.* 14*s.* 8*d.*

DISCLOSURES RESPECTING SUBURBAN DWELLINGS.

At the Edmonton Petty Sessions, before Messrs. Abbiss, Howard, and Doe, divisional justices, James Henry Etheridge, builder, 17, Heaton-place, Peckham-rye, was summoned, at the instance of the Tottenham Local Board of Health, for infringing the 10th bye-law of the said Board, which provides that the foundations shall rest on solid ground or upon concrete or other solid substructure. Louis Etheridge, builder, of 252, Lower-road, Rotherhithe, was summoned for a similar offence, the houses in respect of which the proceedings had been taken being situate in Circular-road, Stoneley South Estate, Upper Tottenham.

The case against Louis Etheridge was taken first.

Mr. de Pape, surveyor to the Board, deposed to his attention having been called by the building inspector to the material used in the foundations of the houses in question; he visited them on the 2nd of September, and found that the walls were being erected upon improper foundations,—first, upon other than solid ground; and, secondly, on an artificial foundation, made up of loose material not suitable for the purpose. The ground was but little firmer than turf, and the so-called concrete consisted of brick rubbish, spent lime, and other materials from old buildings, and had been put in dry. Notice was served upon the defendant that the material being used was contrary to the bye-laws, and on the 6th of September witness made a further examination, and took samples of the foundation under each wall.

The defendant considered the justice of the case would be met by his promise to amend. Besides, his foreman was absent through illness.

The Bench imposed a penalty of 5*l.* and costs.

The features of the case against the other defendant were similar to those above reported, and he was also ordered to pay the full penalty of 5*l.* and costs, Mr. Abbiss remarking that the Local Board were simply doing their duty in prosecuting.

THE DOCTORS AND THE ARCHITECTS.

Sir,—I think attention should be drawn to some matters which should not be left unnoticed in the *Builder*. There appears to be a sort of concerted action on the part of a certain section of the medical profession of late to weaken the influence of architects and engineers in drainage and sewerage matters, and, indeed, in sanitary questions generally. I have had my eyes upon this movement for a considerable time past, and I have good ground for my suspicions that some sanitary organisations have been started, two chief objects of which have been to assist a section of the medical profession to rule the roast in sanitary leadership, and make architects to play second fiddle to them. Some of the medical journals are also assisting. This move has been worked in Dublin as well as in London, and is being worked at present; and one sanitary association across the Channel has been worked with energy, and has succeeded in its object of pitchforking its prominent members into official appointments.

Take note of some medical men's opinions at the late Exeter Sanitary Congress, and particularly observe the impertinent allusions of Mr. H. C. Burdett anent architects and the Institute of Architects.

The Local Government Boards in London and Dublin are worked to a great extent by the medical element, and the Poor-law doctors in connexion with, or under, that institution, if they are allowed to go on with their wings unclipped or unchecked, will soon be betraying effrontery enough to snub architects and engineers generally.

It appears to me that architects and engineers are allowing the doctors to lay their eggs like the cuckoo's, and with the usual results. It is time that a wholesome check should be put to medical men's dictation and abuse in house construction and drainage matters, and that they should be kept as far as possible to their legitimate spheres. If curative medicine is becoming a non-paying game, the doctors should not be allowed an undisputed claim for the new departure in respect of preventive medicine, a cause in which you yourself have worked for more than half a lifetime, with a few other veterans.

The great body of the medical profession were not merely inert when the *Builder* was first pointing out existing evils in our towns, and the necessity of sanitary improvements, but many of its members, as I well remember, were sneerers at the movement, and even positive obstructors. The communication from Mr. Chadwick, which you published in the last issue of the *Builder*, *re* drainage and sewerage work as a specialty, is very good in its way as an exposition of bad drainage work, but, in my humble opinion, it would neither be prudent nor advisable to aid the organisation of a class of specialists. It would lead to the further sub-division and weakening of the architectural and engineering professions, who have already, and can have in future, sufficient capable members of their bodies to grapple with all the problems of drainage and sewerage work as part of their general practice. Do not let the architectural profession be weakened or cut up at the bidding of doctors, few of whom know anything practically of drainage work. H.

THE EDUCATION OF THE WORKMAN.

Sir,—Many things in recent numbers of the *Builder* interest me much.

Respecting the "dignity of labour," speaking as the father of a numerous family, now for the most part out in the world, I have felt that it was my first duty, after providing for their immediate wants, to teach them such a trade or calling as would practically make them independent. I hold that it is the first duty of every parent to teach his child some useful trade by which he or she may get its living. Mere quill-driving by no means satisfies this condition, nor does mere buying and selling goods. I have, therefore, put each and all of them to a handicraft trade, as is the excellent practice in Germany; and so both hand and eye are educated, and if they possess brains and energy besides, they may rise to be in the end captains of industry. In no case are they likely to become drones in the hive.

Whether the handicraft trade should be taught under the conditions of an apprenticeship, or otherwise, is a matter very difficult to decide. There can be no doubt that in small works, where the master takes an active part in the conduct of the work, and being himself a competent workman taking an interest in his men, as was almost always the case in times gone by, then it was right and proper to apprentice the learner. But in large works, where the master is probably only a managing director, with little practical knowledge of the work, and the youth is put to an already overcrowded trade, where every workman is jealous of any addition being made to the number of his competitors, and has no inducement given him to teach; where the foreman has much the same feelings, and no time for teaching, having to strain every nerve to get the utmost out of both men and machinery to keep his place, and satisfy his managing director, and earn a large dividend,—where, in fact, no one below the foreman is taught to think, but only to obey, then it is an open question whether apprenticeship is desirable. I know it is largely practised under such conditions, and the boys are put to do one particular thing, which they soon learn, and they are kept thereafter to that only for the remainder of their term, to their own detriment and their employers' profit. I took the liberty, some years ago, of remonstrating with the managing director of a large machine-works in the North about this practice, but I only obtained for answer that he had got a dividend to earn, and must not be too particular how he earned it.

The lament of the decay of the useful general workman is by no means new. Some thirty years ago the late Sir William Fairbairn, in the preface to his "Mills and Millwork," pointed out how the old millwright had been superseded by the fitter, the turner, the machine-maker, *et hoc genus omne*, and was consequently, to a great extent, dying out. The same division of labour has taken place in the building trades, though to a much less extent. The mason is now a hanker hand or setter, seldom both. The carpenter *and* joiner is now very frequently dissociated. The "three-branch hand," plumber, painter, and glazier, is only to be found in remote districts. But the man who has to direct all these, in the superintendence of any important building works, must have as practical, although not as manipulative, a knowledge of the several trades, as though he had been taught each of them separately. The eye and head have been taught, in his case, without the hand. And so it has come to pass, that for those who are intended from the first to take a

leading position in mechanical engineering, special schools have been opened, like that at the Crystal Palace at Sydenham, for the purpose of teaching the hand as well as the head, and this teaching is stimulated by the scholarships established by Sir Joseph Whitworth. The result of all this is that our mechanical engineers who occupy positions of authority, are able to maintain that pre-eminence they have always held as regards general knowledge. Not so the rank and file. Very frequently these are reduced to the level of mere machine-tenders, and are paid little if any above the ordinary labourer.

Whether it would be possible to establish special schools for those who are to direct building operations is open to question. I have not yet heard that it has been attempted in England. Theoretical knowledge can be and is largely in use, but nothing can supersede the practical knowledge only to be gained by experience on the works, which are of such infinite variety, that we never build twice alike, and the conditions under which the works are carried out are never twice alike. Hence, doubtless, the catastrophes, &c., to which you allude. That the average workman in the building trade is not so good a workman as his predecessors in the past, is, in my experience, undeniable,—a fact due in great part to the wretched system of paying all alike, and so leaving no room for emulation; and also to the fact that many—perhaps most—of the men waste their leisure in music-halls and other equally enervating and unprofitable amusements; and the main reason why their wages have not been reduced, as those of the engineers have been, is that hitherto machinery has not been profitably adapted to do the work.

E. G.

ALTERATIONS IN AND ABOUT NORWICH CATHEDRAL.

Sir,—In expressing my gratification at the honourable mention made of my remarks on the supposed Saxon remains attached to Norwich Cathedral on the occasion of the visit of the Architectural Association to East Anglia, I hope I may be allowed to express also a regret at the passing over in silence of some remarks which I ventured to make on the wanton mutilation of the billet mouldings over several of the arches of the cathedral. Over the west door in the inside, and in part of the nave and the transepts, they have been entirely removed; and, what is in still worse taste, over the arches between the organ-loft and the jambs of the tower they have first been hacked and mutilated, and then covered with a coating of plaster. Thus a sham circular moulding is produced, like nothing that can be found in any work on architecture. This spurious moulding had been previously noticed by Mr. Brown, the architect, and by Mr. Spanl, who also pointed out the entire excision of the billet mouldings in various places. I should mention also that the Dean had concurred in a representation which I made to the Dean and Chapter on the subject, and exhibited his good feeling and judgment by ordering the billet moulding to be replaced over one of the arches on the north side of the nave at his own expense.

Now in advocating this restoration of Norman work, which has been wantonly innovated upon, I will add that I will yield to no one in my desire to retain, as far as possible, the joint works of different periods in our venerable ecclesiastical buildings. They ought to be regarded as historical monuments, blended and associated together, and frequently producing a harmony exceeding that of the original uniform design; but a line must be drawn against such alterations when they are utterly uncalled for, as in the destruction of the billet mouldings in Norwich Cathedral; and I beg to point out another still more glaring instance of demolition perpetrated, when two of the jambs of the tower were cut back about 2 ft., in addition to the removal of the pilasters, which were carried down to their Norman basis, making not less than 3 ft. of the solid masonry and support of the tower and the spire. It appears as if the architects of the time were desirous to show experimentally how much of that support might be withdrawn without endangering the finest part of the edifice. The pilasters, when truncated, were stopped by moulded drops of plaster or cement, and the plane of wall, when cut away, was covered by carved woodwork, forming stalls for the Precentor and the Minor Canons of a later date than the carved stalls of the Honorary Canons. I endeavoured to represent at the visit of the Architectural Association that the tower jambs, which at present suggest the painful idea of insecurity of the fabric, ought to be restored; and my object in now addressing you is simply to crave your influence in bringing about this embellishment to our cathedral. An argument in its favour is that no injury or loss will be sustained by the removal of the stalls, as there is room for the Precentor and the Minor Canons in those appointed for the Honorary Canons.

John Gunn.

WIND PRESSURE.

Sir,—I have found it useful to note down any account of violent storms, and possibly you may consider the following worth notice.

The *Elgin Courant*, about thirteen years ago, published the following:—

"The wind recently blew a hurricane at Keith, and the focus of the storm was at the Isle Mills, near the railway station. The wind lifted one of the roofs, the outside one, 100 ft. long and 30 ft. broad, and without a plank falling. The whole was borne 20 ft. high in the air, and was carried over three houses, when it came in contact with the engine-stalk, and knocked it over from the foundation. The stalk was 50 ft. high. Without it being in the slightest degree arrested in its progress through the air, the flying roof passed over the ruins of the engine-stalk, and, coming into contact with a cloth and yarn warehouse two stories high, smashed the slates of it, carried away its chimney, and then spread over the road in pieces, involving the railway telegraph-wires in the ruin. The roof flew,—body bulk, as the phrase goes,—more than 60 yards before it came to the ground, and, what is even still more surprising, it rose from a one-story house, and passed over two-story houses."

Mr. Peter Carmichael, in his paper on Factory Chimneys, read before the Institute of Engineers in Scotland, states that in 1864, at Dundee, there was a violent storm of wind, worse than had been experienced for twenty years previously. This gale considerably damaged some shafts which he describes.

On the 16th of December, 1873, the *Sheffield and Rotherham Independent* published an account of "a gale which swept over Sheffield and neighbourhood, almost unparalleled for intensity and violence," it blew down nine large chimney-shafts, and doubled up the principals of an iron roof being erected at the gas-works, and caused a great loss of life, of which they give the details.

In June last I had the following sent me:—

"Professor Tice, of St. Louis, has recently disclosed the results of a tour of inspection he has been making over the track of the tornado which wrought such havoc in the Valley of the Missouri some time ago. This terrific 'wind,' as everybody supposed it to be, performed some astounding feats. It bore off a factory-chimney for a considerable distance, and literally demolished a large number of buildings, while its effects on trees and shrubs were of the most curious character. In many instances it did not tear them up by the roots, but tore off the bark from their stems, and that not only on the side exposed to the storm, but all round them, while the ends of branches were stripped of their leaves and split up into fibres. Professor Tice affirms that all this was the work, not of wind, but of electricity; that, in fact, it was not a tornado of wind at all, but a terrific electric disturbance. The chimney just mentioned was carried off by the storm, though the building from which it was wrenched was left almost untouched, the fact being that the chimney was an iron one. In many cases the Professor found that buildings with iron roofs were rent in pieces, while others directly in the path of the storm, but which had ordinary shingle roofs, were left untouched. The action on the trees he explains by assuming that the sap and moisture of their trunks and branches were by the electric current passing down them converted into steam, the sudden expansion of which tore the bark and twigs into fragments. He notices, too, that for 145 miles the storm followed the track of a railway, and, as it were, swallowed up all the water in its course. All the facts he discovered tend to convince him that there really was no wind in this tempest, but electricity only, and that, as we understand it, he takes to be the case with cyclones generally. If this view is supported in the law courts, it will no doubt be found that the damage done by such tempests must be compensated for by those who insure against 'lightning.'"

The late Professor Rankine paid great attention to wind-pressure, as may be seen from his account of the chimney at the West Cumberland Hematite Ironworks, and other writings.

I trust some of your numerous correspondents will continue this important subject.

R. M. Bancroft,
Mem. C. & M. E. Society.

Is it True?—The *American Architect* says: "A cablegram from Scotland states that a joint stock company which has been forming in Great Britain for the purpose of purchasing timber and controlling the lumber market has been completed, and has now control of Messrs. Cooke & Grant's 'limits.' This is a beginning of a gigantic scheme, which will throw a large amount of British capital into this country."

WATER SUPPLY OF BRADFORD.

The Barden reservoir works, which are being constructed for the Corporation of Bradford, in order to give additional supply of water to that growing town, have been in progress for about four years. The new reservoir will cover an area of from 70 to 100 acres, and will have a couple of hye-channels (one at the north and the other at the south), by which waste or unnecessary water may be let off. It will be somewhat of a triangular shape, and will require a bank on one side only, as the natural formation of the earth will form the sides of the basin on the remaining portion. It is this single bank which has caused so much work and labour, for at its base it is several hundred feet in width, whilst in some places it will rise to the height of over 100 ft. above ground (to say nothing of the great depth below) and will be something like 30 ft. in width at the top. For a long time past the energies of the staff have been devoted to this bank, which has a central portion of concrete of considerable thickness, then puddle on either side on account of its effective resistance to percolation, and then, outside the puddle, massive coverings of stone, the whole forming an immense boundary-wall, which one would think sufficient almost to withstand a second Deluge. This artificial embankment is upwards of half a mile in length. There are two principal streams by which the reservoir will be filled, namely, those of Yethersgill and Fadmire Syke; whilst two channels will also connect Gill Beck and Lumb Gill with it. When completed it is estimated to hold 800 million gallons, and the contract for the work is 200,000*l*. The work has been going on for about four years, and it is hoped it may be completed in a couple more years. Mr. Easton Gibb is the contractor, his principal assistants being the manager (Mr. Alexander Riach), Mr. Malcolm, C.E., and Mr. J. H. Smith, C.E. The reservoir is being constructed from plans by Mr. Binnie, engineer to the Bradford Corporation; and the interests of that body are looked after by Mr. Yourdi, C.E. (their resident engineer), and Mr. Johnson, who inspect and measure the work as it progresses.

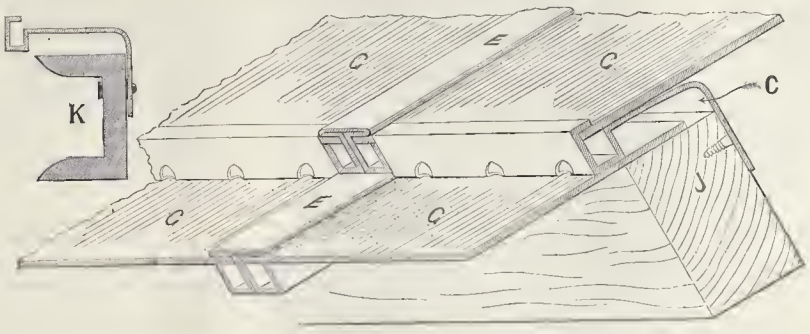
PROVINCIAL NEWS.

Stafford.—At a special meeting of the Stafford Town Council, plans were approved of for the erection of a new wing to the Borough Hall. The new building, which is estimated to cost something under 2,000*l*., is destined to hold the free library, which was sanctioned by a public meeting of townspeople some time ago, the Wragge museum, and the school of art, which has outgrown the present accommodation provided in the Borough Hall.

Smethwick.—The new building erected for the purposes of a free library and reading-room at Smethwick, and recently opened by Mr. M. A. Bass, is situate at the rear of the Gas Offices in High-street. Its main room, which is to be used both as a reading-room and library, is 52 ft. long by 24 ft. wide. It is light and airy, and is fitted up with the usual reading-desks, tables, and stands. The building, which was designed by Mr. Yeoville Thomason, of Birmingham, has been erected by Messrs. Harley & Sons, Smethwick, the cost being 1,800*l*.

Carlisle.—The large new hotel on the Victoria Viaduct, Carlisle, is approaching completion. Externally it is in the style called "Queen Anne" or "Free Classic." The ground-story is entirely of red stone. The south-east corner is corbelled and carved, and the effect is heightened by the mixture of red and white stone throughout the façade,—the white being from Lazonby, and the hardest building stone in the district, while the red is the sandstone of the district, from Aspatria. On the eight pilasters there are carved illustrations of Æsop's fables; and on the east front are two large panels, one showing the heraldic arms of the city of Carlisle, namely, a cross and four roses surrounded by a floral device, with the legend, "Be just and fear not"; the other showing a device of the rose and thistle intertwined, with the date, "1880," on a shield. The building is finished with a Mansard roof, out of which project dormer windows. There are no fewer than 126 rooms in the hotel, upwards of eighty of them being bedrooms. Though the rooms are so numerous, they are arranged on a simple plan. On each floor they open upon the central corridor, which, like the passages and staircases, is built of stone and concrete; and the whole of the

RENDLE'S NEW PATENT "ACME" GLAZING.



C. New Patent "Acme" Horizontal Bar.
E. New Patent "Acme" Vertical Bar.
G. The Glass.
J. Wooden Purlin, showing method of fixing Patent Bar.
K. Channel Iron Purlin, dispensing with wood of any kind.

walls are brick on iron girders, and hydrants for use in case of fire are placed in each lobby. On the ground-floor, on entering, is the coffee-room, 34 ft. by 20 ft., on one hand, and the commercial-room, 44 ft. by 20 ft., on the other; also the bar, smoke-room, bar-parlour, manager's room, still-room, billiard-room, 46 ft. by 25 ft.; and billiard and smoke room, 33 ft. by 20 ft., &c. On the first floor there is the ladies' coffee-room, the assembly-room, 46 ft. by 25 ft.; lavatories, &c., luggage-room, and suites of sitting and bed rooms for families. The first, second, third, fourth, and fifth floors are appropriated for bed-rooms. The hotel stands upon a part of the old city wall.

Eccles (*near Manchester*).—The foundation-stone of the new Town-hall was laid on the 13th ult., by the chairman of the Local Board. The building is of the Classic style of architecture, and comprises,—in the basement, hall-keeper's residence, heating apparatus, coal and store cellars; on the ground floor, a board and committee room, with ante-room, hat and cloak room, lavatory, &c., adjacent. Rooms are also provided for clerk, surveyor, collector, and inspector. The upper floor comprises a public room, with gallery and platform, affording accommodation for 1,000 persons, also retiring-rooms and other requirements. The principal elevations will be faced with stock bricks, relieved with Huddersfield stone to the doors and windows, &c. The contract has been undertaken by Thomas Moore & Sons, builders, of Eccles, at the sum of 4,000*l*. The architect is Mr. John Lowe, of Manchester.

RYAN'S PLUMB-RULE.

The ordinary plumb-rule with its leaden "bob" always getting out of gear, and the string twisting in wet weather, and sometimes breaking in dry when not expected, is an awkward instrument. Feeling this to be the case, an ingenious bricklayer, John Ryan, has devised, and protected, a plumb-rule to which these objections do not apply. In a sinking on the face of an ordinary "straight-edge" a thin metal rod, weighted, is hung pendulum-fashion, and its point, gravitating over a certain number of divisions marked below, shows not merely when the rule is or is not upright, but the exact extent of deviation, so that it also becomes particularly useful in building chimney-shafts or giving the right batter to a retaining wall. The rod is covered with a thin plate of metal to keep it in its place, the point only being shown, so that however the rule may be thrown about, it cannot get out of order. It may be had for a few shillings, and we are led to go a little out of our way and say that the inventor has made a number of them, and that his address is No. 50, Lockington-road, Battersea Park.

Art Classes for Ladies.—We are glad to hear that Mrs. E. M. Ward's classes are well supported. They will re-assemble on October 15th next at 6, William-street, Lowndes-square. Mr. Calderon, R.A., Mr. Alma Tadema, R.A., and Mr. W. P. Frith, R.A., are the visitors for the term.

RENDLE'S NEW PATENT "ACME" GLAZING.

The "Acme system" is the title given to the arrangement of glass roofing lately patented by Mr. Rendle, and the accompanying diagram will serve to explain it. The advantages appear to be that the lap is greater; and there being no clips, the water runs freely away; further, the channels of the vertical bars are square, thus filling the slot in the horizontal bars, as will be seen in the sketch; and the purlins are narrower, giving increased light. The new bars can be used without wood (see fig. K), thus giving an indestructible roof both inside and out. Another advantage is that there is no drip from condensation, the moisture running into the patent bar and on to the out-side of the roof. The system has been adopted at St. Bartholomew's Hospital.

STATUES.

Robert Burns.—The bronze statue of Burns for New York has just been completed by Sir John Steel, R.S.A. The statue represents the poet in a sitting posture, and the figure is colossal, being about 12 ft. in height. The incident in Burns's career which the artist has represented is that when, on the anniversary of the death of Highland Mary, he composed the pathetic poem commencing, "Thou lingering star with lessening ray," &c. The poet is represented as seated on the trunk of an elm tree, attired in the garb of a husbandman of the period, with a plaid thrown loosely round his shoulders. A replica of the statue has been bespoken for Dundee. The statue was unveiled on the 21st ult.

Denis Papin.—On the 29th of August a statue of Denis Papin was unveiled at Blois, where he was born in 1647. Papin, who was a Protestant, spent the greater part of his life in exile, living sometimes in London and sometimes at Cassel and Marburg, where he invented the celebrated steamboat on which he ascended the Weser, to the horror of the native peasants, who seized it and broke it up, believing it to be the work of the Evil One.

STAINED GLASS.

London.—The old windows over the communion-table in the Church of St. Katherine Cree, Leadenhall-street, are being replaced by a series in stained glass, emblematical of flowers, which Mr. W. M. Pepper, of Euston-road, is supplying. They are five in number.

Addiscombe.—Messrs. Britten & Gilson have just now executed and fixed a stained-glass window at St. Mary Magdalen's, Addiscombe, Croydon, for the Committee, in memory of the late Mr. Theodore Lloyd, the subject being the Ascension. We hear that it is very boldly treated.

Kingston (*Surrey*).—A window has recently been placed in the parish church to commemorate the late Mr. H. Shrubsole, formerly mayor of Kingston. It is designed to illustrate the latter part of the twenty-fifth chapter of the Gospel according to St. Matthew, with more especial reference to the fortieth verse, part of which is inscribed under the subject. Our Lord, crowned, and bearing in his hands and feet the marks of his Passion, stands in the central light of the window, and on either side of him are the blessed whom he is calling to inherit the kingdom prepared for them from the foundation of the world. The groups consist of men, women, and children, and an angel is conducting them into our Lord's presence. The figures are placed under canopies of tabernacle work, designed in accordance with the character of the masonry of the window, which is of the fourteenth century, and in the tracery or upper lights there are figures of angels bearing scrolls, on which a portion of the text referred to is written. A memorial brass tablet is in course of preparation, and will be erected upon the wall beneath the window. The window and brass are the work of Messrs. Lavers, Barraud, & Westlake.

Coventry.—A four-light stained-glass window has just been placed in the west end of Holy Trinity Church, in memory of the late Mr. W. Chater, organist of the church. The window illustrates Christ's teachings in the two great commandments, "Duty towards God and duty towards your neighbour." The window was designed and executed by Messrs. Heaton, Butler, & Bayne, of London.

CHURCH-BUILDING NEWS.

Walton-on-the-hill (*Liverpool*).—On the 10th ult. the new church of St. John the Evangelist, Walton-on-the-Hill, was consecrated by the Bishop of Liverpool. The foundation-stone of the church was laid on Easter Monday, 1876, by Lord Skelmersdale, now the Earl of Lathom. It was opened for service, under the licence of the Bishop of Chester, on May 17th, 1878, but was not consecrated owing to the debt upon the building, which has now been removed. The portion of the building now completed accommodates about 600 worshippers. When carried out in its entirety according to the plan, it will consist of chancel, nave, and side aisles, with five bays, two vestries, and lofty tower at west end. The total length of the church when completed will be 131 ft., the nave being 33 ft. 6 in. wide, and 60 ft. high, and it will then accommodate about 1,000. The contractor is Mr. Hugh Yates, the architects being Messrs. Aldridge & Deacon. The style of the building is an adaptation of thirteenth-century Gothic, treated in a simple manner. The materials of the walls outside are local red-stone, the interior stonework being entirely of the variegated red and white stone from the Runcorn quarries. The chancel is divided from the nave by an elaborate wrought-iron screen and gates, and is paved with marble mosaic. It still awaits decoration, permanent choir-stalls, and organ cases. Foremost among the ornaments of the church is the costly reredos given by Mrs. Gerard Leigh, of Luton. This consists of a polished and inlaid red marble framework rising to a height of 14 ft. 6 in. above the sanctuary floor, and enclosing a white marble panel 6 ft. wide by 4 ft. 6 in. high,

in which is sculptured in high relief the subject of the Crucifixion. At the foot of the Cross kneels the blessed Virgin, looking up at the dying Christ, whose face is turned towards her. Her hand is placed on the Cross for support, while on the other side kneels St. John, watching the Virgin Mother in readiness to receive her if she fall overpowered by the scene. This group is the work of Mr. J. Woolner, R.A. The altar is of dark carved and panelled oak, richly decorated hy the architects witb conventional roses, lilies, and passion-flowers on a ground-work of gold. The nave is enriched by several stained-glass windows, the gifts of various members of the congregation, Mr. Holiday having designed those on the south side, while the two on the north side are the work respectively of Messrs. Forrest & Sons, of Liverpool, and Mr. Holt, of Warwick. The cost of the church, exclusive of the reredos, was a little over 6,000*l.*, and an additional 4,000*l.* is required to complete the edifice.

Maghull (Liverpool).—Dr. Ryle, the bishop of Liverpool, has consecrated the new church of St. Andrew, at Maghull. The new building is in marked contrast to the small structure which it supersedes, and consists of a chancel to the east, with transepts at each side, the north transept being used as a chapel for the school-children, and in the south transept is placed the organ. The style is Gothic of the Early English period. The walls of the chancel internally are lined with polished ashlar stone. The arches, strings, label moulds, and jambs of the arcade and windows are deeply moulded, and finished with carved capitals and bases. The altar-cloth, the gift of Miss Hollingshead, is from the factory of Messrs. Jones & Willis. The nave has an arcade of five bays on each side, and a lofty clearstory. The roofs of nave, aisles, transepts, and porch are open-timbered, of pitch pine, varnished. The various dimensions of the church are:—Total length over all, 127 ft.; total width, not including porch entrance, 54 ft. 6 in.; the nave, 68 ft. 6 in. by 24 ft.; north and south aisles, 68 ft. 6 in. by 12 ft. 9 in. each; vestry, 14 ft. square; tower, 21 ft. square by 72 ft. high; the height of church to apex of nave roof, 45 ft.; the chancel, 29 ft. 6 in. by 20 ft. 6 in.; organ-chamber and chancel, 15 ft. 6 in. by 13 ft. The whole of the work has been carried out from the designs of the architect, Mr. James F. Doyle, assisted in the superintendence of the work by Mr. S. Gunning, clerk of the works. Mr. James Lesley was entrusted with the sole contract, the joiners' work being executed for him by Mr. Samuel Webster, of Bootle. The glazing in the chancel is by Messrs. Edmundson & Co., of Manchester; the tiling by Mr. Laidly Brown; the mosaic pavement by Messrs. J. Rust & Co., of Lambeth; the heating apparatus and lightning-conductor by Messrs. J. R. Cooper & Sons, Liverpool; the lamps and ornamental metal work by Messrs. Freeman & Collier, of Manchester; and the carving in the church is by Mr. Joseph Rogerson, of Liverpool.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS.

On the 24th ult. the first conference of the recently-formed Northern District Branch of this Association was held in Darlington. The President of the Association, Mr. A. W. Morant, borough engineer of Leeds, occupied the chair. Mr. P. W. Thompson, C.E., of Willington Quay, who has taken an active interest, along with Mr. Hall, Stockton, in forming the Branch Association, was unanimously elected district secretary, and it was agreed, after some conversation, that there should be no hard and fast rule in the settlement of the boundaries of the Northern District, which, it was understood, will now include the North Riding of Yorkshire.

Mr. Craggs, of Shildon, read a paper on the scheme suggested by him for the disposal of the sewage of the Shildon and East Thickley Local Board district. The population of the district is 10,000, but sufficient capacity has been provided in the outfall drain for 50,000. Provision is made for rainfall and surface water by a separate set of drains, which are exclusively used for this purpose. There are two subsiding tanks, each 150 ft. in length, 9 ft. wide, and 6 ft. deep, built of 9-in. brickwork in lime mortar, the sides having a 3-in. batter upon them. The paper described the under-drainage and the surface preparation, in respect of which latter it was said that the twenty acres of land used for sewage disposal were divided into four parts, arranged upon three different levels, each plot having a gradient of 1 in 400. The cost per acre of laying out the land was about 190*l.*, which included the main drain, nearly a mile long. The number of acres of land they were laying out for the purification of their sewage was twenty. There were not more than half a dozen water-closets in the district, but nearly all were middens, such as are usually found in the mineral districts. It was the wish of his Board that they should be constructed. Nothing came into the sewer save the surface water from the yards and sewage. The land was of a somewhat clayey nature, with some gravel. It was held on lease for forty years, at 7*l.* 10*s.* per acre. The cost of the purification works would be about 100*l.* per acre.

Mr. George Bell, surveyor to Felling Local Board, then submitted a paper on "Sanitary Appliances." He said he had introduced a system of disposing of ashes and privy refuse, which would eventually be a boon to the public at large, especially the working classes. It comprised a self-acting water-closet and a dry ash-pit combined, designed and patented by Mr. A. M. Fowler, borough surveyor, Newcastle.

Mr. Hall said they had recently commenced to adopt Mr. Fowler's system at South Shields, and there it seemed to answer admirably.

Mr. Vawser confessed that as an occasional observer of the working of Mr. Fowler's system, he was highly pleased with its efficiency. The tub system, in his opinion, did not meet the difficulties of the situation.

The members then visited the Darlington Iron Company's works, in the office of which luncheon had been provided. They next proceeded to the Darlington Corporation Sewage Farm, over which they travelled under the guidance of the borough surveyor, Mr. T. Smith, who fully explained the engineering features of the scheme. At present the farm covers some 225 acres, though at the end of the year the corporation will come in possession of ninety acres more. 1,153,000 gallons of sewage on an average are dealt with every twenty-four hours. The farm, as a farm, about clears its working expenses. The party finally visited the works of the Stockton and Middlesbrough Water Board, at Tees Grange, about two miles and a half from Darlington Market-place, the water being drawn from the Tees, which is here about forty-seven miles from the source, and the same distance from the mouth. Mr. Simpson, the secretary of the Board, officiated as conductor. The land occupied by the Board at Tees Grange is twenty-seven acres in extent, eighteen acres of which are covered by works. The total area of the filtering beds is 142,000 square feet, while there are two tanks holding 2,500,000 gallons each, and one tank containing 1,500,000 gallons. The population of the district supplied is 130,000. About 50,000,000 gallons per week are pumped, 32,000,000 of which go for manufacturing purposes.

In the evening the members dined together at the King's Head Hotel.

SCULPTURE.—BLACKFRIARS BRIDGE.

The Chairman of the Bridge House Committee has objected, and the majority of the Court of Common Council have concurred in thinking it undesirable, that the regulations to govern this competition should be made known and well-considered and discussed before sculptors are invited to compete, and probably nothing more will now be heard of the matter until it is too late.

It is not often that so grand an occasion to encourage the noble art of sculpture arises, and there are, no doubt, many like myself, who, with no personal ends to seek, no particular artist to patronise, anxiously desire that the result may not be a failure, like so many other art competitions, but a great success, alike to the Corporation, who, to their honour, so liberally defray the cost, and for the artists who may be engaged in the work.

If the Chairman really thinks, as he said, that it is sufficient merely to invite sculptors to send in models, or that crayon sketches may be requested in the first instance to select from, I say unhesitatingly, disappointment will ensue.

A sculptor's sketch is made in clay; he does not affect the pencil, and the sketch in clay is a long and rather expensive matter from first to last. No artist of eminence will be likely to waste his time upon it, unless carefully-framed instructions put all competitors on a general footing, which, while leaving the artist free to express the idea put before him as his genius may suggest, will regulate the work by such a sufficient definition as will insure a general harmony in the result, so that the work of one,—excellent, perhaps, in itself,—may not have to be rejected, because it may not harmonise with some others. To illustrate what I mean, I think that instructions to competitors should determine the leading points as follows:—

1. The competition to be for four groups, of not less than three figures in each, illustrating the following subjects:—

   a., *b.*, *c.*, *d.* } The committee should select the subject (historical, not allegorical).

2. The arrangement of each group to be pyramidical, and no equestrian figure to be introduced.

3. The figures of each group, if standing, to be 12 ft. high (some may think 10 ft. better).

4. The scale of the models to be one-third full size.

5. The material to be Sicilian marble.

6. Sculptors may compete for any one or all of the four groups.

7. The successful competitor to be entrusted with the work, for which £ will be paid.

8. Second and third premiums for each group, of 150*l.* and 100*l.*, will be awarded.

Let me add that I have outlined the above, not for a moment supposing that what I suggest may not be improved, added to, or altered for the better; but only to bring to the surface some of the points requiring to be considered, and I hope sculptors will not fail to criticise and make their own views known through your columns, for it seems no other opportunity will be afforded before the first steps are taken, and then, of course, it will be too late. It is unfortunate that sculptors are not represented by any central body, Academy, Institute, or Society, which could speak in the name of the whole, and individuals, of course, are reluctant to make themselves prominent. I feel sure any good suggestions in this most important and interesting matter would be received by you in all confidence, and must be allowed due weight.

James Edmeston.

THE LONDON AND PROVINCIAL STEAM LAUNDRY.

We must congratulate the company associated under this title upon the possession of what seems to be a very complete set of buildings for their purpose. They are erected in the Battersea Park-road, and cover more than an acre and a half of ground, Mr. Ernest Turner, of Regent-street, having been the architect, and Messrs. Scrivener & Co. the contractors. The machinery has been supplied and fitted by Messrs. Bradford & Co., of Manchester. The works were opened to visitors on Wednesday last, and we had an opportunity of seeing all the working details. The arrangements appear to be excellent, apartments for the various processes succeeding each other, so that the articles treated continually move on until they reach the van by which they are to be returned to their various owners. The general washhouse is a lofty apartment, with an area of about 50 ft. by 30 ft., having down the centre a double row of Bradford's "Vowel A" washing-machines of various sizes. Along the north wall is a range of large-sized pigeon-holes or racks, each capable of containing, when duly folded, just so many socks, napkins, shirts, or what not, as can be introduced at one time into the open mouth of the washing-machine, thus greatly economising the time occupied in charging them. Along the opposite wall is a range of washing and boiling troughs for such articles as may require these methods of handling, with a tramway arrangement by which manipulation is much facilitated. At the north end are the tanks of boiling soap solution, compounded after a recipe which, without the use of chemicals, produces, in some half-dozen turns of the ponderous machine, a lather of proper thickness and fineness. At the opposite end are the "hydros," in which, when washed and rinsed, the various articles are whirled round at the rate of about 400 revolutions per minute, till every drop of extractible moisture is driven off through the open wire sides, without, it is maintained, any of that straining or rending of the fabric

inseparably attendant on the primitive process of wringing. How far this is the case we must leave time and the housewives to determine.

We cannot now pretend to describe the establishment, but will mention a few points that deserve attention.

The ventilation of the boiler-house is unusually complete, and the same may be said of the entire building, special attention having been given to this essential point by the architect.

For infected linen there is a separate department. The infected articles, being collected, not in baskets, but in open wire-work crates, are inserted bodily, without unpacking, into the disinfecting chamber, where they are subjected to dry heat, and the washing, &c., are carried on in the same isolated house.

On the opposite side of the yard are the stables, a fine and well-ventilated range, accommodating at present ten horses, but capable of extension as circumstances may require. Beyond this again is the van-shed, where the white vans of the company, with their blue lettering and smart scarlet wheels and shafts, make a handsome show.

A well, over 400 ft. in depth, has been sunk in the yard, at a cost of something over 600*l.*, and extending into the chalk, from which it extracts a supply of water running, if required, to 15,000 gallons per diem, and described by Professor Hehner, of the Analytical Sanitary Institute, as singularly good for the purpose.

As to the sewerage, great care has been taken. Every drain throughout the works runs into a central channel effectively cut off from the common sewer by ventilated manholes, and is thoroughly approachable for inspection and cleansing from end to end. The amount expended may, we understand, be called about 15,000*l.* for the buildings, and 10,000*l.* for the machinery and fittings.

DECORATION OF ST. PANCRAS CHURCH.

During the last two months this well-known church has been in the hands of Messrs. Crace, and it will be again opened for service on Sunday next, October 3rd. An important change has been effected in the aspect of the interior, which, with its walls of "Pompeiian" red, no longer produces that gloomy impression which it before shared with many of its "Classic" sister churches in London. A building with a flat ceiling, 117 ft. long by 60 ft. broad, and only 40 ft. high, may be said to present distinct difficulties to the decorator; but these have been boldly met, and not without success. The ceiling in question is originally divided by very wide margins into a great number of very small panels or shallow coffers, containing at intervals pendent rosettes. The margins are kept light, of a quiet stone tint, and the panels mostly blue, with a Greek star in each, only those being coloured red which emphasise the general design. The proportions of the panels are improved by carrying the blue or red somewhat beyond their own limit. The cornice, which has the demerit of consisting of a great number of small mouldings, without any frieze or leading feature, has been brought out with firm colour and solid gilding. The walls above the galleries are painted a bright, luminous red, whilst below the galleries so much of the wall as is not occupied by the numerous marble tablets is of a darker tone, the window and door dressings throughout being kept light. The gallery fronts are also light, with bronze and gold mouldings, and are divided by ornament into spaces which accord with the columniation below them. The dwarf columns which support the galleries are also treated as bronze, and relieved with gilding. The apse or "tribune" (which already contained three good but somewhat dark stained windows, is now made rich and effective by a series of wide horizontal bands of fine Greek ornament, on gold ground, which well relieves the six heavy verd-antique scagliola columns. These columns are said to be the largest ever made in scagliola, and will be remembered, by those who know St. Pancras, as the leading features of the interior. The topmost of these gold bands bears words (from Isaiah), "Come ye, and let us walk in the light of the Eternal." The high plinth below the columns is decorated principally in a rich morone colour and gold ornament, which is made to connect and frame the white marble tables of the Decalogue, Prayer, and Creed, which already existed. The oak seating remains, and has been renovated. New warming-apparatus, on Grundy's system, has been introduced, and, under the supervision of Mr. Salter, architect, the surveyor of the fabric, other general repairs have been executed. The cost of the works has been undertaken by a committee of the congregation, who have relied entirely upon private subscription. The church was designed by Inwood, and built in 1820-22, at a cost of 76,000*l.* The renovation will cost over 2,000*l.* The Rev. the Hon. Canon Spence is the present vicar, who has actively promoted the work.

WESTMINSTER VESTRY-HALL COMPETITION.

Sir,—As, with your usual courtesy, you complied with the request of the Vestry not to notice these designs until they had been examined by themselves; and as they have now come to a decision without affording you an opportunity of previously expressing an opinion, I ask you, in the interests of justice, which you have ever upheld, to consider and give your opinion as to the decision arrived at. Mr. Charles Barry, it is true, advised it, but strangely ignored the principal condition imposed upon the competitors. This was, that 15,000*l.* was to be the limit of expenditure, inclusive of such a large ball as could be provided within that sum.

Nevertheless, he adjudged the three premiums to three designs, two of which, according to their authors' reports, failed entirely to include the said hall; and the third design, obviously more costly in character than either, ought equally to have been put out of court by Mr. Barry on that ground, as also the elevation sent with it to double the allowed scale.

It will be obvious to you, Sir, that other designs which fulfilled the above-named conditions must have been placed at a disadvantage with these.

In other respects, also, the report which has been published, and the designs themselves, deserve careful consideration, and should be studied in connexion with the instructions to which the competitors were bound to adhere, and which have been treated as a dead letter.

John P. Seddon.

PROFESSIONAL REFEREES IN COMPETITIONS.

Sir,—Now that some architects are trying to prove that the appointment of an architect of eminence produces unsatisfactory results, taking as examples the recent competitions at Glasgow and in Westminster, I think it well to call your attention to a case in which the result has been perfectly satisfactory. Referring to the tenders published in the professional journals last week for the erection of a New Market Hall at Over Darwen, it will be seen that the accepted tenders amount to 13,417*l.*, or about 1,600*l.* less than the estimate of Mr. Charles Bell, the architect.

The competition designs were invited last year, and Mr. A. Waterhouse drew up the conditions as well as a report on the designs. The Corporation accepted, without question, the award of Mr. Waterhouse. Mr. Bell was formally appointed architect, and the amount of premium did not merge into the commission.

I think that the memorial to the Institute of Architects by Mr. Cole Adams and his colleagues can do but little, although I was One who Signed It.

P.S.—What a dreadful disappointment to the Richmond Vestry, after selecting a design marked "Natation," believed to be by a local resident, to find "Two Richmonds in the field."

DRAINAGE AND SEWERAGE.

West Bromwich.—A special meeting of the West Bromwich Improvement Commissioners was held on the 16th ult., to consider the sewerage scheme which it is proposed to adopt for the town. Mr. Reuben Farley presided. A plan and explanatory report with reference to the scheme were presented by the town surveyor, Mr. John J. Eayrs, C.E. The report set forth that the returns for the year 1879 showed that the population of the township was 53,639, and for the purposes of his calculation Mr. Eayrs had taken the population at 54,000. In the year referred to there were 10,800 houses. At present the sewage and surface-water was discharged into the River Tame, Birmingham and Tame Valley Canals, and certain watercourses. The estimated quantity of sewage per twenty-four hours was 1,609,950 gallons, and with the estimated increase it would be 2,414,850, which would have to be provided for. In the opinion of Mr. Eayrs the "separate system" of sewerage would be the best for the township. The plans provided for the drainage into the Westbromwich system of 270 acres of Smethwick, with a present population of 2,985, and an estimated increased population of 4,475. The land proposed to be purchased for the purification of the sewage was known as Friar Park, and was situated at the western extremity of the parish, adjoining Bescot Station and land about to be purchased by the corporation of Walsall for the disposal of sewage. The area of the land for Westbromwich was 287 acres, provisionally purchased from the Right Hon. the Earl of Dartmouth, tithe-free, for 20,000*l.* The system of intermittent downward filtration was recommended for the disposal of the sewage of the parish. The report further set forth that it was proposed to carry out the drainage scheme in three sections, and the plans now drawn up provided for the first section, which, it was estimated, would cost 54,726*l.* 11s. 9d. A resolution was passed approving of the plans and first section of the scheme drawn up and presented by Mr. Eayrs, and requesting the sanction of the Local Government Board to a loan of 60,000*l.* from the Public Works Loan Commissioners, the repayment to be spread over a term of fifty years.

Nairn.—A system of drainage has lately been completed at Nairn, at a cost of about 3,000*l.* Instead of running the sewage into the sea, it was resolved to apply it to the irrigation of a piece of waste ground for the growth of grass or other produce. The drainage had to be carried across the river, and for this purpose two piers, consisting of iron cylinders filled in with concrete, were sunk. The pipe,—an 18-in. iron pipe,—was laid upon them, and with footboards and hand-rails on the top of it, the pipe has been converted into a foot-bridge, which has proved a great public convenience. The level of the pipe being higher than the ground on the other side, a large embankment was raised, in which the pipe is embedded, and the top of the embankment is utilised as a public walk. The place selected for the sewage farm was known as the Salt Marsh. The soil was very thin and poor, and the subsoil consists of sand and gravel. The place was let for a few pounds as a grazing outlet to a neighbouring farmer. The first work of the engineer was to devise means to keep back the tide. This he has succeeded in doing by building in the heart of the embankment a dyke of clay, going down to the rock. At present only ten acres are being treated for the utilisation of the sewage. Its distribution is carried on by a series of channels cut in the ground, and is completely under control, one part being treated one day and another the next. The cost of the work in disposing of the sewage, including building, &c., is about 1,542*l.*, of which 200*l.* has been expended in levelling the ground.

SCHOOL-BOARD SCHOOLS.

Great Grimsby.—The second new school erected by the Grimsby School Board was opened a few days since. It is in the West Marsh, on a fine open site given by the Corporation. It has two main fronts, to South Parade and Fildes-street. It accommodates 260 boys, 260 girls, and 260 infants, and each department contains a large main school-room and three class-rooms, together with teacher's rooms, &c. A caretaker's house is placed at the angle of the two fronts. This has an octagon slated roof. The buildings are of good local pressed bricks; the windows having Bath stone lintels and sills, with blue brick bands. The roofs are slated, with red ridges. Each of the playgrounds is tar-paved, and has a covered playshed. The desks are all on the dual system, made in the town from Messrs. Colman & Glendenning's pattern. The total cost, including fencing, paving, playgrounds, fittings, architects' commission, &c., but exclusive of site, has been 5,377*l.*, or less than 7*l.* per child. The architect is Mr. Charles Bell, and the builders are Messrs. Riggall & Hewins, Grimsby.

Newcastle-under-Lyme.—The School Board here is erecting schools in the Barracks-road, to accommodate 1,000 children. Messrs. Chapman & Snape, of Newcastle, are the architects, and Mr. John Gallimore is the contractor, the amount at which the contract was taken being 3,847*l.*

At the Exhibition just held in Leyden, Holland, a gold medal was awarded to Messrs. Worr & Lewis, of 11, Lawrence Pountney-lane, Cannon-street, London, for their improved hand-power circular and band-sawing machine, and for their mortising and boring machine.

Books.

A Handbook for Painters and Art Students on the Character and Use of Colours, their Permanent or Fugitive Qualities, and the Vehicles proper to Employ. By W. J. Muckley. Baillière, Tindal, & Cox, London, 1880.

Most persons on noticing the title of this book and its publication at the present juncture will have supposed, as we did, that it was a kind of corollary to the protestation which has recently been made on the subject of colouring materials by certain painters. The author, however, specially mentions that it was in the press some weeks before Mr. Holman Hunt read his paper on "Painters' Materials" at the Society of Arts in April last. Mr. Muckley seems to have done eminently good service in bringing out a book of this kind on such a subject—a book short, concise, and practical, giving not a word more than is necessary, and based on long practical experience. The treatise is preceded by a brief preface by Mr. Poynter (to whom it is dedicated), expressing his concurrence in the views of the author, and his high opinion of Mr. Muckley's judgment on the subject. For the many readers who go by names it may no doubt have been necessary to provide the book with some such warrant from an artist of established fame, and Mr. Poynter, as the official head of the Government schools of art, was on other grounds a peculiarly suitable referee. Those who have knowledge of the subject will at once perceive that the author understands it; but then they are not the people who most need the book.

The author rightly urges, in his own preface, that the artist has no right to neglect the subject of permanence of pigments and allow himself to be careless about it as a prosaic matter. If he does not care about his own future fame, he has no right to disregard the interests of those to whom he has sold pictures, under the supposition that they will be permanent possessions, and he incurs a culpable responsibility if he wilfully neglects all care about the stability of the materials with which they are painted. *Caveat emptor* cannot rightly apply here, because the buyer is exactly the person who cannot know much about the matter. Even if the purchaser knows anything about the chemical composition and action of pigments, vehicles, and varnishes, he cannot know what the painter has used, and how he has used it. "It therefore becomes all the more imperative on the painter's part that he should thoroughly deal with it as a necessary part of his education and practice, or in ignorance he may lay himself open to the charge of supplying to his client that which he did not bargain for."

Mr. Muckley first ranges under the head of "Permanent Colours," the colours which he thinks can be justly so called, subdivided under the heads of whites, yellows, reds, blues, greens, and browns. The constitution of each colour, whether vegetable or mineral, is briefly mentioned, and any particular quality in it, either good or bad, which requires special attention. The only deficiency we find in this portion of the book is that the author does not clearly state whether all his remarks refer equally to the behaviour of the colours whether used as oil or as water colours. In general they probably would apply equally to either, though there must, we should imagine, be some cases in which a pigment may be permanent with oil and not with water, or *vice versâ*. We appear to be worst off in the matter of yellows, in regard to which Mr. Muckley seems to be generally sceptical; for though he says lemon yellow is the only yellow the painter can use with safety, he afterwards speaks very disrespectfully even of that: indeed, his remarks on it are contradictory. "It is the only colour of the kind on which we are at all able to rely, and this varies so often,—both as to purity of colour and density, that it will rarely ever serve the purpose of a primary. It should therefore be regarded with suspicion." It is certainly not a very powerful or effective yellow, as the author elsewhere admits. Cadmium yellow, the most powerful of yellow pigments, is placed by the author among the colours of inferior permanence. Yellow ochre he believes in, and Naples yellow "under all ordinary conditions." It again, however, seems rather a contradiction to be told that the old masters used yellow ochre a great deal, and elsewhere to read that "no permanent true yellow pigment appears to have been discovered by the ancients suitable for the painter's use." "The transparent vegetable yellows have been used during the last three centuries, in combination with blues, to form greens. In all cases these yellows have flown away, and only the blue colour with which they were originally mixed has remained." The opaque yellows from arsenic have gone in a different way, from damaging the colours combined with them. Altogether, the advice in regard to using yellow seems nearly to amount to that once given to people about to marry,—"Don't." However, people will go on marrying, and painters will use yellow, and perhaps both will get along somehow.

The reds and the blues are better behaved colours. The madders and vermilions used by the early painters have retained their power and purity, Mr. Muckley finds, down to the present day; though one result of this is that they now appear far too strong and brilliant for their surroundings. "Many reds," adds the author, "have been added to the old list, but they are either ineligible, or require the greatest care in the use of them." Among reds of inferior permanence, which change certainly when combined with others, and probably when alone, an old and much-used friend, crimson lake, is gibbeted. Carmine is even in worse case, the old colour; but madder carmine may be trusted. Of the decided red colours the author recommends vermilion, Venetian red, and light red, the latter being, in fact, "yellow ochre calcined to redness." Of the blues, ultramarine, of course, the queen of colours, takes the lead, and cobalt and French ultramarine stand well. Smalt, Prussian blue, Antwerp blue, and indigo are all condemned,—a sad levelling of old and respectable reputations. We must leave the reader to look up greens, greys, and browns, and study the remaining matter in regard to the primaries, in the book itself, which most people who have to make practical use of pigments will probably purchase. At the end of the chapters on the choice of colours are given three tabular lists,—the first, of permanent and reliable colours; the second, of those doubtful and unreliable; the third, of colours so fugitive that they should never be used; "and if colour-makers would cease from manufacturing them it would be of the greatest importance to the art." Among these last are found such well-known and often-used colours as Indian yellow, rose pink, chrome green, &c.

To this part of the book succeeds a very useful and tolerably full consideration of vehicles or mediums and their use and abuse, followed by other general suggestions in regard to the use of the painter's tools, some of which are comprehensive and very pithily expressed. Mr. Muckley recommends the habit to be early formed of using large brushes. The student will thus be obliged to work slower and with more deliberation. "When painting with large brushes, every stroke must be well guided, or confusion and emptiness will soon be the result. Every touch, when well directed, will probably be the just embodiment of the eye, the mind, and the hand, which last should ever be the obedient servant of the two other agents. The hand should never be permitted to work on its own account, a habit which we so constantly see. . . . . The use of small brushes favours poor work. They do not require so constantly directing as large ones do." The spirit-rapping "medium" in Mr. Browning's poem says about pens,—

"Who knows if you drive them or they drive you?"

and Mr. Muckley, without being a "medium," seems to suggest that the question may reasonably put as to brushes. The attention of architects may be directed to the remarks as to the lighting of studios for various classes of painting, and the treatment and colouring of the walls (pp. 73-75).

In regard to the preparation of colours and materials, the author comments on the very different condition under which painters work now, when everything is supplied to them ready made, and the artist may, as *Punch* suggested, "have nothing to do but just shove the colours on," as compared with the time when painters occupied a great deal of their own time and attention in preparing canvasses, brushes, colours, and vehicles. Under those circumstances an artist at least knew pretty well what he was working with, and Mr. Muckley seems to think, not unreasonably, that this practical work was not without its good effect on the artist, "sharpening the appetite of the real student, making him doubly eager to follow the more pleasant part of his occupation when the time arrived for him to do so." We may add that to every man whose main occupation is æsthetic or ideal, some degree of practical occupation is most valuable, as preserving the balance of the faculties and the character. We are not expecting that artists will take to mixing their own varnishes and vehicles again, or grinding their own colours; but the fact that it is all done by tradesmen for them now has at least this drawback, that the interest of the tradesman is merely to sell colours; he has no direct interest in making them permanently fitted for their work in the best way; whereas the painter who mixed his own colours had the ultimate result at heart. But the same dealer sells, indifferently, permanent and fugitive colours, and cares not which, so long as he does sell them. Now, says Mr. Muckley, "Let some colourman begin anew, by taking special care that all the materials which come into his hands are pure, and that the washing and grinding of certain pigments be as perfect as possible. Let him also supply only those colours which he knows to be of the best quality and permanent. Or if he chooses to sell those which are semi-permanent, let this be indicated on the usual label attached to the tube or cake, so that painters may be made aware with what they have to deal. The price of such materials might be raised according to the extra time and care given to their preparation. There can be no doubt that any colourman who would take up the business in this form would soon have the best part of it to himself, for at the present time no such person exists. The formation of a body or society for the preparation of painters' materials, under the immediate control and direction of painters of repute, would doubtless be still better." The mere additional cost of making colours carefully should count for little or nothing in the matter, when we consider the importance of the subject to art and artists, and when we realise that "from a few tubes of colour, of small comparative cost, a work of the value of hundreds, and sometimes thousands of pounds, is often produced." With which practical quotation we take leave of a very practical and useful little book.

VARIORUM.

"The Electric Light for Industrial Uses," by R. E. Crompton (Mansion House-buildings), although only a pamphlet, and having to some extent a personal motive, gives some plain, straightforward information on the subject, which many are seeking for.——Mr. John H. Webber has published, on a sheet, sketches of some of the numerous memorials of eminent Nonconformists to be found in Bunhill-fields burial-ground.——The *Magazine of Art* has a touch at our ugly street-lamps:—"A lamp in Paris or Brussels is an elegant object, of a sort of bronze, tapering up, with a little half-raised decoration of leaves running round, and crowned with a pretty lantern. The lantern is the chief and all-important feature, the post being merely to support it. But here some kind of glass "thing" is perched on the top of a massive cast-iron pillar. Then this bulk is a waste of strength and emphasis. So, too, with the newly-introduced lanterns in the City, made in the shape of cylindrical cups out of one piece of glass. This was suitable in the case of the old oil-lamps hung out by a branch from the wall, and when the light was cast downwards; but here the absurdity has to be introduced of breaking a hole in the lower spherical surface to introduce the gas-jet. This clumsy device actually interferes with the light."——In the first number of the new serial, "Egypt" (Cassell), readers are reminded that the ancients took pains in laying out their cities. This is the course that was followed in laying out Alexandria:—"Orders were given for the measurement of the ground and foundations, and the architect, Dinocrates, was commissioned to prepare a plan. This took the form of a Greek *peplum*, or of a fan, and the work of indicating the direction to be followed by the roads, and the extent of the market-places, was begun by strewing white earth on the level ground. The supply of this material falling short, it was supplemented by the assistants of the architect taking the meal which had been provided in abundance for the labourers. The legend goes on to say that hardly had this been sprinkled on the soil when numbers of birds came flying down to feed on the welcome supply of food. Alexander hailed the appearance of these feathered guests as a favourable omen, signifying the rapid prosperity and future

wealth of the city."——"The art of Fan-painting," from the French of the Baronne Delamardelle (London: Lechertier & Co.), gives information which will be found useful by those who desire to attempt the practice of this pleasant and sometimes profitable art.

Miscellanea.

Sale of the Royal Dramatic College.—This ill-starred building found a purchaser in the person of Mr. Chabot, the "expert" in hand-writing, to whom the trustees, under an order of the Charity Commissioners, have sold it for a very small sum over the reserved price of 5,000*l.* Considering that the building has been sold along with the grounds, containing ten acres of freehold land adjoining the South-Western Railway, the purchaser is said to have secured a bargain. Mr. Chabot has bought the building entirely on speculation. Last week the furniture and fittings of the twenty dwelling-houses of the pensioners in the college, together with those in the great central hall, and the out-door effects were sold. The pictures, drawings, and a variety of other gifts of considerable value, together with a library containing upwards of 1,500 volumes will shortly be sold in London; and it is stated that the Charity Commissioners have directed that the proceeds of the sale of the college and effects are to form a fund for the benefit of the pensioners of the college.

Fall of Buildings.—On Thursday in last week, about half-past nine in the evening, the greater part of the back of the premises, No. 34, Knightrider-street, Doctors' Commons, suddenly fell into the roadway of Peter's-hill, completely blocking up the thoroughfare with the *débris*.—— A singular accident occurred about a quarter to ten on the previous evening in White Hart street, Drury-lane, where the pavement in front of the shop of Mr. Prendergrass suddenly fell in without any warning. It would appear that the pavement is built on a succession of vaults, although the houses have no connexion with them, the foundations of the latter being quite independent. Some two months ago the parish had occasion to repair the drain in the immediate neighbourhood of this shop, and this is believed to have interfered with the stability of the wall between the fallen vault and the one next to it. Fortunately no one sustained personal injury by either accident.

Profit of Public Works.—M. de Labry has written an essay, in which he discusses the various advantages of public improvements to invested capital, to adjacent regions, and to the Government, showing that the dividends to stockholders and the direct revenues of Government constitute only a small portion of the benefits conferred by increased facilities for travel and the transportation of merchandise. He thinks that both self-interest and duty should prompt the inhabitants of regions which have been well developed to contribute towards the opening of new districts. Even if the contributions appear to be sunk, the increase of trade and of general prosperity will, almost without exception, amply repay all the outlay.—*Ann. des Ponts et Chauss.*

Tramways, Great Grimsby.—The Provincial Tramway Company are now laying about four miles of line in this rapidly-rising seaport, which will no doubt be a boon to the inhabitants. Messrs. Davis & Emanuel, of London, are the engineers for the works, which are being executed under the superintendence of Messrs. Manghan & Cuxson, of London and Grimsby (as resident engineers) by Messrs. Riggall & Havins, contractors, of Grimsby. It is expected that the lines will be opened early in January next.

Candidates for District Surveyorships. At the meeting of the Metropolitan Board of Works, on this Friday, Oct. 1, the Board are to consider a letter from the Royal Institute of British Architects, stating that they are desirous of improving the character of the statutory examination of candidates for certificates of competency to perform the duties of a district surveyor in London, and that they have discussed the advisability of imposing a moderate fee upon each candidate, and inquiring whether the Board would acquiesce in such a course.

Arnold Sewerage Works.—Mr. Frederick Jackson, C.E., Nottingham, is the engineer for the above works, the tenders for which we printed last week.

Defective Gas Mains.—Large street excavations have just been made in the Mile-end-road and other East-end thoroughfares on account of the discovery that a very considerable quantity of gas was escaping at some points of the gas mains into the street sewers. It became absolutely necessary to make an immediate examination, and, as the subway system is not in operation in the district, the streets had to be opened up in order to get at the defective parts of the mains so as to make them gas-tight.

Exhibition of Gas Apparatus, Glasgow. Under the auspices of the Philosophical Society of Glasgow there is now being held an exhibition such as has never previously been held in Scotland, and such, indeed, as has never been equalled in the United Kingdom, if we consider its extent and variety, and the great degree of scientific interest attaching to the collections of exhibits in several of the departments. Briefly it may be called a Gas Apparatus Exhibition, but it is that and a great deal more.

School of Art Wood-Carving. — Free studentships in both the day classes and the evening classes of the School of Art Wood-carving, at the Royal Albert Hall, Kensington, are at present vacant. These studentships are maintained out of funds provided by the City and Guilds of London Institute for the Advancement of Technical Education. Forms of application and prospectuses of the school may be obtained on application to the Secretary.

Brixton.—A stained-glass window has been presented to St. John's Church, Angell Town, by Mr. Charles Mansfield, of the Burton-road, in memory of Sarah his wife, who died on the 1st of May last. It is a two-light window, and the subjects represented are scenes at our Lord's Resurrection. The work has been executed by Messrs. Heaton, Butler, & Bayne, under the superintendence of Mr. Harley M. Grellier.

Cemetery for the Parish of St. Mary Cray.—Designs for chapel, mortuary, lodge, laying-out roads, &c., are invited in competition. More than one correspondent have pointed out that the stipulated expenditure, 1,200*l.*, is too small for what is asked for, and that designs cannot be prepared properly by October 16th as required.

Hanley School of Art.—The Hanley School of Art, which has done much useful work in promoting good design in English pottery during the last quarter of a century, is about to be re-opened, after the enlargement of its buildings at a cost of about 2,500*l.* The committee appeal for subscriptions towards meeting this outlay.

Safety of Canterbury Cathedral.—Attention has been properly drawn to the dangerous condition of the staircases leading to the top of the central tower through the accumulation therein of inflammable matter carried in by birds.

Dublin.—The erection of the (R.C.) church of St. Agatha, North William-street, Dublin, has been commenced. The new church will be 154 ft. in length, 45 ft. in width, and 33 ft. in height. Messrs. O'Neill & Byrne are the contractors, and Mr. Toole is the architect.

Photographic Society of Great Britain. The private view of the annual exhibition of photographs will take place this Saturday, October 2nd. It will be opened to the public on Monday, the 4th inst.

Sewer Gas.—Five men have been killed in clearing out a short length of sewer in Paris by the foul gas which it appears to have contained.

Clonakilty.—The opening of the (R.C.) Church of Mary Immaculate, Clonakilty, took place on the 25th ult. It has been built at a cost of 29,000*l.* from designs by Mr. Ashlin, of Dublin.

TENDERS

For forming new roadway and sewer in Adpar-street Edgware-road. Mr. Gundry, architect:—

	Sewer.	Road.
Williams & Co.	£749	£960
Mowlem & Co.	710	795
Nowell & Robson	650	849
Keeble	620	800
Boyer	670	782
George	645	800
Killingback	644	755
Neave & Son	669	750
Burford & Ball	590	750
Alldred	468	728

For building five warehouses on Great Saffron-hill, for Mr. John Jaques. Messrs. J. & S. F. Clarkson, architects. Quantities not supplied:—

Langmead & Way (accepted).

For the erection of new stable buildings, Great Enton, Witley, Surrey, for Mr. F. E. Eastwood, J.P. Mr. Henry Peak, architect:—

Martin, Wells, & Co., Aldershot and London (accepted) £2,147 0 0

For range of glass houses, potting-shed, and garden walling, Great Enton, Witley, Surrey, for Mr. F. E. Eastwood, J.P. Mr. Henry Peak, architect:—

Martin, Wells, & Co. (accepted) £767 5 0

For new stable and coachhouse, "Greylands," Horsell, Woking Station, for Mr. J. P. Fitzgerald. Mr. Henry Peak, architect:—

Gale, Woking Station	£665 0 0
Wilson, Woking Station	583 0 0
Butt, Woking Station	545 0 0
Harris, Woking Station	486 10 0
Sheers, Maybury (accepted)	350 0 0

For house, Seven Sisters-road, for Mr. E. Jarrett Messrs. Lee & Tregelles, architects:—

Conder (accepted) £1,570 0 0

For workshops, &c., Southampton-mews, Euston-road for Mr. T. Hughes. Mr. G. P. Raggett, architect:—

Grover	£2,683 0 0
Patman & Fotheringham	2,543 0 0
Macey & Sons	2,404 0 0
Bird	2,395 0 0
Conder	2,367 0 0
Scrivener & Co.	2,294 0 0

For roads and drains, Oakfield Estate, Ashtead, Surrey. Mr. John Norton, architect:—

Ford & Co.	£5,999 0 0 !
Dyer	4,880 17 6
Norris	4,884 12 10
Sibsey	4,570 0 0
Crockett	3,335 0 0
Burford & Ball	3,199 0 0
Impey	2,980 11 10
Bloomfield	2,776 0 0
Catley	2,715 9 9
Blake	2,665 18 0
Strachan & Co.	2,603 19 11
Woodham Bros.	2,505 0 0
Botterill	2,499 0 0
Bell	2,389 0 0
Peill & Sons	2,345 0 0
Rigby	2,150 0 0
Hancock, Jun.	2,075 0 0
Cole	1,926 6 0
McKenzie & Co.	1,810 0 0
Kavanagh	1,736 0 0
Caulton	1,627 14 0
Taylor & Co.	1,493 7 6
Putney	1,386 0 0 !

For new Congregational Church, Widmore-road, Bromley, Kent. Mr. J. Sulman, architect. Quantities supplied:—

Austin	£7,646 0 0
Higgs	6,859 0 0
Reading	6,517 0 0
Linzell	6,560 0 0
Staines & Son	6,194 0 0
Hollidge & Stuart	6,230 0 0
Hobern	6,050 0 0
Lowe	6,153 19 0
Bowyer	6,186 19 0
Smith & Son	6,074 0 0
Batley	5,900 0 0
Garrud	5,651 0 0
Arnaud	5,688 0 0
Beale	5,525 0 0
Crossley	5,495 0 0
Grubb	5,235 0 0
Stephens & Bastow (accepted)	5,299 0 0

For the erection of Nos. 3, 4, and 5, Wychombe Studios, Haverstock-hill:—

Nash	£2,230 0 0
Gregory & Bruce	2,224 0 0
Gould & Brand	2,098 0 0
Langmead & Way	2,050 0 0
White (accepted)	1,989 0 0

For alterations and additions to the Royal Oak Tavern, York-street, for Messrs. Murrell. Mr. W. E. Williams, architect:—

Edgar	1,663 0 0
Perkins	1,433 0 0
Yeo	1,321 0 0
Marr	1,287 0 0
White	1,249 0 0
Mark	1,223 0 0

For alterations and additions to the Green Man Public-house, Edgware-road, for Mr. John Hancock. Mr. Josiah Houle, architect:—

Temple & Foster	£1,288 0 0
Mark	1,239 0 0
Canning & Mullins	1,177 0 0
Langmead & Way	1,130 0 0

For re-erecting a part of the Royal Oak Brewery, Croydon, for Mr. F. Overton. Messrs. Scamell & Colyer, engineers. Quantities by Messrs. Curtis & Son:—

Morter, Stratford	£2,347 0 0
Smith & Sons, Islington	2,329 0 0
Boiler.	
Horton & Sons	£385 0 0
Copper Coil, &c.	
Pontifex & Sons	604 0 0
Millwrights' Work.	
Thornewill & Warham	663 0 0

For roads and sewers, Abbey Lodge Estate, New Wimbledon, for Messrs. Teuten, Robottom, & Co.:—

Martin & Welmarsh	£1,999 0 0 ! !
Ellis	1,340 0 0
Blackmore	1,050 0 0
E. & W. Hes	1,041 0 0
Harris	894 0 0
Jackson	866 0 0
Pizzey (accepted)	858 0 0
Taylor	587 0 0 ! !

For a school on the Limes Estate, Croydon. Mr. Charles Henman, architect:—

Bellham & Co., Buckingham Palace-road	£955	16	0
Taylor, Croydon	925	10	0
Laing & Co., Parliament-street	913	0	0
Holt, Croydon	884	16	4
Marriage, Croydon	869	10	0
Clark & Bracey, Coleman-street	839	0	0
Smith & Sons, South Norwood*	763	0	0

* Accepted.

For a residence, Birdhurst-road, Croydon. Mr. Charles Henman, architect:—

Humphries, Sutton	£2,670	0	0
Laing & Co., Parliament-street	2,468	0	0
Glaskin, Croydon	2,390	0	0
Williams & Son, Canonbury	2,360	0	0
Taylor, Croydon	2,319	0	0
Bellham & Co., Parliament-street	2,202	1	8
Marriage, Croydon	2,200	0	0
Smith & Sons, South Norwood*	2,117	0	0

* Accepted.

For a residence, Radcliffe-road, Addiscombe. Mr. Charles Henman, architect:—

Goddard & Son, Farnham	£4,265	10	0
Jarrett, Croydon	4,100	0	0
Macey & Sons, Strand	4,010	0	0
Marriage, Croydon	3,970	0	0
Laing & Co., Parliament-street	3,960	0	0
Glaskin, Croydon	3,887	0	0
Smith & Sons, South Norwood*	3,709	0	0

* Accepted.

For the erection of five cottages and corner shop at Hemel Hempstead, Herts. Mr. Walter T. Feldon, architect:—

Monk	£1,300	0	0
Flint	1,100	0	0
Horn	1,060	0	0
Philbey, Hemel Hempstead*	835	0	0

* Accepted.

For villa residences at West Heathfield, Twickenham, for Mr. D. W. Palmer:—

	One Pair.	Two Pairs.
Pillar	£795	£1,585
Potter	700	1,400
Cordery	709	1,380
Coney	764	1,358
Collier	700	1,340

For erecting shop at Old Southgate, for Mr. T. Sugden. Mr. William Smith, architect:—

Shurmur	£492	0	0
Harper	476	0	0
Dunford & Langham	466	0	0
Newby	456	0	0
Steele Bros.	460	0	0
Larke	443	0	0
Wheeler	427	0	0

For proposed additions to Wycliffe Hall, Oxford. Mr. Wm. Wilkinson, architect:—

Castle	£3,280	0	0
Dobson	3,275	0	0
Frankland	3,080	0	0
Wyatt & Sons	2,916	0	0
Symm & Co. (accepted)	2,777	0	0

For erecting seven shops adjoining the Upland Tavern, North-cross-road, Crystal Palace-road, East Dulwich, for Mr. W. Sayer. Mr. G. Treacher, architect:—

Gill, Wandsworth-road (accepted)	£4,550	0	0

For alterations and repairs at the North Pole, Shadwell. Messrs. Perry & Reed, architects:—

Mark	£720	0	0
Staines & Son	688	0	0

For sundry repairs and re-decoration of Mayfield Chapel, Dalston:—

Repairs to Exterior.

Barber & Co.	£357	0	0
Jarvis & Sons	270	0	0
Shurmur (accepted)	189	0	0

Re-decorating Interior.

Goodman	525	0	0
Snook	419	0	0
Campion	393	0	0
Jarvis & Sons	300	0	0
Shurmur	279	0	0
Barber & Co. (accepted)	238	0	0

For addition to swimming-bath, Public Baths, Maidstone. Mr. Edward W. Stephens, architect:—

Smith, Maidstone	£429	0	0
Naylar, Rochester	409	0	0
Bartholomew, Maidstone	405	10	0
Cox, Bros., Maidstone	391	0	0
Elmore, Maidstone	390	0	0
Avard, Maidstone	386	0	0
Wallis & Clements, Maidstone	386	0	0
Simmonds, Maidstone	377	0	0
Vaughan, Bros. (accepted)	339	0	0

For fittings, &c., at Cheshire Cheese, Addle-street, Cheapside. Mr. H. J. Newton, architect:—

Hockley	£378	0	0
Shurmur	333	0	0
Lascelles	283	0	0
Auley (accepted)	215	0	0

New Counter.

Warne	£144	0	0
Hellings	137	10	6
South	134	0	0
Sanders & Son	119	4	0
Paddon (accepted)	119	0	0

Plate Glass and Embossing.

Gibbs, Blackfriars-road (accepted)	141	0	0

For erecting smoking-saloon and enlarging polo-pavilion, decorating dining-room and saloon, at Hurlingham, for the committee of the Hurlingham Club, Fulham. Mr. Joseph S. Moye, architect:—

Saala (accepted).

For the erection of new spinning-shed at Shafteshury House, London-fields. Messrs. Leo & Walton, architects:—

Rider & Son	£353	0	0
Barrett	345	0	0
Boyce	328	0	0
Jarvis & Sons (accepted)	310	0	0

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W. S.—J. E.—W. T. F.—J. C.—G. K. M. & Co.—J. P. S.—C. H.—C. & Co.—E. C—H. L.—H. P.— L. & W.—W. W. C.—H. C. S.—G. A. F.—H. G.—M. & C.—E. W. H.—M. W.—H. F.—J. H. W.—W. E. R.—J. A. S.—J. P.—H. H.—J. W.—H. L.—W. O. H.—J. G. C.—W. L.—J. A. C.—T. H. L.—S. & S.—F. & Son—G. T.—K. & P.—W. Y. B.—F. J.—H. F.—Dr. F (we are not able to return to it).—C. & L. (no).—F. C. (book has been posted).—H. & J. (thanks. Received).—W. F. P. (under our mark).—C. & L. (no. A description was given).—A. J. R (take proper advice on the spot).

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The Builder.

VOL. XXXIX. No. 1966 SATURDAY, OCTOBER 9, 1880.

ILLUSTRATIONS.

CONTENTS.

Decorative Suggestions from Natural Forms.

THE part played by natural vegetation in architectural ornament is very obvious in some of the best-known and most prominent features in past styles of architecture. The water-lily leaf in the Egyptian capital, the acanthus in the Greek capital, are specimens of architectural decorations in which the natural form on which the decorative treatment is founded is perfectly recognisable, and in the case of the Egyptian example is, indeed, hardly conventionalised, except in regard to its orderly and symmetrical arrangement around the capital. The Greek acanthus is conventionalised a good deal more than this; it is, to begin with, a more irregular and broken leaf in its natural form than the lotus, and had to be reduced to a conventional irregularity of form to adapt it to the spirit of Greek ornament; and as it was not used in flat incised treatment, like that of Egyptian work, but in relief, it was necessary to impart to it a comparatively solid and heavy appearance, and to get rid of its thin edges and sharp points, in order to give it sufficient weight and mass to harmonise with the architecture amid which it was placed, as well as to have some appearance of giving, at least, partial support to the angles of the abacus under which it curled. Thus the transition from nature is, after all, pretty well marked, and those who had been shown merely an acanthus-leaf in a state of nature, and told that this was elaborated into the decoration of a capital by the Greeks, would probably by no means expect to find a piece of carving so decidedly removed from imitation of nature as the Corinthian capital unquestionably is.

Other ornament in connexion with Greek architecture is even more decidedly removed from nature than this, though it may be observed that when Greek ornament is founded on natural forms the principle of the growth of nature is almost invariably retained and correctly expressed. Greek floral ornament is developed from a leading idea; it is not merely formed applied thoughtlessly and illogically. Roman floral ornament has a character and often a sumptuous effect peculiar to itself; it is still further from nature than Greek ornament, as it not only does not imitate the character of nature, but it frequently ignores altogether even the principles of nature in regard to growth and development of design; it shows us large thick masses of foliage of a somewhat heavy cauliflower type, which do not grow upon any recognisable principle, but seem to be applied in unwieldy twists and spiral bunches, mainly with the view of producing an effect on the spectator by mere massiveness and richness, and by highly-elaborated surface carving. This remark does not apply so much, of course, to the Roman capital, but then the merits of that are chiefly due to the Greeks.

Romanesque carving is oddly mingled of purely naturalistic attempts to represent foliage and small animals in as real a manner as the carver's skill allowed, and of purely abstract ornaments, looking often like classical reminiscences more or less coarsely carried out. When we arrive at the earlier complete Gothic, in this country especially, we then, for the first time, find an application of nature to ornament which is carried out on the same principles as Greek ornament, and with often nearly equal excellence, though in a very different style of execution. In the later Gothic style we find more realistic imitation of nature than we have noticed in any leading architectural style previously, and also a greater variety of vegetation introduced, especially in some exceptional cases, such as that of the chapter-house at Southwell, on which we were commenting the other day. But in general, even at this freer period of Gothic ornament, we find that prevalent types are very much repeated in the floral ornament, and only a comparatively few of Nature's types, and those among the most common and easily accessible, are pressed into use by the Mediæval carvers.

We have named the leading styles of the world, and if we look at subsidiary architectural styles we do not find any larger use of natural types of ornament, but rather less. The Arabic and most of the Oriental styles, it is needless to say, are almost entirely abstract in their architectural ornament. In Indian work it is only in worked ornament that some suggestion of Nature's comes in, and sometimes even direct imitation of nature; but that, as far as we have observed, is but seldom. When the Renaissance gave a new direction to architecture in Europe, ornament went even further from nature than ever. It developed into something founded on Roman ornament, which itself had been founded on Greek, and the reference to nature, even in the case of forms and designs which pretended to imitate nature, became thus very distant indeed, and seemed all the more so from the curious way in which the quasi-natural forms were blended with or ran into all kinds of imitations of artificial objects or unnatural chimeras. Yet one merit must be conceded to the Renaissance ornament, in which it was superior to the Roman; its foliage, however far-fetched and artificial, has a clearly-marked principle of growth and development from a root or a centre, according to the principles of natural growth, and in this respect it is more allied to Greek than to Roman taste in ornamental design, and approaches Greek ornament also in the beauty and decision of its curves. Its types, however, are even fewer than in Classic ornament, and much fewer than in Gothic; the Renaissance designer only recognising one kind of leaf and one kind of growth, combined and massed in various ways, certainly, but always the same kind of vegetation, an artificial scroll, half leaf, half stalk, derived from the Roman acanthus, reduced to more slender proportions, and employed on more definite and carefully-constructed lines.

In modern Gothic work considerable attempts have been made to introduce a greater variety of natural vegetation into architectural ornaments, and many churches have been decorated with capitals carved from knots of flowers and ferns and other vegetation, brought together for the purpose, and in some cases that we know of carved from Nature's models, placed before the eye while the work was in progress. And it is creditable to the profession of architectural carvers that in some cases this trouble has been taken not at the bidding or suggestion of the architect, but spontaneously, and from pure love of the work.

It must be observed, however, that merely carving flowers and vegetation from models is not designing ornament, and that something more of thought, more of adaptation of the form to the circumstances and the material, must be displayed to justify the claim of the work to be called ornamental design. This is what we do find to perfection in Greek and in early Gothic ornament; it is not the mere imitation of nature, but the application of natural form, retaining much of its original characteristics, to the production of ornament in a style suited to the peculiarities of the material in which it is executed, and the final form of which is the result of considerable thought, not of the mere cleverness of the hand and eye in realistic reproduction. But it is remarkable how few natural types seem to have been used in the production of ornament of this thoughtful class, and how little attempt there has been to evolve any new ones in the same class of ornament. We have gone on reproducing the Corinthian capital over and over *ad infinitum*, without it having apparently even occurred to any one that the same general form would be susceptible of varied treatment by using other leaves instead of the beautiful but well-worn acanthus, and that this variation might even be carried out in the same building with good effect, preserving the general aspect of the capitals alike, and varying the details. In the case of that beautiful production the carved Early English capital, again, we have been content to go on copying and reproducing it (very seldom with anything like the success of the Mediæval inventors), with no attempt to apply the same free yet conventional treatment, so admirably suited for execution in stone, to any other derivation from

vegetable form. It may, we confess, be doubted whether the Early English lobed foliage is adapted from any precise form in the vegetable world; whether it is not, in fact, evolved from a reminiscence of the volute of the Classic capital, which took this lobed form in the Romanesque French capitals, while still retaining its original angle position as in the Classic capital, but which the later carvers, in England more especially, adopted as the prevalent feature in the carving of a capital, introducing it with the same freedom and absence of order as if it had been a natural growth. The feature is so complete in itself, and so individual in character, that it seems difficult to touch it without spoiling it, and perhaps any effort to adopt the Early English capital with another form of detail could hardly be successful. But other forms of Gothic capital might be reproduced with foliage different from that which was used as their model by the Mediæval carvers. And if the characteristic distinction of the Classic and Gothic type of capital be kept in mind, there is no reason why the same type of vegetation might not be equally suggestive for either type of capital (or of ornament generally), and be used with totally different expression in the Classic or the Gothic manner. The radical distinction, it must be remembered, between Classic and Gothic floral ornament is that the former is geometrically and symmetrically arranged; the latter is free, and, for the most part, unsymmetrical, and imitates the irregular growth of nature even when, as in the Early English capital, it does not absolutely imitate nature in detail. This difference between symmetrical and unsymmetrical in the relation between ornament and nature is conveniently expressed in the terms "Classic" and "Gothic," the signification of which, in relation to such a point, every one readily understands; but, in reality, the distinction is a much more typical one, since the whole of ornament which is based on natural foliage may be divided into these two great classes,—that which is irregular and more or less naturalistic, of which Gothic work shows the best types, and that which, in adapting natural forms, compels them to assume an artificial and bi-lateral symmetry, and results in the type of ornament which we call Classic, and of which Greek ornament furnishes the highest and most perfect examples.

Now, considering that we have always these two essentially different methods of treating a *motif* in ornament, and that behind these we have the almost infinite variety of nature to furnish us with types and suggestions, each of which may be treated not only in one or other of these two leading methods, but may be also susceptible of several sub-variations in character arising out of the different nature and requirements of different materials, it seems strange that there has been so little effort, if not to evolve new forms of ornament, at least to give new character and treatment to old forms by taking fresh suggestions from nature. Of course all the varieties of natural form are not sufficiently marked and individualised to afford each a separate type of ornament: a good deal of similarity of character runs through many species of *flora* when taken in detail, and when taken as a whole a plant or a tree is commonly a subject for the painter rather than for the ornamentist. But even admitting this limitation, there is a variety of form in the *flora* of this country alone which is eminently suitable and suggestive for ornament, and which has never been used; and a far wider range is given if we include among our suggestive types those which are to be found in the vegetation proper to other climates, and which have scarcely been applied at all in architectural and ornamental design. Considering how frequent is the complaint of want of novelty in architectural ornament especially, and deficiency in marked character, it would seem worth while to try if new hints may not be taken from nature by way of furnishing the basis for more variety of treatment in the ornamental detail of architecture, or in ornamental work which is accessory to architecture. We propose, by way of giving these remarks a practical turn, to give sketches of some bits of natural detail such as seem specially suitable and suggestive for this purpose, and such as have been little if at all previously used in architectural detail. In doing so, we shall endeavour to draw somewhat upon exotic types of foliage, not only because these are novel in their application to this purpose, but also because there are to be found among these a good many forms peculiarly suitable thereto; forms which are more precise in their design, and more bold and free in line, than are generally to be found among the natural productions of our own temperate zone, where nature seems to work in a quieter and less exuberant style than under a tropical sun. To the sketches of nature's detail we will take leave to append, always in a spirit of modest and tentative suggestion, one or two examples of the manner in which these may be applied in the formation of architectural detail, or of ornamental detail in one of the forms which may be regarded as subservient to architectural design. The application of mere natural types to one or two different materials may also furnish opportunity for illustrating some ideas as to the manner in which ornament should be affected by the nature of the material in which it is executed, and which often in itself may almost necessarily suggest considerable varieties of treatment and of design, founded on the same initial form. The specimens of natural detail which we may be able to give will perhaps be of interest to some who have not time to collect such "cribs" from nature themselves, and if our suggestions in treating them do not meet with the approval of all, they may at least afford hints on which the taste and fancy of others may exercise themselves further.

The example we offer in this number is from a tropical shrub of very characteristic formation. The leaves have the appearance, at a little distance, of being cut short off; but in reality, as will be seen from the full-sized sketch of the end of the leaf, they are very carefully and delicately modelled. The section of the leaf is like that of a ridge-and-furrow roof. This section, with its edges and depressions, gives a great many fine lines of light and shadow, and this, as well as the flat character of the leaf and the fine and delicate curve of its lines, seem to point it out as very suitable for treatment in rather flat carved work in such a material as marble, in which the delicate curves and sharp edges can be rendered with precision. It is accordingly here adapted to a carved capital supposed to be in that material, the general form being borrowed from a semi-Byzantine form of Romanesque capital found in early French work. It may be observed that the specific epithet, *Licuala horrida*, is not to be taken as implying anything "horrid," but simply means, in the original signification of the Latin adjective, "prickly" or "thorny," referring to the stem of the plant.

Such a design as is here given might be rendered more effective in execution by picking out the lines of the leaves with gilding, either on the margin, or (better, perhaps) applied to one bevel of each ridge, leaving the alternate bevels plain.

THE BOARD OF TRADE AND THE RAILWAYS.

The circular letter of the 20th of September to the railway companies, signed by Mr. Calcraft on behalf of the Board of Trade, betrays a certain amount of tension in the relation between the administration and the managers of the various lines. It may be held to show something further, namely, the conviction entertained by the Board of Trade of their own powerlessness to exert any efficient control in the existing state of the law. Little as it is consistent with the dignity, or we might even say the utility, of a Government department to reiterate, year by year, in its official reports, that complaint of the inadequacy of the returns laid before them, which was a stereotyped feature of the reports of Sir Henry Tyler, and which has been repeated by Messrs. Calcraft & Giffen in their latest annual report, the public may be thought to have become used to it. "The companies will not furnish a word more of information than is contained in the forms authorised by Parliament," it might be said. "Some of them, as, for example, the London and North-Western, will not even do this. It is of no use to make any complaints; without new legislation the companies will defy the Board of Trade. And new legislation will not depend on the real requirements of the case, but on political or class interest conditions." So, on the principle of not crying over spilt milk, the public has left the companies masters of the field.

The alarm generally occasioned by the sudden outburst of a new crop of railway accidents seems to have inspired the Board of Trade with the idea that their hands are, at all events, morally strengthened. They have put categorical questions to the companies, the replies to which would, no doubt, be matter of public interest. And they have done this, pointedly and firmly, without having any power to enforce a reply. If the companies choose to ignore the questions, or to say that they are not bound to furnish the replies, the Board of Trade can do nothing but say that, in that case, they must go to Parliament to ask for further power. That this will be the upshot of the contention is, we think, most probable. Supposing the companies to furnish the Board of Trade, as now requested, with an alphabetical return of all the stations on their lines, showing whether the points and signals at those stations are, or are not, interlocked with one another, such returns can have no practical utility except as furnishing a basis for further requirements on the part of the Board of Trade. The general condition of the lines in this respect is well known. In 1876, on the English lines, 69 per cent. of the mileage was worked with interlocking points and signals, and the same percentage of railway was worked on the block system. In Scotland the proportions were 49 and 52 per cent.; in Ireland, 25 and 2 per cent.; and in the United Kingdom 64 and 57 per cent., respectively. By the end of 1878 the proportions had risen to 77 per cent. of interlocking, and 75 per cent. of blocking, in England, and 71 and 63 per cent. in the United Kingdom. The desideratum, therefore, for the Board of Trade is not so much to ascertain the exact localities of that quarter of the average length of the English lines on which these precautions are not yet taken, as it is to see how they can ensure the dealing with these exceptional cases in the mode which prudence points out to be desirable. The Brighton, the Chatham and Dover, and the Metropolitan District railways were the only three great lines on which, in 1878, the absolute block system was universally adopted. The Metropolitan was the only line on which every point and signal was interlocked.

With regard to the reports of Colonel Yolland, of which "the Board of Trade feel it their duty to emphasise the conclusions," they are on many points so fully and minutely in accordance with our own remarks at the time of the occurrence of the accidents, that the only point left in doubt is, how far the recommendations made in our columns have been directly utilised for the public service, or how far different professional men, impartially studying the same facts without any mutual exchange of ideas, have arrived at identically the same conclusions. Which be the case matters but little, but the fact of the accord is one of good omen.

Colonel Yolland has ascertained that on several occasions the North British Railway Company has felt it necessary to complain of the great speed at which some of the North-Eastern Company's trains were run over their line between Edinburgh and Berwick. It appears, however, to the inspector that it is the state of the line which renders the rate of running unsafe. In pointing out those wholly elementary precautions, which were neglected by the North British Company during the operation of repairing their line near Berwick (which neglect, together with the failure to reduce the speed of the trains over the unfinished portion of the line, caused the accident), it is dismaying to find the Government inspector stooping so near the ground as to attach great blame to "the foreman of the platelayers." Is there no engineer to the line? If so, what has the Government inspector to do, directly, with his subordinates? The fact that a Royal Engineer officer, familiar as he must be with the rules of hierarchical subordination, has in such a case to express an opinion as to the conduct of an ordinary workman, seems to betoken a marvellous absence of anything like systematic organisation of the service of the line.

With regard to the Wennington disaster, again we find "the act of the foreman and gang of platelayers" blamed as contributing to the occurrence. The want of cant in the rails, and the absence of a check rail, to which we before called attention, are also mentioned as contributing to the ease with which the engine left the rails. But the public cannot deal with foremen and gangs of platelayers. The public has a right to expect, and does expect, that there shall be, on every railway, an engineering officer of adequate standing directly responsible for the state of the line, for the state of the rolling plant,

and for the relation between the good order of these two integral parts of the great compound machine, and the speed at which it is driven. It is with such an engineer that the Government inspector alone ought to have to reckon. It is the engineer who should be primarily responsible, in the face of the world. And if any of those employed under him, in any grade, have disobeyed his orders, and thus incurred danger or wrought damage, it is for the engineer, in self-justification, to prove the fact, and to ask that the due penalty should be inflicted in the right quarter. In the behalf of the safety of the public we protest against the Inspector of the Board of Trade telling the world that "foremen," or "gangs of workmen," are "greatly to blame." In each of the cases in question we have to choose between attributing what occurred to the unexpected failure of some mechanical appliance, or to a neglect of duty not far—if at all—removed from criminality. It is with the responsible managers of a line that the public has to deal in such cases, and to descend at once to the hand that erred, without taking any notice of the head, is something like Sydney Smith's metaphor of patting the dome of St. Paul's to give pleasure to the Dean and Chapter.

As to the brakes in the Wennington case, it seems that the Westinghouse brake was on the tender, that there was a hand-brake in the guard's van, and that there was no brake on the engine, or on any other of the nine vehicles which composed the train. It is, therefore, evident that the brake power was inadequate, and was far inferior to that which should have been applied to a train running at such speed. But we must be allowed to say that the establishment of this fact throws very little light on the cause of the accident. The driver must have known,—at all events, ought to have known, but in our opinion must practically have known, —what the brake power was. He ought to have been aware whether it would retard the train properly before arriving at the station. There is no doubt that it failed so to retard the train, and the question of interest to the mechanic (and indeed to the public) is, why did it so fail to retard it? It is all very well to say there were only two brakes; but the driver know that. Did both act? or if not, why not? Was the brake on the tender in order? Was it applied? How was it that the engine was driven over the curve at a speed at which it was certain to run off? These are the points which a scientific inquiry ought to elucidate. We fully agree with Colonel Yolland when he says that *if* the train had been fitted with a good continuous brake, and *if* it had been under the control of the driver, and *if* the driver had made use of it, the leading van would not have run 166 yards from the point of crossing. But surely we do not require a Government official to tell us that. That much is perfectly obvious to any one who has read with attention the Report of the Royal Commission on Railway Accidents, published in 1877. If the train was running at thirty miles an hour, it would have been brought up by a good set of brakes in 15 seconds,—that is to say, in 220 yards. But in the absence of this unusual retardatory power a much greater distance was necessary for slackening speed. What we want to know is, when ought the two brakes that were actually on the train to have been applied? When were they applied? and what was the true reason that the speed was unchecked?

It is of the utmost importance that the cardinal points of every disaster should be distinctly brought out. Colonel Yolland calls attention, with great justice, to the noting and registering every fact concerning the permanent way, in any case of accident, before "the removal of those marks which are the surest guides to the elucidation of the causes which led to the accident." But it is possible to take a view of causes which is so narrow as to be of little use. The public naturally says, Who is to blame? But what the engineer wants to know is,—what is to blame? Extra speed, at a given point, was the mechanical cause of the accident. We want to know why, in that particular case, the speed was excessive. It is no reply to be told, if there had been a better brake the train could have been stopped. That we knew before; and it is leaving the track to go off from the inquiry on that scent.

A contemporary, whose information on mechanical points is of an unusually good character, says that the inspectors to the Board of Trade have over and over again pointed out that almost all railway accidents, especially those of a graver character, are due to one of three causes, —the neglect of the block system, the omission properly to interlock points and signals, or the absence of adequate brakes. To a certain extent that is true, although the experience of the last few weeks shows that this list of causes is far from exhaustive. The human machine breaks down, sometimes, under responsibility or fatigue; and it is to this kind of failure that at least two of the latest railway disasters were due. We have with us the weight of the highest authority when we express the opinion that every attempt to throw human responsibility on to automatic machinery has at least its dangerous side. We do not call the interlocking of points and signals automatic. It is a precaution usually of the utmost value. But we do feel convinced that anything which tends to induce the regular use of a violent retardatory power for the sudden stoppage of a train, with the result of allowing the driver habitually to approach a station or crossing at full speed, introduces a new source of danger; and one which, as recent events have shown, may be a more fertile cause of disaster than some of those which we are seeking to avoid. Let us, by all means, have ample brake power, but let it only be relied on, to any great extent, for the prevention of apparent danger, not for the regular working of a line.

THE BRUSSELS EXHIBITION.*

The brilliant representation of her industrial arts that Belgium shows in the Brussels Exhibition is of that peculiar nature that renders almost impossible a hurried epitome. Even after a comparatively lengthy notice of the more salient points, so many important features have been omitted that it would be unjust to pass to the Modern Industrial Arts Section before devoting a few more words to the exceptional show made in the Retrospection Section, which forms the great feature of the Exhibition. Those who remember the Exhibition held at Manchester in 1857, so fitly termed an Exhibition of Art-Treasures, may form some conception of the gathering made here; for the choicest marvels produced from the jealously-guarded and little-known,—too-little-known,—treasure-houses of the churches, the convents, and various ecclesiastical bodies that exist in Belgium, as they have done, untouched for so many centuries, have been contributed, and combine to form, with treasures from the wealthy corporations and educational establishments, a show such as no loan-collection could have gathered together. From sources such as these come forth "gems of purest ray serene," which know not of the ruthless hand of the dealer or the commercial fashion-ruled fluctuation of the auction-room. It is this feature which, as in the case of Manchester, will mark the Brussels Retrospective Section in the annals of Exhibitions, offering a *histoire de travail*, perhaps, even more interesting than that of Paris in 1867, as almost exclusively showing the artistic industry of one country.

There are, however, to be easily detected many marked features of foreign origin, but these only add a zest to the unity of the whole, Italy, Germany, Holland, Spain, England, and the East all contributing to enhance the general effect. Among these stands foremost a feature which would merit, did but our space allow, an article to itself,—the room in which M. Somzee, a Belgian collector, has exhibited a portion of his choice collection of Italian majolica-ware and other rarities. In one large room, in the cases ranged round the walls and in the centre, are gathered together several hundred of the choicest pieces of that sixteenth-century majolica, known as Gubbio-ware, a sight such as is rarely to be seen; and beautiful, indeed, is this array of one of the busiest decorative art industries of the *cinque cento*,—so beautiful, that ten times the space they occupy might be ornamented with the treasures that are here crowded together, gorgeous in their glow of colour, heightened by, in some cases, the delicate *lustro* of age, in others by that of the artist, who, however, was always loth to employ its aid when his own design sufficed to decorate the simple piece of glazed earthenware that he rendered a priceless gem, to be disputed by princes and cardinals. What marvels by Maestro Giorgio and his contemporaries exist in these cases we know not, as no catalogue has been made of this collection, nor has, again, the necessary aid of labels been thought of,—a feature the value of which the Manchester Exhibition of now twenty-three years back did not neglect to understand. But the general character of the works is so familiar that it is easy to distinguish many of the vases and dishes, from Gubbio, from Faenza, from Castel Durata, from Pesaro, and from Forli, and many another pleasant town in Raffaelle's country; the well-known *spezzeria*-pots from Caffagiolo,—the tradition of the ornamentation and use of which is handed down to the druggists' shops of the present day. A rare collection of glazed and painted tiles, also of Urbino ware, fills a space at least three yards square in the centre of the room, the corners of which are crowded with other treasures of the Italian industrial arts, too numerous to mention, but among which let us not pass over the several rare Florentine *cassoni*, or marriage-coffers of the fifteenth century, carved and gilt and painted with all that luxury of decoration that belonged to the early Renaissance. No famous artist has happened to decorate the panels which adorn each of these coffers; but luck might have thus spared the creation of a great painter, for, as is well known to collectors, the artists of the Renaissance did not disdain to paint such *cassoni*.

To one other treasure of M. Somzee's collection we can alone afford to refer,—a choice piece of time-stained, but still perfectly-preserved, Arras tapestry, which has wisely been placed behind glass. Complete with its border, the whole piece scarcely measures 2 ft. 6 in. square. Through the now even-toned mellowness to which exposure has reduced the once brilliant colours, lighted up by the glitter of the gold-thread, it is not difficult to trace the master-design of some contemporary of Memling, if it is not by that patient artist himself. Purchased in Italy, this gem of the looms of Arras has returned to its native country, and now justly forms one of the pearls of the tapestry show.

A feature which it might be expected would have proved, as such gatherings usually do, of more than passing interest,—the collection of national portraits,—has, owing to the manner in which these have been hung, lost much, if not all, of its instructive character. In their valuable aid as decorative "properties" these portraits have been sacrificed, and, scattered about the Exhibition as they are, an examination of them is rendered difficult to a degree; while here, again, the utter want of label or catalogue renders these pieces of painted canvas unmeaning. To be of instructive value, a collection of portraits, whether national or what not, must be hung in some systematic order, and, above all, be carefully catalogued.

Another of the great arts of the past in Belgium is here but very inadequately represented,—the art of the glass-painter. Destruction has sadly lessened the number of master-pieces with which the Belgian painters decorated many a cathedral and church throughout the country. Many fine pieces still exist, but these could not, of course, be exhibited. There are, however, to be seen some good specimens of the art, but which give only a very imperfect idea of the power of the renowned Flemish *verriers* of the Middle Ages and the Renaissance.

To those interested in musical matters, the choice collection of Belgian musical-boxes particularly appeals; here, from the early days when the musical notes find no separate expression beyond a few mere dotted marks placed between the lines of the big-lettered psalter, we trace the beautiful art in which the Belgians were renowned throughout Europe down to our own modern complicated system. As a complement to this collection, there are exhibited a number of musical instruments. These, again, are mostly made in Belgium, which boasts of more than one famous maker, Rucker, of Antwerp, being the Belgian emulator of the fame of Stradivarius and Guarnerius.

A word is due to the Belgian armourers, whose works are here well exhibited; the Belgian knights of old were no less generous patrons of the artist-blacksmiths of their time than were the princes of Italy, of England, of Germany, and of France. Nor are there wanting among the well-chosen collection of arms beautiful specimens of work, on which something more than the ingenuity of the artisan has been bestowed,—marvels of patient decoration, rich with damascened work and engravings; arquebuses and powder-flasks, gems of coloured inlaid work, and

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* See p. 316, *ante*.

sword-hilts, worthy a place by the side of the goldsmith's most cunning productions. Among the arms, all choice specimens, will be noticed with more than usual interest the sword of Rubens, its hilt a rare piece of damascened gold work, not far from which reposes in another case, picturesquely filled with the collars and badges of a number of St. Sebastian or archery societies, the collar that Rubens wore in his official capacity at the Academy of Fine Arts at Antwerp,—another piece of delicate metal-work.

With a hasty mention of the rare collection of ivories,—to which no reference has as yet been made,—our notice of the Retrospective Section must unwillingly be drawn to a close. Of these peculiarly interesting works, in which have been preserved for us some of the few remains of the art of the mystic commencements of Christianity, the Exhibition shows some rare specimens of several of the periods into which collectors classify these rare and precious works; early Christian diptychs, and quaint book-backs, religious, Romanesque, Renaissance, and purely secular work. In the country of "Il Fiammingo," as François de Quesnoy was called by the Italians, among whom he worked so long, there are naturally here to be found a number of works attributed to that renowned artist; attributed only, as De Quesnoy never signed his work, but fame has not neglected to keep due record of his memory, as it has of many another great artist of the busy past, and long is the list that Belgium has contributed to the history of art. The exhibit of the Minister of Public Instruction, to which casual reference has already been made, is one that deserves more lengthy notice, consisting as it does of a large and carefully-selected series of photographs of all the great works of the Belgian sculptors, from the eleventh century down to the present day, whether existing in Belgium or abroad, where so many Belgian artists have left their works. To quote at length the list of works exhibited would form an interesting epitome of the history of Belgian sculpture. Here each photograph is carefully labelled, and a genuine pleasure it is to be able thus to pass a complete review of one of the great branches of the past art of the country. One is carried in this manner to many a quiet old church in Belgium, and many a gorgeous cathedral in France, in Germany, in Austria, and in Italy. Name after name, too little known, passes before one, and work of rarest merit, reposing undisturbed in out-of-the-world corners and in still busy centres of activity. Exquisite work of the eleventh, twelfth, and thirteenth centuries; work of the succeeding centuries and the Renaissance, among the great artists of which Colin of Mechlin, the artist of the Emperor Maximilian's tomb at Innsbruck, and some less known work at Prague and at Heidelberg, should take a higher rank than is usually accorded him; work of the sixteenth and seventeenth centuries, when the Belgians still held high their reputation; down to the last century, and the present day, when they fall no lower than their brother artists of the rest of the world; the list is a long and suggestive one.

In Belgium the artistic traditions of the past are not yet dead, as the section of the modern industrial arts clearly shows, and to this we must hurry on, regretfully leaving the retrospective section, to pass time in which would be an education in itself. One feels ashamed to have to notice in the haste of a few minutes' survey works that have taken so many patient weeks and months to design and elaborate, and which can never again be produced,—which seem, indeed, almost out of place in the hustle and the crowd, speaking as they do of the quiet and repose of the cloister, the workshop, and the hearth, of centuries ago.

Chelmsford Main Drainage.—On the 30th ult. Mr. F. Chancellor, chairman of the Sanitary Committee of the Local Board of Health, Mr. Charles Pertwee, the Board's surveyor, and Mr. W. J. Botterill, of London, the contractor, met in the King's Head Mead, and raised the "penstock" in the old sewer, and set the sewage in motion in the new outfall sewer, which is of brick and concrete, egg-shaped, and 2 ft. 6 in. high, by 1 ft. 8 in. wide. They afterwards walked to the receiving-tanks at Brook End, a distance of 1¾ mile, and there checked the time of the arrival of the sewage, which worked out exactly as calculated by the Surveyor. Chelmsford, according to Mr. Chancellor, is now in the enviable position of being well drained without having to pump one pint of sewage.

THE PROGRESS OF ELECTRIC LIGHTING.

EYESIGHT AND SAFETY.

The general satisfaction which has hailed the latest effort at electric lighting, that of the Royal Albert Dock at Silvertown, gives an especial appropriateness to the printing, at this moment, by the Institution of Civil Engineers, of the "Notes," by Mr. K. W. Hedges, C.E., "On the Principal Systems of Electric Lighting in Use in England and the United States." Already printed in the convenient pamphlet form in which the Transactions of the Institution are from time to time issued, these Notes will form part of the forthcoming fourth volume of the Proceedings for the Session 1879–1880, which will be volume lxii. of a series which, under the judicious editing of Mr. James Forrest, is growing into a comprehensive and extremely valuable professional library.

The lighting of the Royal Albert Dock is an attempt, on a large scale, to turn night into day. Each of four horizontal steam-engines, of 20 nominal horse-power, drives seven Siemens dynamo machines, which act as light-producers, and one machine of the same kind, which is used as an excitor. These engines are placed at four stations, from each of which it is intended to work twenty-four lights. The number of lights actually produced is twenty-six, each of which is placed on a latticed standard, 80 ft. high. The area of the Dock thus illuminated is about a mile and three-quarters in length.

The three systems which, according to Mr. Hedges, have made the most progress in practice are the Gramme, the Siemens, and the Brush. An adequate account of the rapid extension of the last-named system in the United States does not, unfortunately, come within the survey of the "Notes" in question.

In England, the most important installation of the electric light during the year 1879, was, we are told, the lighting of the Picton Reading-room in Liverpool, which is effected by the Gramme machine, and the Serrin regulator or lamp. The area lighted is not stated by Mr. Hedges. Three Serrin lamps are enclosed in an umbrella-shaped reflector, which throws the light on the ceiling, whence it is a second time reflected on the eye. The glare is thus diminished, and that probably with less loss of light than by transmission through partly transparent screens. A slight hissing noise is observed. The cost of the light is stated at 1s. 9d. per hour, as compared with 7s. 8d. per hour for gas. The horse-power employed is not stated.

The St. Enoch Station, the terminus of the Glasgow and South-Western Railway, is now lighted by Crompton lamps, arranged in lanterns having octagonal mirror reflectors, and slung about 35 ft. above the platform, and 27 ft. from the side walls. The span of the roof is 198 ft., and the height from the platform 80 ft. The length is not stated, nor is the engine-power. Each lamp is worked by a 6,000-candle Gramme machine. The cost of the six lamps is 3s. per hour, independent of the cost of driving power. The gas previously consumed cost 4s. 5d. per hour.

The esplanade of the town of Blackpool is lighted by four lamps, each worked by a separate Siemens generator. The lamps are fixed on the top of pillars, 60 ft. high, and are enclosed in lanterns furnished with reflectors that throw the light for about 150 yards in each direction. Mr. Alexander Siemens states the total cost of lighting six lamps, of 6,000-candle power each, for five hours, at 3l. 6s. 10d. by electricity, as against 7l. 5s. by gas. In comparisons of this kind the local cost of the gas ought always to be stated. It is true that this price is likely to be proportionate to that of the steam-power used for working the dynamo machines. But when information is volunteered on these points it ought to be complete, as it is otherwise of but little value. If we calculate aright, the cost per hour per lamp is 26·7d., as against 21·0d. at the Picton Reading-room. But the candle-power at the latter spot is not stated. In fact, it seems very difficult to get at the exact cost of electric lighting; when we come to inquire into details, some omission or other often becomes obvious.

The lighting of the reading-room of the British Museum is effected by four Siemens lamps, of 6,000-candle power, each worked by a separate dynamo-electric machine. Details of the engine-power are not given. The cost is brought out at 8s. per hour, as against 4s. 9d. for gas, at the price of 3s. 9d. per 1,000 cubic feet. In all these matters it is most desirable that not only results, but details, should be given. The amount of the illuminating power produced at the focus is one thing, that of the quantity and quality of the light that falls on the page of the reader is another. As far as we can form an opinion, we should say that the effect on the eye is highly objectionable in both cases. We are convinced that nothing tends to the rapid deterioration of the sight more certainly than reading, or still worse, drawing, by gaslight. We recommend every student or every one who reads or writes much by artificial light, to use a Queen's reading-lamp, or a candle or pair of candles provided with a shade. We should expect that the degree of pulsation which so often characterises the electric light would render it far more injurious to the working eye than gas itself. Then it has to be borne in mind that the lamp or candle may be at 18 in. or 20 in. from the book; the gas-burner may be at 3 ft. or 4 ft.; the electric-light at 30 ft. or 35 ft., and in each case the proportion of light that falls on a page to that created at the focus of illumination will be inversely as the squares of these numbers. Let us light open spaces, as far as practicable, by electric suns; but we counsel those who care for their eyes to reflect on what we have said. Let them compare the fatigue of the eye after three or four hours' work by the Queen's reading-lamp and by gas.

A statement of the performance of the Brush machine, furnished by Mr. Brush, is printed by Mr. Hedges, but it is of too technical a nature for extract. Mr. Hedges has not so much to say as to Mr. Edison's efforts as will be found in the pages of the *Builder*. The Werdermann lamp, to the light of which we are disposed to give the preference at present over any electric light with which we are acquainted, has been introduced at the South Kensington Museum. Eight of these lamps, Mr. Hedges states, were placed in the Art Library at that institution, and worked off a Gramme machine. The light was steady, and the room kept cool, but the cost was found to be greater than that of lighting by gas. Considering the small size of the apartment, it is difficult to make this statement harmonise with those that precede it. We can conceive no cause for extra cost in the Werdermann lamp. We rather tend, therefore, to the view, that in the care which is given to every matter of detail in the Art Museum, under the direction of the thoughtful and accomplished librarian, photometric observations may have been taken with more direct reference to the visibility of the page brought under the eye of the reader, than to the amount of light produced at each luminous focus. At all events, we trust that what we have said may have the effect—first, of inducing all writers on the subject of electric lamps to bring forward full, clear, and attested details of every instance of illumination as to which they write; and secondly, of directing attention to the great difference between the quantity and the quality of the light which is desirable for the student, and that which is desirable for the nightly illumination of halls and theatres, of stations and dockyards. Nor should it be forgotten that it is in the lighthouse and the steamboat that the chief field for the display of the electric light is at present found; nor that it is yet an untried question how far safety, combined with adequate illumination, can be offered by the electrician to the coal-miner.

WESTMINSTER VESTRY-HALL COMPETITION.

The drawings sent in competition have been open to inspection at the United Westminster Schools during three days of this week.

The design to which the first premium has been awarded we publish in our present number, with some descriptive particulars, and may therefore dispense with any detailed comments upon it, which our readers can make for themselves. We may say that, as far as plan is concerned, we believe we should have come to the same conclusion as the referee,—that it is, on the whole, the best working practical plan of the set, though it has points in detail very much open to question. Some people may like a surveyor's clerk's office with two rather small windows on either side of a fireplace in the outer wall; but we should hardly ourselves recommend such an arrangement. Again, the requirements for two retiring-rooms with lavatories, &c., in connexion with the public hall, would naturally lead to the conclusion that these are intended for gentlemen and ladies respectively, since rate-

payers are to be found in both sexes; and how impossible this use of the rooms would be will be seen at once from the plan. It may be said that in this and some other points the wording of the instructions is not so explicit as it should have been. Judging, however, from some experience in looking at competition drawings, our impression is that not one competing architect in fifty understands the planning of accessory offices of this kind. For the external design of the building we refer the reader to our illustration and description.

Of the remaining designs there are three,—"Portoullis" (second premium), "Black Star" (third premium), and "Unitas,"—which especially deserve attention. We may, moreover, mention that "Sunm Cnique" shows a neat Free Classic elevation, which, however, hardly looks so well in perspective; and "Civis," a good, but rather heavy, elevation, in more orthodox Classic style, but which is obviously too expensive. The plans in both cases are not good.

The main requirements of the building are surveyor's and vestry-clerk's offices, with waiting-rooms, &c.; a rate-collectors' office, with separate entrance from the street, but communicating internally with the general offices, and other usually required offices for the work of a small town-hall establishment; rooms for medical officer, sanitary inspector, gas-meter testing, &c. These come on the ground-floor, and on this floor also, in the rear of the building, is to be a large hall for ratepayers' meetings, with public entrance from Gardener's-lane, on the flank of the building. On the second-floor is to be a vestry-hall, with lavatory and hat and cloak rooms (specified to be in communication with each other and with the lobby), with a strangers' gallery, which is rather ambiguously described as "not to be within the area of the vestry-hall," and yet to be "a more important feature than is usually the case," and with a retiring-room contiguous to it, for use on occasions when strangers may be ordered to withdraw. The rest of this floor is occupied by committee-rooms and a waiting-room for deputations. The only important point in the plan which is left to the discretion of the competitors, therefore, is whether the vestry-hall should form a feature in front of the building, or should be kept in the centre. The latter is, of course, the most economic plan, and has, therefore, been wisely adopted by most of the competitors, though, of course, it destroys the principal opportunity of giving any special architectural character to the front. We proceed to make a few comments on the three designs above-named.

"Portoullis" (Mr. John E. Trollope) is a design of late Elizabethan character, effective in general appearance, but too much is spent on a clock-tower, which runs away with a great deal of masonry, and is out of place where economy was an object. The vestry-hall is brought to the front on the upper floor, and its windows form a feature in the design of the front. The vestry-clerk's offices are fairly planned, to right of the main entrance, and the rate-collectors' office is conveniently arranged, except that the fireplace comes in a very awkward position. Surveyor's rooms well arranged; waiting-room would be better *en suite* with clerk's room. The way round to the Sanitary Inspector's office seems tortuous, and the general arrangement of plan somewhat deficient in simplicity. Approach to the large room good, but lavatories opening into main passage too conspicuously next door to each other. We propose to illustrate this design in our next.

"Black Star" (Messrs. Hunt & Steward), a "Queen Anne" design of not very interesting character. Vestry-clerk's offices conveniently placed and arranged; rate-collectors' room in right place, but cuts off the light from the passage; surveyor's offices satisfactory; retiring-rooms to public hall badly arranged if they are supposed to be for ladies and gentlemen respectively. First floor has vestry-hall in centre, members' cloak-room and lavatory clumsily planned, and room wasted in this and staircases; waiting-room too far off and with bad access to vestry-hall.

"Unitas" (Mr. J. P. Seddon), a Gothic design, certainly the best hit of architecture of the set; the author sends alternative Queen Anne elevations, which are adequate; any one who can design in Gothic can design in Queen Anne; "there's nothing in it." Alternative plans, A the cheaper, with vestry-hall in centre; B with vestry-hall in front, and forming a good feature in front elevation. The waiting-rooms which should be in immediate connexion with the vestry-clerk's and surveyor's offices respectively are not *en suite* with them in either plan, in one case very far off. The public hall is an octagon, with low walls and high roof, much more inexpensive in construction than the others, but the octagon is a bad shape both for speaking in and for seating the audience. The two sets of retiring-rooms are very well planned in themselves and quite separate, but we can hardly imagine it would meet the case to have them opening out of the hall at the furthest point from the entrance; they should be in connexion with the access to the room. The upper floor is very satisfactory in plan B; in plan A the cloak and lavatory rooms are too prominent on either side of the entrance-passage to the vestry-hall, and the waiting-room for deputations is too disconnected and has bad access to the vestry-hall; but this defect exists similarly in the first premiated design. This is the only plan which exactly carries out the instructions as to the strangers' gallery, which is partially screened from the vestry-hall by an arcade of three arches, and has commodious retiring-rooms immediately in the rear.

There is one important point in connexion with the decision in regard to which some explanation is desirable. The instructions state that the cost of the whole building is not to exceed 15,000*l*. The three premiated designs are just over this limit, but in all these cases, according to the referee's report, this is without counting the public hall in the rear. But the instructions have no reservation in regard to the public hall; they state explicitly that the sum above named is to include the whole cost, exclusive of movable furniture. Has there been any subsequent understanding upon this point? And if so, did all the competitors know of it? If not, it appears to us that "Unitas" may have a technical ground of complaint. His plan A is the only one which at all looks as if it might be carried out for 15,000*l*., including the hall of meeting. We do not say his plan is better than that of "Stet,"—in some points it is decidedly inferior, though the architectural design is certainly better; but he has made an effort to comply with the stated conditions of cost, with more apparent success than the others, and this calls for some explanation. We put the question, therefore, but without by any means joining in or favouring the complaints which have been made about anything like unfair play, which we do not credit. On the contrary, we feel very strongly that some of the profession are putting themselves in a very absurd position by clamouring against the decision of a professional referee, immediately after there has been a general declaration on the part of a great number of their body against all competitions in which a professional referee is not employed. This is both foolish and undignified. The profession, by the mouth of their central representative body, have undertaken, or a great number of them have, not to enter into any competition unless there is to be a professional adjudicator. They have no sooner done so, than they seem disposed to fall foul of the first professional adjudicator who decides a competition. They cannot expect infallibility in a professional referee any more than in a committee of non-professional men; all that can be reasonably counted on is that a professional man will understand and go into the details better. People may think the umpire has made a mistake, though this has yet to be proved; but in all games it is considered very bad form to question the decision of the umpire, if he is a properly-constituted authority: and the *lex non scripta* which obtains in this respect in matches at cricket, or boating, or billiards, is just as applicable to architectural competitions.

Purchases for the Indian Museum.—The Science and Art Department lately decided to send an officer to India to make purchases of Indian art objects, to complete the collections exhibited at the Indian Museum, South Kensington, and it has been announced that Mr. Caspar Purdon Clarke has been appointed to this mission, and that he was to leave for India on the 7th inst. A fund of about 8,000*l*. has been placed at his disposal, of which 3,000*l*. has been contributed by the India Office, this sum being the unexpended balance received on account of the exhibition of the Prince of Wales's Indian presents in 1876, and reserved by his Royal Highness for the purpose of promoting the interests of Indian art.

NEW THEATRE AND DISSECTING-ROOM, MIDDLESEX HOSPITAL.

In order to meet the requirements of the increasing number of students attending the medical schools, the Board of Governors at the close of the last session decided upon partially rebuilding the schools. These works have been carried out during the vacation, and were opened on Monday last by Mr. H. A. Ross, M.P., the annual address to the students being delivered and the prizes distributed in the theatre on the same day.

The new buildings comprise a theatre, dissecting-room, demonstrator's, lecturer's, and prosector's rooms, and large cloak-room for students. The form of the theatre is semi-circular, with prolonged sides, the diameter being 34 ft.: it is capable of holding 200 students, all seats being provided with desks for writing, it being intended to use the theatre for examinations. The theatre is warmed by means of air heated by passing through a chamber under the building containing hot-water pipes; the fresh air being drawn in from the garden and delivered warm in a distributed form in different parts of the theatre. It is lighted by a powerful sun-burner supplied by Messrs. Strode & Co., and in connexion with this is a ventilating-shaft for the extraction of vitiated air. Natural ventilation is also provided by means of a large lantern light.

The dissecting-room measures 35 ft. by 30 ft., and is fitted up with every modern appliance. The building, although carefully planned and substantially carried out, is not intended to be a permanent structure, it being contemplated at some future time, when the opportunity of acquiring other land occurs, to remodel the whole of the schools on a larger and more complete scale.

The works have been carried out by Messrs. Longmire & Burge, under the superintendence of Mr. Matthew Wyatt, architect, of Great Russell-street.

JOTTINGS IN EXETER.

Only one or two buildings of any importance are at present in progress in Exeter. The eastern end of the site of the grammar-school, in High-street, is being built upon by the Exeter Arcade Company (Limited), who are erecting an arcade and coffee-tavern, from the designs of Mr. James Crocker, architect, Exeter, the builders being Messrs. Stephens & Son. The western portion of the site has been secured by the Government for new chief post-office buildings for the city. The new grammar-school buildings are being erected at Victoria Park, Mount Radford (about a mile from the city), from designs by Mr. Butterfield. Many of the citizens are greatly dissatisfied with the removal of the school, not only on account of the demolition of the ancient buildings, but because they feel that they are being practically deprived of what was essentially a school for the children of tradesmen and the better class of working men; and the promoters of the change are accused of intending to make the school into a "high-class school," for the children of people higher in the social scale than those for whose children it was originally intended.

For the new church at Newtown, the plans sent in in competition by the architects of Exeter (to whom the competition was limited), are now under consideration.

St. James's Church, at the higher end of Sidwell-street, is being restored, under the direction of Mr. R. Medley Fulford, architect.

More than one interesting specimen of Domestic architecture has lately been demolished to make way for modern "improvements,"—notably a house at the corner of Goldsmith-street.

The Sanitary Exhibition remains open until the end of this week, but adventitious attractions have had to be put forward to draw the multitude. The Militia band plays every evening, and there are other novelties, such as dancing dolls, and "Try your weight, Sir?" In this way the affair has, we hear, become quite popular.

The statue of the Earl of Devon, in Bedford-circus, is to be unveiled this Saturday, the 9th. It is of bronze, on a granite base, and is the work of Mr. J. B. Stephens, A.R.A., who is a native of the "Ever Faithful" City. Statues of Mr. Denham (a local light) and Sir Thomas Acland, on Northernhay, and of Earl Fortescue,

in the Castle Yard,—all in marble, are by the same sculptor; so are the statue of the Prince Consort, in the Albert Memorial Museum, and the group of the "Deerstalker," now removed from Bedford-circus into Northernhay to make way for Lord Devon's statue. It is not often that native talent is so largely appreciated by fellow-citizens.

In the extensive workshops of Mr. Harry Hems, in Paris-street, a number of works in carving and sculpture were in hand at the time of our visit. They included a fine memorial pulpit and prayer-desk for the parish church of St. Michael, Macclesfield, from the designs of Mr. J. Stevens, architect, Manchester. The pulpit is octagonal, and of wainscot oak, the style being Perpendicular. Eight detached columns rest upon the base, from which spring groins, carrying the body of the pulpit. In this, on each cant, is an ogee-headed niche, containing a sculptured figure, the whole being surmounted by an enriched cornice. The prayer-desk and seat partake of the ornate character of the pulpit. We also noted a couple of figures, SS. David and Cecilia, for the Rev. C. J. Ridsdale's well-known church at Folkestone. These are from the designs of Messrs. Morris & Stallwood, of Reading. A fine rood-screen in oak is in progress for Rodmersham Church, near Sittingbourne, Kent. Of the original screen only one or two small fragments are left, and they have afforded the design for, and been incorporated in, the new work. The screen contains a great deal of delicate detail, and will be surmounted by an elaborate cross. Some rich carved work in old English oak is also in hand, from the designs of Mr. John Lessels, architect, Edinburgh; in one of the circular panels an enlarged and sculptured representation of the old seal of the Abbey of St. Bathan's, at Berwick, has been introduced. Stalls are in hand for St. Michael's Church, Honiton, where Mr. Hems has already restored the rood-screen, which is 50 ft. long, and the finest, perhaps, in Devonshire, for it is groined its unbroken length on both sides. The two parclose screens in the same church are now in hand, *in situ*. Mr. Edward Ashworth, of Exeter, is the architect concerned. For the church of the Holy Cross, Standlake, Oxon, Mr. Hems has just completed a series of full-length angels for the hammer-beam roof. Each angel holds an heraldic shield in its hand. These figures, which are of oak, and 5 ft. high, have been executed from the designs of Mr. Clapton C. Rolfe, architect, Reading. Mr. Hems has been commissioned to execute thirty-two figures of saints, martyrs, and virgins for the same church. He has also just commenced a particularly rich font and cover,—in all, 13 ft. high,—for the parish church of Rotherham. It is a memorial to the late Rev. W. Newton, vicar, and has been designed by Mr. J. P. Seddon. The font itself is of red Corsehill stone, and the cover is of oak. In richness this font recalls to mind some of the sumptuous examples to be met with in Norfolk. For the interior decoration of the *Citizen* newspaper office, Glasgow, Mr. Hems has in hand a number of carved panels, of the so-called "Queen Anne" character, from designs by Mr. T. L. Watson, architect, Glasgow. A rather rich reredos is in hand for Cockington Church, near Torquay. It is in oak, and consists of three canopied compartments, each terminating in a profusion of pinnacles and gablets. This has been designed by Mr. James Hine, architect, Plymouth, from whose designs Mr. Hems is also making a font for Delabole Church, Cornwall. This font is in the fine white Beer stone of which Exeter Cathedral is in great part constructed. Among other works in hand in the shops are some full-length figures of St. Patrick, for Upper Reformatory, near Cork, of which Mr. S. Hennessy, of that city, is the architect.

The Classes of Architecture and Construction at University College, London, will be again conducted by Mr. T. Roger Smith. They will commence on Tuesday next, the 12th inst. Mr. Roger Smith will also repeat the course of lectures on professional practice which he delivered for the first time last session at this college. The class for the study of this subject will meet for the first time on Monday, the 25th inst. It may be worth while to state that any gentleman desiring to attend a single lecture in either class as a visitor will be admitted on giving his name to the attendant.

THE PARKES MUSEUM OF HYGIENE.

This Museum was re-opened on Monday last (after the usual vacation) in connexion with the inaugural *conversazione* of the Medical School at University College. There was a large attendance, and much interest was manifested in the collection of sanitary appliances, to which many additions have been made of late, including a model of a new ventilator presented by Messrs. William Tonks & Son, called the "Architrave Ventilator." This ventilator is an adaptation of the Carrall patent, and has been designed by Mr. Mark H. Judge for the purpose of making an architectural feature of the provision for changing the air of rooms—a provision now admitted to be so necessary that without it no apartment can be said to be properly ventilated. As its name indicates, this ventilator is made to form part of the architectrave or frieze over doors and windows, the opening for the inlet and outlet of air being made above the lintel or arch, or between them and the framework, thus rendering unnecessary any cutting or interference with structural arrangements. The architrave ventilator is made of metal, and consists of three parts, which fit together in such a way that it may be adjusted to suit doors and windows of various sizes. Acting both as an inlet and outlet, it is so constructed that while the incoming current of air is turned upwards, the fresh air is very quickly diffused, and is not carried direct to the ceiling, so as to cause a down-draught, but when gas is being burnt, or when from any other cause the air is hot or oppressive, the ventilator immediately acts as an outlet; and in order that its action may be regulated, whether as inlet or outlet, a controlling lever is provided.

ROAD FORMATION AND STREET PAVEMENTS.

There are several volumes descriptive of road-making, out of which some knowledge may be obtained, and yet there may be very little useful information as to the best modern forms of paving for streets over which there is the largest and heaviest traffic. To settle as to the best material and the best form several points require to be considered.

Highways, streets in small towns, and streets in larger towns, over which the traffic is small, may have macadam formations, the foundation being concrete, and the surface hard broken granite; otherwise, the hardest broken stone available. It is of the utmost consequence to obtain and use the hardest stone available, even if the first cost is more, as bad material may be dear if given.

All roads and streets should have well-drained, dry, and sound subsoils; and all roads will wear better, lasting longer, if there is a bed, or foundation, of concrete, from 3 in. to 9 in. in thickness. This concrete to be the true road; the covering, or pavement of any sort, being only a veneering, to be renewed as worn out.

Roads and streets should have smooth surfaces of such a nature as to afford a foothold, and allow wheels to roll with the least jumping. Wheels, in motion over an uneven surface, jump and ram in proportion to the roughness of the road and the velocity of the wheels. A locomotive engine on the best and smoothest steel rails, jumps, and rams in proportion to the velocity. Railway engineers have found out by experience that swift trains punish the rails and roads most, and consequently cause most cost in maintenance and repairs. This is true also as to street surfaces.

Railways use steel rails as offering most endurance under the weight, velocity, and ramming blows of the engines and trains.

The nearest approach to a steel-rail surface, for an ordinary street surface, is asphalte. Tramways are not being considered. The objection to asphalte is its slipperyness in wear, under certain conditions of wet and gradient.

Granite and limestone sets, and hard grit stones, make good pavements; but not the best, as the surfaces are rough, from the dimensions and nature of the materials. Indeed, it is considered necessary to lay such stone pavements with open joints, to give foothold. The rough surface of the stone and the open joints constitute a faulty street pavement. Carriages, carts, wagons, cabs, and, above all, spring-vans, if they move at or above six miles per hour, roll, jump, and ram, destroying the road or street over which they move, in proportion to the number of the vehicles within a given time, the weight moved, and the velocity. If there is a sufficient foundation of cement concrete beneath to prevent mud working through the joints to the surface, the surface-wear will not be sufficient to cause mud, but there will be some wearing of the stone and a considerable wearing of iron from wheel-tires and the shoes of horses. If there is a poor and weak base, and the stones can be rammed into it, and the subsoil can rise, there will be a rough, uneven, and muddy surface.

However good granite paving is in a town,—that is, however smooth and solidly laid,—it is noisy and destructive to carriages, destructive to an extent the general public are very little aware of. Coachbuilders, however, know something about it, as the best portion of their income is derived from repairs and renewals.

Of all the road surfaces for streets of swift and heavy vehicular traffic, broken stone makes the worst; and if the foundation is soft, the dirtiest. A macadam stone street in London is merely a mill on which the stone is crushed and ground to mud in wet weather, and to dust in dry weather. The mud is, however, a disinfectant; and, as such, does serve to cleanse the street from horse-droppings, but the dust, mixed with such filth, is most offensive and in every way injurious to shop goods, to clothing, and to the lungs and throats of the inhabitants. The macadam surfaces at Victoria-street, Whitehall, Great George-street, and Parliament-street, are a national disgrace. These streets and their condition ought to open the eyes of members of Parliament to the crass ignorance and stupidity of vestrymen. Streets over which the combined wisdom of Parliament walks or drives to and from the Houses are the worst made, worst cleansed, and consequently the dirtiest in London.

Of late, wood has come into use for street-paving, if one may speak of "wooden paving stones," as the Irishman spoke of "wooden milestones," or of the fireproof warehouse which was "flagged with cast-iron boards." But to the wood-paving: this, when properly laid, possesses all the properties but one requisite for the best surface of a street of great traffic. The surface is smooth, soft, and consequently noiseless, or nearly so. The lacking property is endurance. Wood need not be expected to endure like granite, but the carriages moving over it will last much longer than when running over granite. The best wood-paving must be laid upon a foundation of Portland cement concrete from 6 in. to 9 in. in thickness, to be finished on the surface to absolute truth. The blocks of wood to be pine, 4 in., 5 in., or 6 in. in depth, according to the traffic, the blocks to be laid on a bed of tarred felt, and jointed with a bed of felt (*close-jointed*). A thin layer of asphalte over the concrete may take the place of the bed of felt, but both will be better. A sound soft wood will make a better surface than the harder woods, as the soft wood will give a little to the horses' shoes and wheels of carriages, and rise by elasticity, producing the least noise. Such a street-surface will be even, smooth, and water-tight; there will be neither grit nor mud. In wet there will be no mud, in dry weather there will be no dust; and such surface may be washed hy hose and jet without injury to the drains and sewers, such as would arise from muddy stone pavements or very muddy macadam.

If all things are considered, such as comfort in riding, freedom from noise, from mud, and from dust, it will be cheaper to renew wood-paving every few years, as the case may be, rather than to retain granite sets or macadam.

One of the items of cost in changing from macadam to wood, is the breaking-up of the old road and the forming the Portland cement concrete foundation. In some cases it will be cheaper to retain the macadam crust, level it over with Portland cement, and on this lay the wooden blocks in the usual manner, raising the footwalks. Of course, there are many cases where this cannot be done, but where the roadway must be broken up.

London is just now under a wood-pavement *furore*, to which all who love comfort and quietness may most heartily wish success.

A thunder-storm ought to teach the vestriss a useful lesson, namely, that footwalks and roadways may be washed by hose and jet. In Paris and in Vienna the streets are regularly washed and watered hy hose and jet. If the water belonged to properly-constituted municipalities in London a similar process might be adopted with great advantage.

Civil Engineer.

TABLE GIVING COST AND PARTICULARS OF VARIOUS PAVEMENTS.

Name of Firm.	Address.	Description of Pavement.	Depth of Concrete.	Depth of Paving.	Total Depth.	Cost per Square Yard.			Total per Yard.	Cost of Repairs Annually.	Estimated Life.	Cost of Cleaning per yard per annum.
						Concrete	Paving.	Labour.				
			Inches	Inches	Inches	£. s. d.	£. s. d.	£. s. d.	£. s. d.			
Asphaltic Wood Pavement Company.	Bond-court House, Walbrook, E.C.	Red or yellow deal in blocks, 3 in. by 6 in. by 9 in., on end, resting on ½-in. layer of mastic asphalte, which rests on a 6-in. bed of lias lime concrete (proportions, 1 lime to 5 ballast). The blocks are spaced ½ in. apart in the direction of the length of the road. Heated asphalte poured into joints to a depth of 2 in.	6	Asphalte ½ Wood 6	12½	...	...	...	0 12 9 to 0 14 0	Free for three years, then about 9d.	Twelve to fifteen years.	2d.
Henson's Street Paving Company.	No. 7, Westminster Chambers, S.W.	Red or yellow deal in blocks, 3 in. by 6 in. by 9 in., each joint being filled with tarred felt. The blocks rest on tarred felt, which forms an elastic and impervious joint between them and the concrete.	6 9	5 6	11 15	0 3 3 0 4 6	0 7 0 0 8 0	0 2 9 0 3 0	About 0 13 0 to 0 15 6	*Nil* for two years, then 1s. per yard.	Wear ⅛ in. to ¼ in. per annum under heavy traffic.	3½d.
Improved Wood Pavement Company.	46, Queen Victoria-street, E.C.	"Baltic Red Deal" is used in blocks, 3 in. by 6 in. by 9 in., resting on a 6-in. bed of concrete. Joints of wood filled to half depth with asphalte.	6	6	12	0 3 3	0 6 0	0 2 9	0 12 0	From 9d. to 1s.	From eight to ten years.	3½d.
Limmer Asphalte Company.	85, Gracechurch-street, E.C.	Rock asphalte, ground to powder, heated and compressed by ramming, resting on surface of cement concrete.	6	2	8	0 3 3	0 12 0	0 2 6	0 17 9	*Nil* for some years.	Wear about $\frac{1}{10}$ in. annually under heavy traffic.	2d.
London and Provincial Wood Paving Company.	54, Gresham-street, London, E.C.	Red or yellow deal blocks, cut obliquely into rhomboids, 6 in. by 6 in. by 6 in., with the grain of the wood at an angle of 60° from the base. These are supported on each side by slabs acting as girders to which the blocks are dowelled. A foundation of concrete is prepared.	6	5¼	11¼	0 3 3	0 7 6	0 3 3	0 14 0	Free for three years, then 10d. per annum.	Ten years.	2d.
John Mowlem & Co., Contractors.	20, Grosvenor-road, London, S.W.	Red or yellow deal blocks, 3 in. by 6 in. by 9 in., are laid on a foundation of 6 in. of concrete. The joints between the blocks are grouted and well rammed.	6	6	12	...	...	...	0 12 0 to 0 13 0	Free for three years; 1s. 6d. to 2s. per yard per annum repairs and renewals.	Under ten years.	2d.
Val de Travers Asphalte Paving Company.	14, 15, and 16, Palmerston Buildings, E.C.	Compressed rock asphalte, with a foundation of concrete asphalte ground to powder by Carr's Disintegrator, and rammed whilst hot.	4 6 9	1½ 2 2¼	5½ 8 11¼	0 2 3 0 3 3 0 4 9	0 6 3 0 9 3 ...	0 2 6 0 2 6 ...	0 11 0 to 0 15 0	*Nil* for some years.	Wear about $\frac{1}{10}$ in. annually under very heavy traffic.	2d.
The Surveyors' Report, Sunderland.	... ...	Macadam.—Granite, including steam rolling, watering, sand for binding, &c., exclusive of foundation and excavation, which may reach 4s.	...	...	...	...	...	...	0 3 0	1s.	The cost of repairs includes maintenance.	4d.
		"Chip" or rubble pavement.	...	...	...	...	...	...	0 2 8	...	...	...
		Random blocks.	...	...	...	...	...	...	0 3 9	...	...	...
Messrs. John Mowlem & Co.	Grosvenor Wharf, Millbank, S.W.	"Blocks" (or "Setts") with concrete.	...	...	...	0 3 3	...	...	0 11 0 to 0 18 0	3d.	...	3d.
		Blocks, without concrete.	...	...	...	...	...	...	0 9 0	3d.	...	3½d.
G. H. Stayton, Esq., C.E., Surveyor, Chelsea Vestry.	King's-road.	Wood blocks, with concrete foundation.	...	...	...	0 3 3	0 6 0	0 3 0	0 12 3	1s.	...	3½d.

N.B.—Some of these Modes of Paving are Patented. When concrete is used there should be an interval of ten or twelve days allowed for the concrete to set, if it is practicable to spare this time. The above prices will, of course, vary from time to time as the cost of materials varies.

WOMAN AS A SANITARY REFORMER.*

I STATE at once that the training required is simple,—beyond simple; that every woman who wills to go through it may go through it, and may become mistress by it of the destinies of the world. Not the Fates themselves were more the mistresses of the destinies of the race than the women of an educated commonwealth, who were conversant with the art of the prevention of disease and premature decay. A woman should master physiology so far as to understand the general construction of the human body. She should be rendered fully conversant with the different changes of food that are required for the digestive process in different periods of life; the extent to which the digestive powers should be taxed in infancy, childhood, adolescence, maturity, first and second decline, and old age. She should be made aware what substances, taken as food, are of real and what of spurious quality. She should be taught the relationship which solid foods hold to liquid foods or drinks. She should be told what drinks are foods, and she should specially understand what are the particular foods required for the young during the periods of active growth. In illustration of the value of this last-named fact, it may be stated that if women only knew what foods were requisite to feed the skeleton or bony framework of the living body while that skeleton is in the course of growth, and if she would act upon her knowledge, as she almost certainly would if she possessed it, there would hardly be one deformed child left in the land in one or two generations. Rickets, with all its attendant miseries of bowed legs, crooked spines, and humped backs, would pass away as if by the spell of an invisible enchantress. After the understanding of the digestive system, the woman should learn the principal facts relating to the circulation of the blood, and the blood itself. Nor should she, in respect to the healthy organisation, be less informed respecting that breath of life which is ever being breathed into the living thing by the Eternal Chemist, whose constructions and resolutions are the motions, visible and invisible, of His eternal universe. The complete structure of those breathing lungs should be as plain before her as the outward form of the things she knows best. Equally clear to her should be the leading facts bearing on that receptive system of the body into which the external universe transports itself, and from which, in reflex response, the acts of life, the expressions, the movements, the thoughts, return in wavelike repetition back again, to become themselves external phenomena, linked, as such, with all the visible universe. To the knowledge of nervous function it would be advisable to add to the store of elementary principles a few facts respecting the great glandular system of the body, and of those night and day labourers of the body, the muscles, the woman should learn sufficient to be made aware of the advantages of so training the muscles to work that they shall be daily exercised, shall not be subjected to over-strain, shall be equally subjected, as far as possible, to healthful labour. And of the bony skeleton, on which the muscular engines are laid, and which act as the passive framework and levers of the engine, she should gather enough information to be conversant with all its outlines of form and chemical construction. Lastly, the woman should attain so much instruction in reference to the great membraneous expanses as to know them also. She should learn the necessity of keeping the functions of the skin in due cleanliness and condition for work; so that the bath should be considered as one of the necessities of the daily life, like a daily meal of cleanly substance. The living house thus generally learned, the sanitarian helpmate for us who can do so little beyond our suggestion would be tempted to study until she completely mastered it, the mysterious construction of that deadly-lively house which, until lately, the architect and builder have pitchforked into street and square with facile and contented wisdom of wigwam descent. She would want to learn how the immaculate house is in every room provided with at least moderate ventilation. She would require to find out how most effectively and economically she can maintain in the varying seasons an even and equable temperature. She would aim to consider in what way she could keep the air of the house free of that most objectionable of mischiefs, dust. She would demand to have marked for her on a map or plan the precise position of every drain-pipe in the establishment, and would insist, with intelligent skill, on having every drain kept as systematically clean as the china in the housemaid's cupboard or the metal covers that make so many bright and effective pictures over the dresser of the well-arranged kitchen. She would see, not trusting to the mere word of any one, that those drains were properly ventilated so that sewer air could never enter the domain except as a burglar might enter, by special skill and violence, against which there is no absolute protection. She would learn enough of the chemistry of water to enable her to determine with as much facility as she could tell whether a looking-glass is clear enough to reflect back without fault the image of her face, whether a water was wholesome and drinkable; and she would have a sufficient amount of skill to direct how an impure water might be purified and made safe for her and hers to drink and use for all domestic requirements. She would see to it that damp had no place in any apartment. She would insist that where any living thing that ought not to be present in a house exists in it, that house is unclean, and in some way uninhabitable for health; since health will not abide with anything that is uncleanly. She would see to the biennial purification of the dwelling, as though a Passover were still a universal belief and practice. She would make the very act of cleaning and cleansing clean; she would make the very best places for cleaning and cleansing—the scullery, the landing, the bath-room, the laundry—the cynosures of the household. In the art of perfection, or towards perfection of health, the educated woman would in her domestic sphere bring her best energies to understand the selection, the purification, the preparation, and the administration of foods and drinks. As she would keep seeds of certain pestilence from her fold, or vulgar poisons that kill outright, and proclaim at once with loud voice, "accident, disease, or murder," so would she do her best to keep out those refined and subtle poisons which, in and under the name of strong drinks, bring silently more accident, disease, and murder into this inscrutable world than all the other poisons put together, unlicensed though they be, and so little liked by the exciseman that he would fly them any distance, the Devil himself in company, rather than so much as touch them with his divining rule. That she would acquire a thorough knowledge of the best art of cookery; that she would acquire a good knowledge in choosing foods in season; that she would become an adept in detecting actual wholesome from actual unwholesome foods; that she would find out what foods are most suitable for persons of different age and constitution; and that she would distribute food with well-balanced hand, neither feeding over indulgently nor parsimoniously, I take for granted. But I expect she would learn to do more than all these things in relation to food. She would be able better than any one to put to the test the experience whether it is good or necessary to go to the living animal creation at all for human food. I am in doubt. It does not seem to me that man is constructed to be a carnivorous animal. It does not seem clear, putting the anatomical argument altogether aside, that it can be good to go to secondary sources of supply for our food when Nature bountifully presents them to us from her prime source. It does not seem reasonable that we should employ millions of living laboratories for our daily food, and take the risks of disease which they in endless forms produce and propagate for us, when we can get all that is necessary without the chance of such production and of such propagation. It does not seem certain, when we know that the vegetable world is the original source of every particle of living food, and that carnivorous animals have to depend on the herbivorous for their supplies—so that carnivorous feeding is an anomaly rather than a basic principle of nature—it does not, I repeat, knowing these things, seem certain that the cost of the support of the living laboratories is justifiable on any ground except the extravagant process of making work that work may be at hand and employment procurable. Still I am not sure whether the secondary supplies of food for man from the animal world are or are not necessary, and that doubt it is in the *rôle* of the educated woman to solve. Her discernment, properly and eagerly directed, would soon settle whether those about her were injured or benefited by an exclusive vegetable and fruit diet. It has been one of the endeavours of my life to show that we living men and women make in our own corporeal structures a refined atmosphere, which I have called a nervous atmosphere, or ether,—an atmosphere which, present in due tension, distinguishes life; which, absorbed or condensed, distinguishes death; an atmosphere through which the external world vibrates and pierces us to the soul; an atmosphere which, pure and clear, brings us peace and power, and judgment and joy; an atmosphere which, impure and clouded, brings us unrest and weakness, and instability and misery. We make it from foods and drinks, and as we make it, it makes us. Go into the wards of a lunatic asylum, and notice amongst the most troubled there the odour of the gases and the vapours they emit by the skin and breath. That odour is from their internal atmosphere, their nervous ethereal emanation. They are mad; mad, we say, up to suicide, or murder, or any criminal folly. Can it be otherwise? They have secreted the madness; they are filled with it; it exhales from them. Catch it, condense it, imbibe it, and in like manner it would madden any one. See, from the study of foods, out of which the radiant or deadly atmosphere is made. What fields of discovery open to the mind. A mother, watching the effect of food on her gloomy, saturnine child, may detect how she can so feed it that the cloud shall pass away. Happy mother of a child! Far, far happier mother, perchance, of science and hope. In some great establishments for the insane so much gloom is secreted in the nervous recesses of human frames, that many times a day, but for excessive vigilance, some terrible hand would raise itself against itself, to kill itself. What if in a wiser day, however far off, the removal of that little cloud from a troubled child should show the way to the removal of those denser, blacker clouds which lower and create storms in human breasts, overpowering altogether the radiant nervous ether! What if from that minor event this greater one should follow! What nobler accomplishment of noble deed could woman perform, save and except when she is the mother of her kind? Women should know the correct names and characters of the more common diseases, and they should know, by sight, the every-day contagions or communicable diseases. All the best-known methods of preventing disease should be at their finger's ends, and the rule of the sick-room should be their faithful care. The woman should know everything about registering the temperature of the sick room and degree of humidity; the mode of ventilation; the different special methods of feeding, washing, and changing the sick; the most efficient means of disinfecting, and of removing or destroying the poisons of the communicable diseases. How, in this way, the woman could help the physician none but the physician can understand.

> "Truth may never be confirm'd enough,
> Though doubt should ever sleep."

I declare it again, that if, in the management and treatment of any of the acute and of many of the chronic diseases, you gave me, in this climate, absolute control of the fire and the window of the sick-room, I could determine the course of the illness. There is no department of practice more neglected, in respect to principles, than the management of offspring in its earliest youth. Love there is plenty of; admiration unbounded; rational systematic training the poorest that can be described. Women, in addition to instruction on all the points above-named, should understand the little appreciative law of temperaments; the nervous, the bilious, the sanguine, and the lymphatic. She should study the combinations of these, and she should observe how temperament influences health, taste, activity, and disease. From this she would learn how different natures would intermix in work or play, and what work, what play would suit the nature. The sanguine child, ruddy and red, with blue eyes, red hair, strong muscle, quick movements, restless limb, she may set to study at books, whilst she curbs exercise with no fear that books will kill, for it will outlive any book. The bilious child, with dark eyes, dark skin, black hair, stolid expression, thoughtful brow, she will not set to the study of books as the work of life; for books may kill; physical exercise may save, but will never be carried voluntarily to injury. The nervous child, with fair skin, light hair, blue eye, quick but feeble movement, timid glance, yet, perhaps, un-

* By Dr. B. W. Richardson. See p. 409, *ante*.

hounded ambition, she will spirit gently; will balance between physical and mental labour; will apportion excess of neither, and will never urge unduly to any effort. The lymphatic child, large of body, pale, with grey or blue eyes, brown hair, shambling step, watery lip, and slow determination, she will rouse to action both physical and mental, with the full assurance that neither effort will do anything but good. Beyond the study of temperaments, and the special dangers connected with them, she should devote her mind to the consideration of what the learned D'Espine has designated the mental contagions. She should study emotional contagion with especial care, and on one emotion, that of fear, she should keep the most watchful observation, because she will discover it to be the most common and disastrous of all contagions. She will never excite it for a moment by story of superstition or dread. Finally, in physical psychological training there would stand out for contemplation, and action founded upon it, one more subject,—that marvel of the marvellous in living phenomena, heredity of type and action, extending to health, and extending, alas! to disease in its deepest foundations. She should stand to resist with her full persuasive might that process which I have elsewhere called the intermarriage of disease. She will tell her sisters what that terrible process means. She will tell that diseased heredity united in marriage means the continuance of the heredity as certainly as that two and two make four; that madness, consumption, cancer, scrofula, yes, and certain of the contagious diseases, too, may be perpetuated from the altar; and that the first responsibilities of parents, towards the offspring they expect, ought to be, not how to provide for wealth and position over which they have no control, but that preliminary healthy parentage which is the foundation of health, and without which position and wealth are shadowy legacies indeed. Delicate ground, you may say. I admit the fact. But in a world in which those who study the living and the dead most carefully rarely see a man or woman hereditarily free from disease, even this ground must be entered on by the enlightened scholar. I touch on it here for the best of all reasons, that the subject it includes, affecting deeply the human heart in its sympathies and affections, is one on which the influence of woman, the arbitress of the natures that are to be, is all potent for good or for evil. To know the first principles of animal physics and life; to learn the house and its perfect management; to learn the simpler problems relating to the fatal diseases; to ordain the training of the young; to grasp the elements of the three psycho-physical problems; the human temperaments, the moral contagions with their preventions, and the heredities of disease with their preventions,—these, in all respect and earnestness, I set before this Congress as the heads of the educational programme for our modern woman in her sphere of life and duty. Let these studies be hers, and once more may he applied to her the promise of that wisest of men, with whose words I opened this discourse: "She shall rejoice in time to come. The heart of her husband doth safely trust in her." And,—sum and sum of all hopes, ambitions, happiness!—"Her children rise up and call her blessed."

CONGRESS OF THE SOCIAL SCIENCE ASSOCIATION.

The Congress of the Social Science Association was opened in Edinburgh on Wednesday last under promising auspices, and we shall, as usual, make our readers acquainted with the pith of such of the papers and discussions as may seem to be the most likely to interest them. The inaugural address of the president of the Association, the Right Hon. Lord Reay, was delivered on Wednesday evening, in the Free Assembly Hall. The Right Hon. John M'Laren gave his address as President of the Jurisprudence Department on Thursday morning; immediately after which the sittings of the various departments in their several rooms were opened.

Lord Reay's address was entirely political. The concluding two paragraphs, which we print, sufficiently show the purport of it:—

"If a Continental statesman asks me whether England does not yield too much to the instinct of isolation, I give him this answer: 'Isolation from your quarrels is absolutely imperative to us, but it is also the best thing we can do for you. England and her colonies will be a refuge to all who are tired of State despotism and of militarism, and who wish to live under another economy. Power, no doubt, has a tendency to lurk in your big guns, but happily, also, in strong brains. In your social condition the army and the bureaucracy absorb the best forces of the country. We prefer to see our strong brains at work, not only in the political and military spheres, but also in solving scientific and social problems, in literary and artistic work, not to mention theology and philosophy. Whether, in the long run, your system will not prove weak as against ours remains to be seen. All we ask is to be left alone. You cannot expect us to put our brains at your disposal, to do the work which your own brains are quite as fit to perform. While you increase the number of your officials and of your soldiers, we open new channels for our trade; we remove all that cripples the advance of education or of prosperity in the nation. You assimilate your citizens to some abstract ideal which you call State. We strengthen our position by adhering to independent, self-developed principles, which constitute the natural links between the English races. Our State is nothing but the result of a living and healthy organism, which does not receive its inspiration from Government offices, but which is left to evolve its own destinies by a number of influences, all of which escape our control. To the adjustment of these self-acting forces we do not apply our legal machinery, as you do. They are left to adjust themselves. We do not attempt to produce a law-made nation, which meets a Government functionary at every turn. The person in England whose absence would probably be more felt than that of any functionary is the boy who sells the penny newspaper. Whether it is a better thing that a nation should be guided by uninspired writers, by leaders of various schools of thought, than by the depositaries of the secret of the State ideal, may well be left to the future to determine." The Anglo-Saxon world is a planetary system in itself. It moves in its own orbit. The voices of Anglo-Saxons all over the world murmur with no uncertain sound what is the duty of English statesmen. Do not seek, they murmur, to adjust the balance of power. Do not attempt to meddle with the internal constitution of other States. Do not pretend to be arbiters of the destinies of the world. Do not enter into engagements which are not imperatively required. Do not fetter in any way our freedom, unless freedom itself is threatened. Prevent any attack being made on the independence of the weaker States of Europe. Promote concert whenever and wherever you can, leaving the responsibility to those States who decline to co-operate for a good object, and to ward off perils. Increase the fund of prosperity to be distributed among her Majesty's subjects in England, in Canada, in Australia, in India, in Africa. Let England and Scotland continue to be,—what they have never ceased to be,—Parent Homes. Increase their attractiveness, that they may always be looked upon with filial affection. Wherever we go, the end and aim is to return to our English home. Guide and control our generous impulses when we might be committed to rash courses. Extinguish old abuses and prevent new ones from cropping up. Invigorate the social system where it shows decay. Remove the obstacles which stand in the way of genius. Give us knowledge for growth, as has been forcibly said. Recognise individual merit wherever it is found. Elevate, not the State, but the individual citizen, who by individual effort strengthens our social system. The respect paid to our scientific men, to our men of letters, to our artists, we consider ennobling to the national life. The great trust we have committed to you is one of constant watchfulness. '*Vigilate, Deo confidentes*,' should be your and our motto. We do not wish to establish a cementing bond of union for Anglo-Saxon greatness other than that which we have inherited from our ancestors: a stanch, brave, and deliberate obedience to the precepts of liberty, which are never antagonistic to cautious progress; and cautious progress alone is uninterrupted progress."

The address of the President of the Health department, Dr. John Beddoe, will be delivered on this Saturday morning (the 9th), and that of the President of the Art Department, Professor Richmond, on Tuesday, the 12th.

THE JOSIAH MASON SCIENCE COLLEGE, BIRMINGHAM.

The opening of this important building was celebrated on Friday, October 1st, when an inaugural address was delivered by Professor Huxley. The first stone was laid on the 23rd of February, 1875, and the building has been erected from the designs and under the personal superintendence of Mr. Jethro A. Cossins. We give a view of the college and plans of the ground-floor. Not long ago we printed some particulars of the structure, but it will probably be thought convenient if we now describe it pretty fully at the risk of repeating what has been said before. Of the admirable founder's remarkable career we spoke in our last number.

The site on which the college stands extends from Edmund-street to Great Charles-street, and comprises about an acre of land, with a frontage of 150 ft. to the former thoroughfare, and a depth of 133 ft.; but only about half the ground is at present covered with buildings. These are arranged around two quadrangles, the main block fronting to Edmund-street, and a range of buildings of about the same bulk standing parallel with it at the rear. The two are connected by east and west wings, and by a covered central corridor and out-offices, which divide the enclosed space into two open courts, each of ample extent for the purposes of light and ventilation. With the exception of the east wing, all the buildings are four stories in height, and in the centre of the principal façade a large museum has been provided, partly in the lofty roof. The whole of the walls are of brick and stone. For the front in Edmund-street an excellent deep-red brick from Kingswinford has been employed, with Portland, Bath, and Bolton Wood stone for the windows and other details. The elevation is symmetrical, having the principal entrance in the centre. It is in the thirteenth-century style, with details of a somewhat French character. The ground-floor is raised 7 ft. above the street level, and a massive plinth of Bramley Fall stone is carried to this height. It is somewhat unfortunate that the space in front of the college is only partially-open ground, so that it is impossible to get a full view of the whole structure. The college is entered by a deeply-recessed arch, with shafts of grey York stone. Their bases stand above the plinth, and thus the mouldings and all details liable to damage are placed above the reach of injury from accident or otherwise. The entrance is closed by handsome wrought-iron gates, sliding into grooves in the jambs. Over the gateway projects a stone balcony, above which is an elaborate oriel window, of two stories in height. The lofty central gable, against which the upper part of the oriel abuts, is terminated by a mermaid,—the crest of the generous founder of the institution, at a height of 122 ft. above the pavement. All the windows,—and there are sixty of them in front of the building, besides the dormers and oriels,—have geometrical tracery within recessed arches, with moulded and shafted jambs, the latter having carved capitals. A stone balcony extends along the whole of the front, at the level of the roof, and is stopped at the angles of the several blocks by octagonal turrets, carried out from the lines of the front on moulded corbels. On the façade at various points are carved the arms of Birmingham, Warwickshire, Worcester, Worcestershire, and of Sir Josiah Mason. The roofs, which are of a very steep pitch, are red-tiled, and are pierced by dormers.

Entering the college by the groined porch, which has moulded ribs, resting on dwarf columns, with carved capitals, the spaces between the wall ribs being filled with geometrical tracery and carved spandrels, the visitor finds a central corridor, about 100 ft. long by 8 ft. 6 in. broad, with transverse corridors branching to the right and the left. The latter conduct to the offices connected with the administration of the college, a room allotted to the Natural History Society, and two professors' rooms. The side corridors turn northwards along the wings of the building. In the eastern wing there are two rooms and a class-room for the use of female students, and in the western two class-rooms and an assistant's room for males. These rooms, which are about 15 ft. square, have windows looking into the quadrangles, and also receive light from the corridors. The corridors end in smaller doors to the apartments in the northern main block, to which, however, the principal approach is by the central corridor. Proceeding along the latter from the entrance, the

visitor first passes on his right the handsome main staircase from basement to top, which opens from the corridor, and is divided from it by an arcade of moulded arches, resting on polished Aberdeen granite columns, with carved capitals. A door opposite leads to cloak-room, lavatory, &c. The windows of the corridors and staircases throughout are of stone, with shafted jambs, carved capitals, and moulded arches. There are also staircases at the extremity of the transverse corridors communicating with every story, and descending into the basement.

At the extreme end of the central corridor are two fine apartments, each 18 ft. by 30 ft. The one on the right is the library and reading-room, and has behind it an ante-room, which can either be used as a place for conversation or as a separate reading-room for ladies. The room on the left is the physics laboratory, fitted with every requisite. It also has an ante-room, which is set apart for apparatus, and a dark room for spectroscope studies. The western corridor is continued past the end of this room along the annexe, which projects further towards Great Charles-street, and in which are provided a workshop and two rooms, at the disposal of the professor of physics.

On reaching the first floor by the principal staircase, a short turn to the left conducts to the rooms facing Edmund-street. The chief and central room is the chemical-lecture theatre, 49 ft. by 33 ft., fitted with seats tier above tier, for the accommodation of 155 students. The male students will occupy the lower half, and the female students the seats above and behind them, a separate entrance being provided for each sex. The arrangements for the convenience of the lecturer or demonstrator are complete. He has a long table fitted with sinks, mercury-bath, down-draught flues (to carry away the noxious fumes that may be evolved in any of the demonstrations), and taps supplying hydrogen gas, oxygen gas, and water, with improved arrangements for regulating the supply. In the wall behind the lecturer is a niche, closed by a shutter, for the purpose of receiving preparations and appliances from his assistant in the ante-room, with which it communicates on the other side. There is also a glazed niche, with stench-flue over, in which any process may be carried on in sight of the students. The theatre is admirably lighted, but can in a few moments be rendered dark by the drawing of opaque blinds, with which the whole of the windows are furnished. Reference has already been made to the ante-room for the lecturer's assistant. This is a large apartment, furnished with slabs, sinks, stench-flues, and everything which could be desired for the preparation of chemical experiments and demonstrations. Behind this there is another room, in which what are called chemical collections may be permanently kept in readiness. Leaving the lecture-theatre by a door at the top of the auditorium, there is a class-room for electricity and another for magnetism, &c. These complete the front rooms on the first floor. In the west corridor are rooms for the biological professor and demonstrator, and adjoining them is a room for models employed in the biological department, which occupies the adjoining end of the north block. The corresponding corridor on the east side is that giving access to three rooms to be used for apparatus and other purposes in connexion with the physics department. The first floor of the north main block is occupied by two other lecture-theatres,—one for biology and mathematics, and the other for physics; the latter 47 ft. by 30 ft., and the former a little smaller, with preparation-rooms at the end of each. The biological department is the one nearest the projecting annexe mentioned in the description of the ground-floor, and in this are provided a biology workroom and museum.

The second-floor, or top story, is principally devoted to the chemical department, for which the arrangements are of the most extensive and complete kind. A large room, 52 ft. by 33 ft., in the front of the building, over the chemical lecture theatre, will be used as a general assembly and examination room. The window of this room is the oriel, which forms such a conspicuous feature in the façade; it is a lofty well-proportioned apartment, and will be available for meetings of scientific societies. Upon one side of it are the private study and private laboratory of the chemistry professor, fitted up with every requisite for research; and on the other side are rooms for the curator of the museum and for class purposes. The laboratories are situated end to end in the north block or back range, and are lighted both by windows and skylights. These measure together about 104 ft. long by 32 ft. wide, and are divided by a screen in the centre. The larger laboratory is for qualitative analysis, and the smaller for quantitative. The arrangements have been the subject of great thought and investigation by the architect, with a view to render them as complete and well-devised as possible. In the qualitative laboratory there are four double operating-tables, fitted with sinks, gas, and water for forty students, and there is a large unencumbered table in the middle of the apartment for long trains of chemical apparatus. The sinks at the tables are drained into depositing-tanks, where valuable deposits are retained. Along the walls are ten niches for operations giving off fumes, each provided with a flue, which rapidly carries off the vapours produced into the outer air. There are slabs at each window for investigations requiring a large amount of daylight, and shelves are arranged along the walls with all the reagents required by the students in their investigations. At the end of the laboratory are slabs and ovens for drying purposes. The laboratory for quantitative analysis is a little shorter than the one just described. In addition to fittings and appliances similar to those in the other laboratory for thirty-two students, there are two large ventilated niches lighted from the back. There is an extra room in the annexe for gas analysis, another for delicate weighing operations, and a room for the demonstrator. The western wing is not carried above the first-floor, but the eastern wing affords accommodation for a chemical reference library and reading-room, a room for combustions and fusions, and a steward's store-room. From the latter the students will be able to obtain all the apparatus they may require, on leaving a receipt with the steward.

In addition to the floors previously described, over the third floor, in the centre of the front block, is a large and lofty room, with open timber roof, and partially lighted from the top, intended for use as a museum. The basement story, extending under the whole of the ground-floor, is lofty and well lighted, and contains store-rooms.

The ventilation and warming of the college are upon an improved and effective plan. Near the centre of the area rises a very large chimney-stack to a height of about 160 ft., and it is divided into three flues by thin partitions. The central flue carries the smoke from the boiler, and heats the air in the adjoining flues, which are used for ventilating the lecture-theatres. The pipes from the fume-niches in the chemical laboratories also communicate with the stack by means of a horizontal flue round the walls. The warming is effected by a coil of pipes, containing 4,475 superficial feet, placed in a vault in the sub-basement. These are warmed by the water from the large boiler, and the air from the courts, passing over the pipes, is conducted by flues to every room in the building. In summer, cold air is admitted into the rooms by the same means. The drains are ventilated into a separate flue, carried up into the main shaft. Another important feature is the lavatory accommodation, which is ample and complete, there being cloak-rooms and lavatories on every floor opposite the central stairs, while the larger number of closets are in the yard beyond, and entirely cut off from the main building. A lift runs through all the floors for taking up stores and other things, and there is also a common shaft carrying the gas and water pipes, the junctions to which are easily accessible upon each floor. There are about one hundred rooms in the college, and 370 windows, while at present about 8,000 ft. of gas-piping have been used.

Sir Josiah Mason has built the college, and has furnished its various departments with the necessary fittings entirely at his own cost, so that the resources of the trustees remain untouched. Mr. J. A. Cossins, as his architect, has devoted himself to the work.

The building has been erected without making a single contract. The architect himself laid out the work, engaged and superintended the workmen, and saw personally to the execution of every detail. Mr. Hodgkiss was his manager; the stonework has been executed by Mr. Prothero; the carving is by Mr. J. Smith: Messrs. Camm, Brothers, have supplied the ornamental glass; the gasfittings are by Messrs. R. W. Winfield & Co.; the wrought-iron entrance-gate is by Messrs. C. Smith & Sons, Deritend; the painting by Mr. Potter; and some of the movable fittings by the Midland Joinery Company; the rest, including the fittings of the lecture-theatre and laboratories, having been made in the college workshops, under the superintendence of the architect. The furniture for the trustees' room and the assembly-room has been made by Messrs. Marris & Norton; and other rooms have been furnished by Messrs. Chamberlain, King, & Jones, and Messrs. Manton & Sons.

The building will probably cost about 60,000*l.*, and the income from the endowment is from 3,000*l.* to 4,000*l.* a year.

The trustees have power, we are glad to say, to make provision for instruction in art as well as in science; and by a supplemental deed they are authorised to include in the course of study certain subjects requisite for the training of medical students.

NEW BUILDINGS AND EXTENSIONS AT PAINTERS' HALL.

Painter-Stainers' Hall, in Little Trinity-lane, is in the hands of the builders. The existing building, which replaced the old hall,—destroyed by the Great Fire of London,—is said to have been erected and first opened in 1669, being thus 210 years old.* The principal frontage of the hall is in Little Trinity-lane, but advantage is being taken of the inclosed open area above the Metropolitan District Railway, on the north side, to put a new face on the ancient structure, visible from Queen Victoria-street. This new elevation is built with red brick, the style of architecture being of the Queen Anne type. The frontage is surmounted by a large central pediment, with the arms of the company carved in red brick. Two lofty arched windows, in three divisions, on the east and west sides of the frontage respectively, are intended to be filled in with stained glass, containing the arms of all the past masters of the company. This new frontage will form the north side of the dining-hall of the company, which is being enlarged in that direction to the extent of about 12 ft., and when completed this apartment will be about one-half larger than its present size, and capable of dining between 300 and 400 guests. The restorations likewise include a new roof, immediately over the Little Trinity-lane frontage.

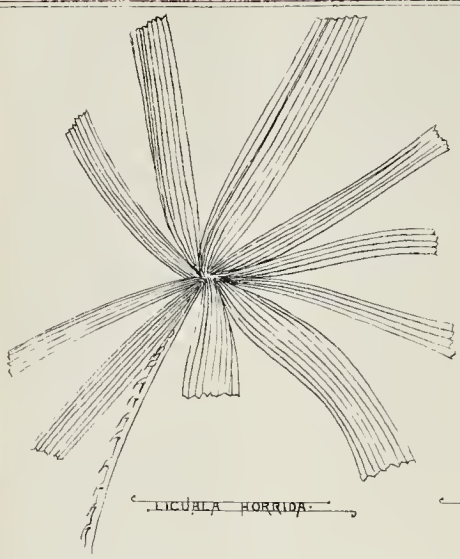
Mr. Edis is the architect, and the contractors are Messrs. Watson, Brothers, of Charlotte-street, Portland-place. Mr. Thorn is clerk of the works.

THE WIDENING OF COVENTRY-STREET.

The Coventry-street improvement project will now shortly be carried out, when this West-end thoroughfare will be considerably widened on the south side, from Whitcomb-street, near Leicester-square, to its junction with the Haymarket, so as to make it about 60 ft. in width, and bring it into direct line with Piccadilly. A few weeks ago the materials of the whole of the houses and shops which are required to be taken down in order to carry out the improvement were sold, and the site upon which they stood is now almost cleared. The property cleared away comprises nearly thirty houses and shops in Coventry-street, Oxenden-street, Princes-street, Whitcomb-street, and also four large houses and shops and other places of business on the east side of the Haymarket. Of the entire area occupied by the four separate buildings in the Haymarket which have been taken down for the improvement, the site upon which two of them stood, at the angle of Coventry-street and the Haymarket, will form part of the widened thoroughfare, whilst the two houses which joined them, lower down in the Haymarket, will be rebuilt. The improvement will likewise lead to the erection of a superior class of buildings on the south side of Coventry-street, set back in the direction of Oxenden-street, Princes-street, and Whitcomb-street respectively.

An Old Workhouse.—The proposal that the Salisbury City Workhouse should be razed to the ground, and in its place a choir chapel be built by the Dean and Chapter of the cathedral, has met with considerable opposition from the Society for the Preservation of Ancient Buildings. Audley Hall, the building in question, dates back to a period earlier than Henry VII., and is noticeable as a fine example of ancient Domestic architecture.

* Some particulars as to the rebuilding of the Hall, together with some notes of the company's history, will be found in our last volume, p. 673.



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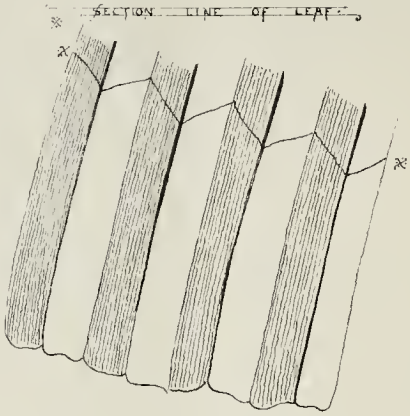
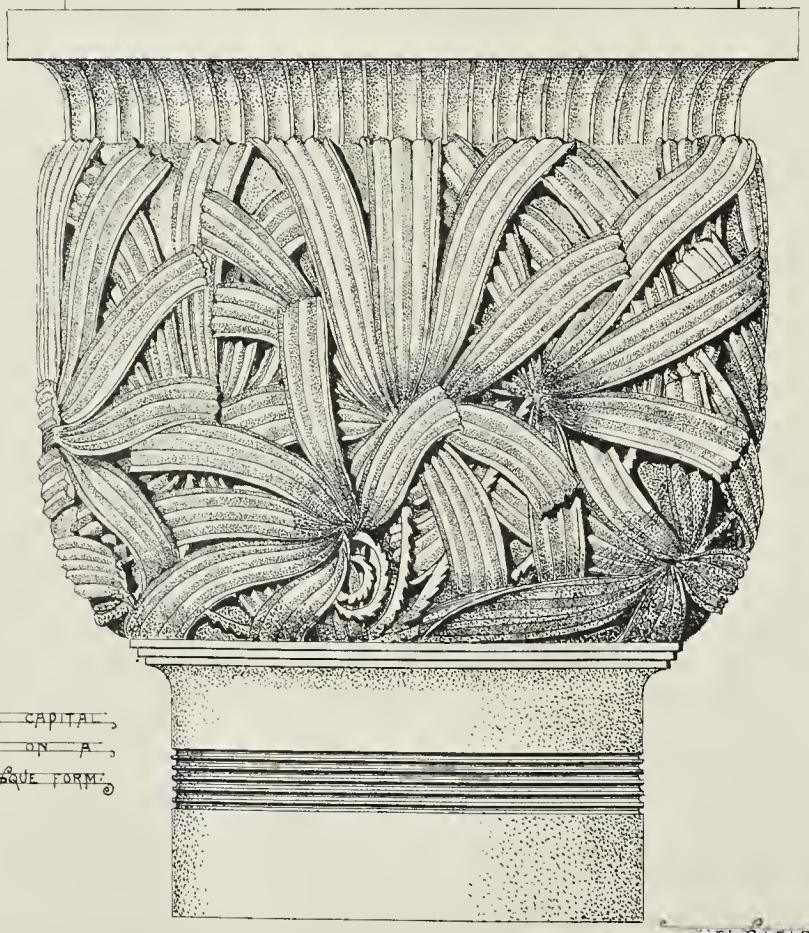
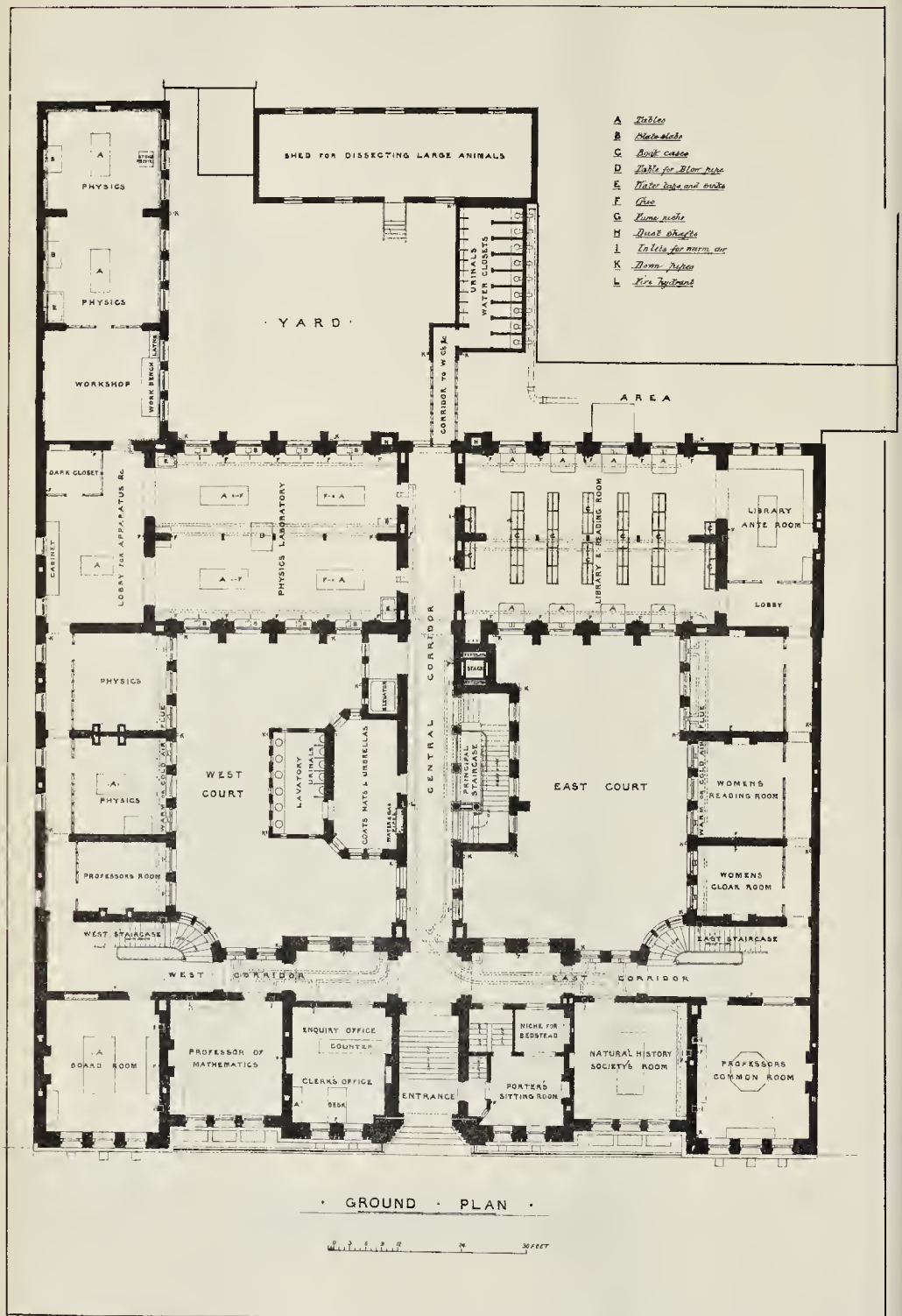


END OF LEAF · FULL SIZE.



MARBLE CAPITAL BASED ON A ROMANESQUE FORM.

DECORATIVE SUGGESTIONS FROM NATURAL FORMS. — No. 1.



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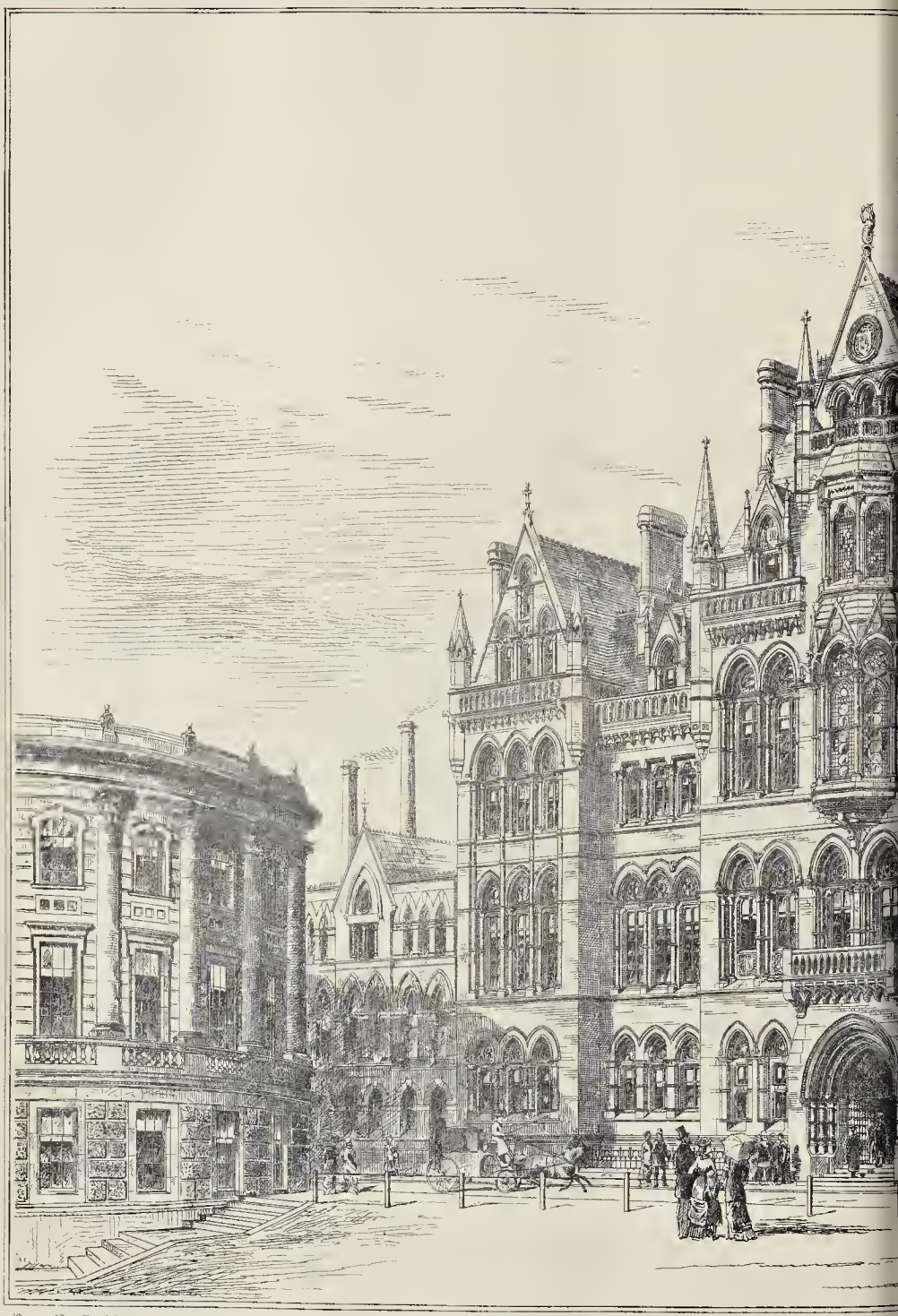
THE JOSIAH MASON SCIENCE COLLEGE, BIRMINGHAM.—Mr. Cossins, Architect.



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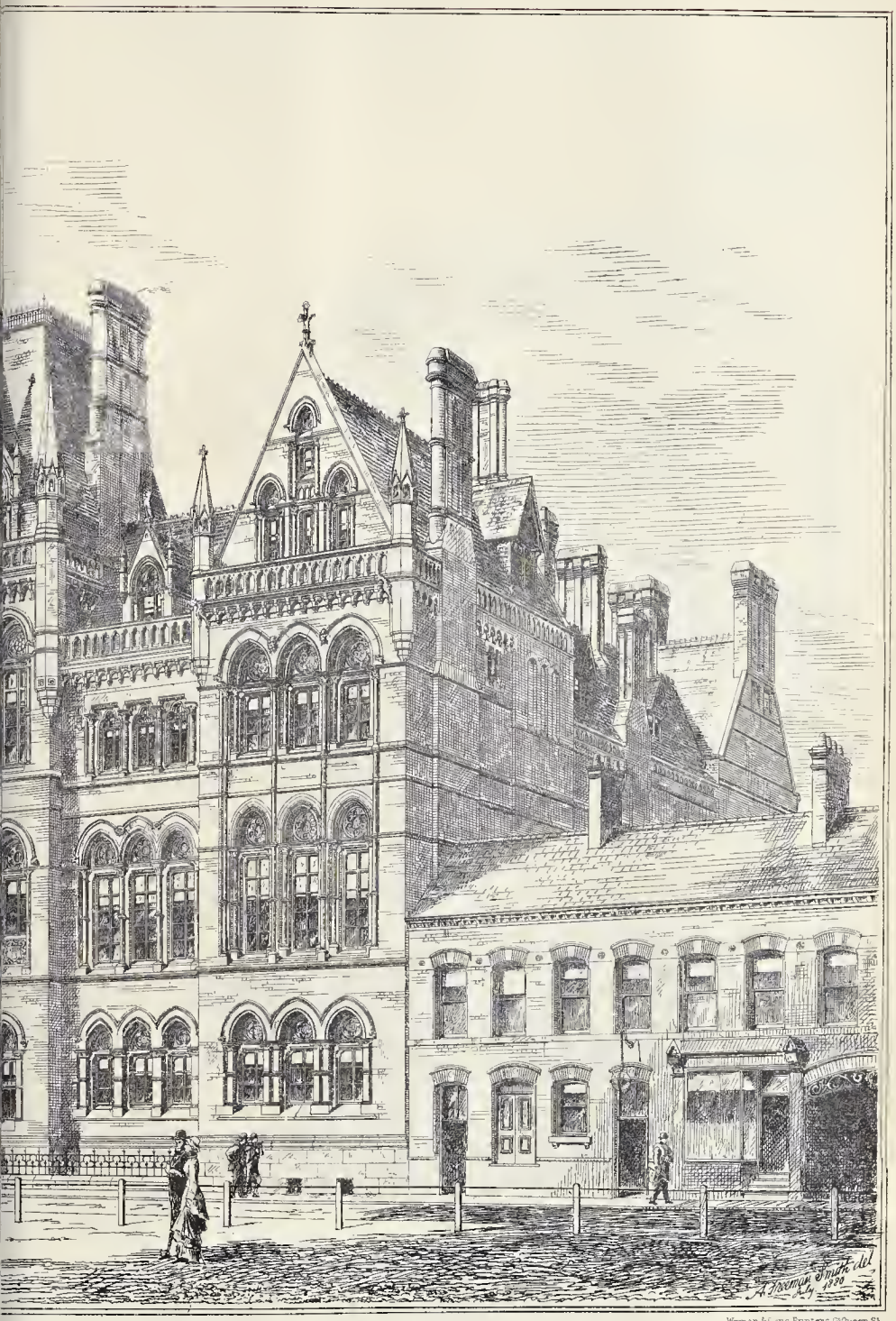
THE JOSIAH MASON SCIENCE COL



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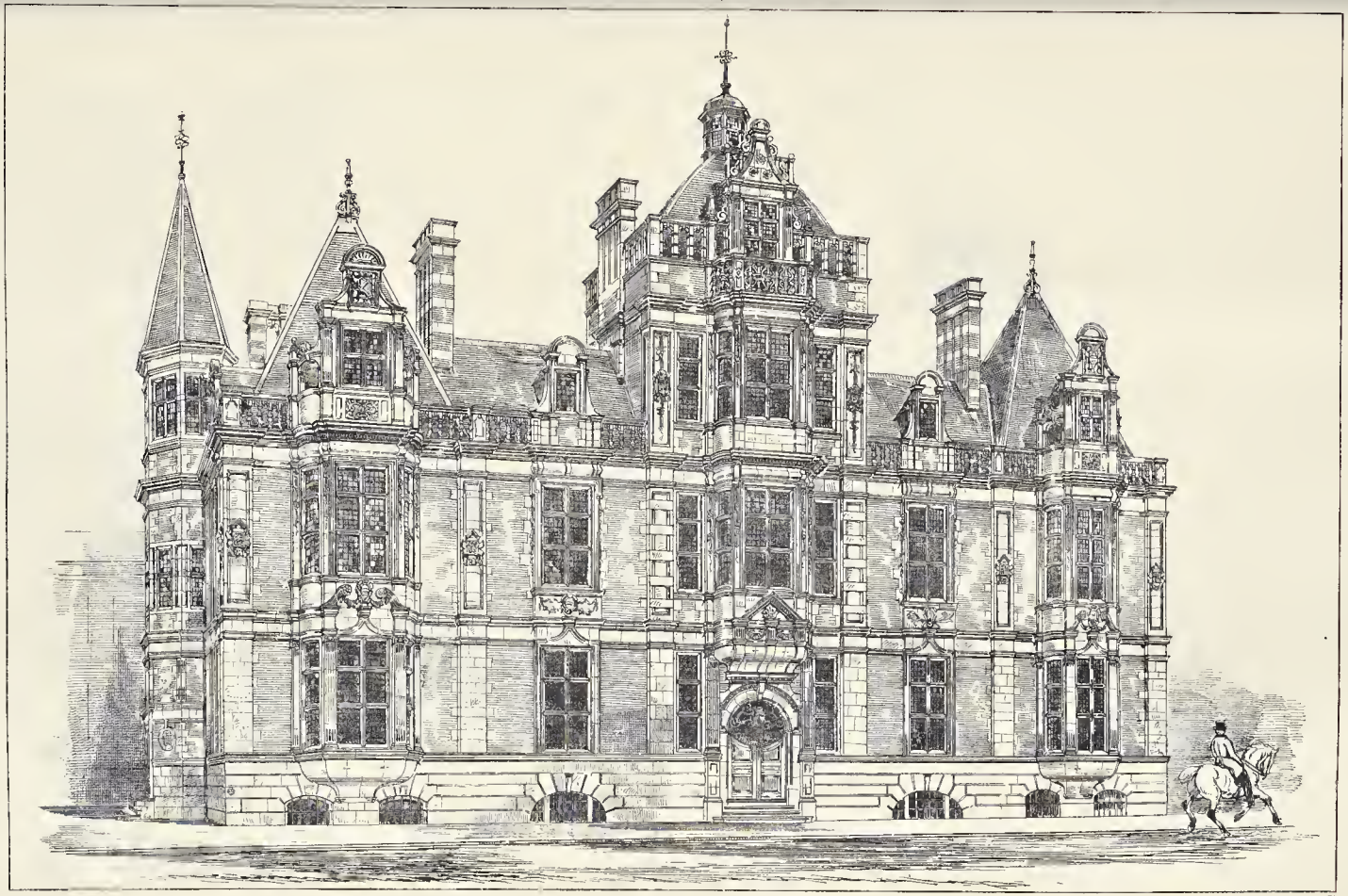
RMINGHAM.——Mr. Cossins, Architect.



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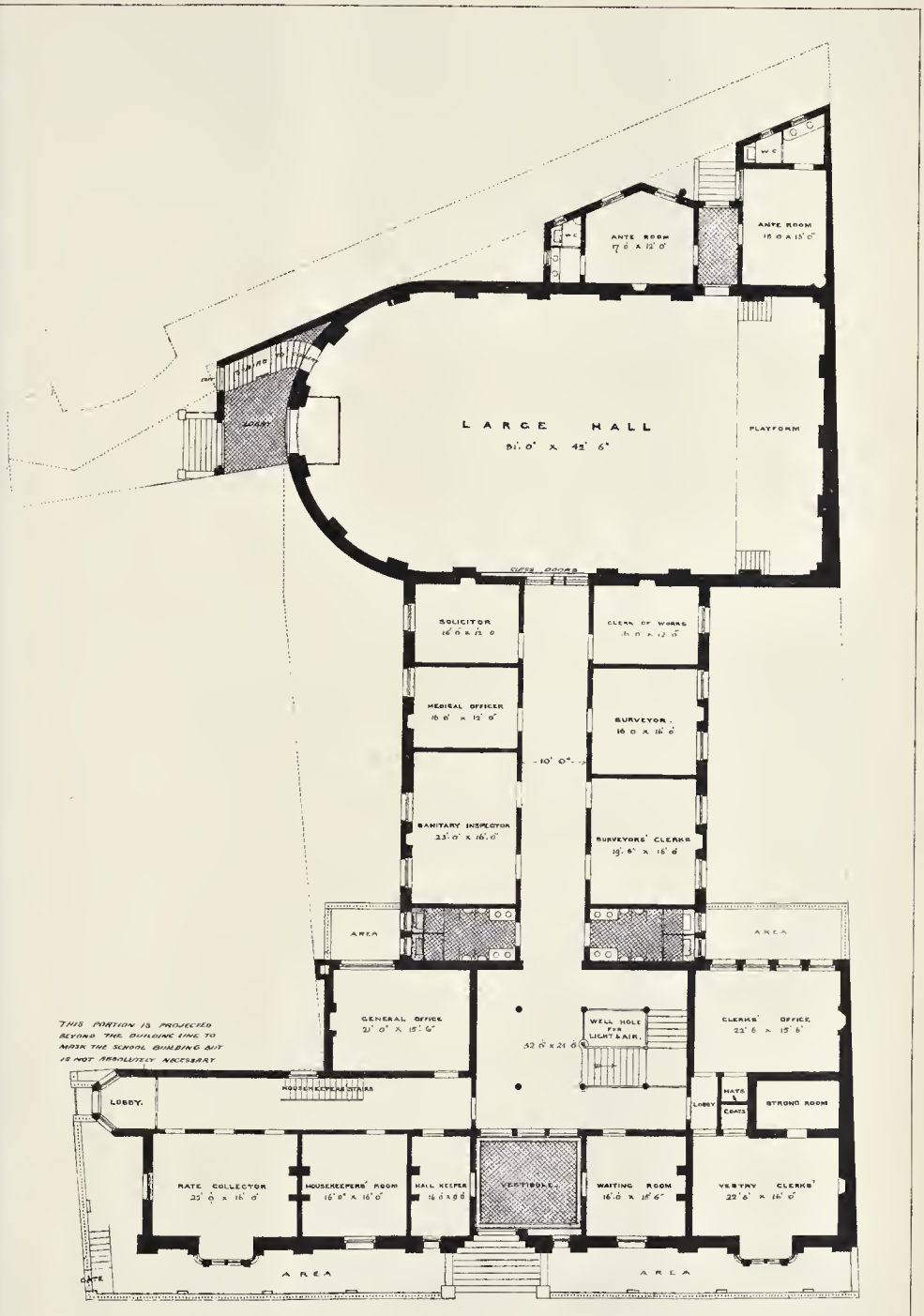
WESTMINSTER PAROCHIAL OFFICES.—Design by Messrs. Lee & Smith, to which First Premium was Awarded.



DESIGN FOR WESTMINSTER PAROCHIAL OFFICES.—*Plan of Principal Floor.*

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DESIGN FOR THE WESTMINSTER PAROCHIAL OFFICES.

We illustrate the design for the Westminster Offices, by Messrs. Lee & Smith, architects, to which the first premium was awarded; giving the principal elevation and plan of the ground-floor. We append some of the particulars given by the architects themselves to explain the design. They say they have considered the vestry-hall the most important matter, and have placed it in a position where the deliberations can be carried on in quietude and free from the noise of the streets. It is lighted by windows on three sides, the dimensions of hall being 49 ft. by 41 ft. and 25 ft. high, with a gallery at one end for strangers, and a retiring-room on the same level as the gallery, which is over the hat and coat room. The hall is approached by a staircase with steps 6 ft. 6 in. wide, rising from an inner hall, 32 ft. 6 in. by 21 ft. 6 in., lighted and ventilated by a lantern-light. This staircase also gives access to the committee-room, 42 ft. by 22 ft. 9 in. and 20 ft. high, the two smaller committee-rooms, the library, room for deputations and strangers' gallery, the hat and coat room before referred to, and the lavatories and conveniences.

The library, or members' tea-room, is provided with a serving-room in connexion with the housekeeper's stairs.

The ground-plan shows the chief entrance in the centre of the main front in Little Charles-street, by a vestibule, 16 ft. by 16 ft., on one side of which is the hall-keeper's room, and on the other a waiting-room, so that any person entering comes immediately under the notice of the hall-keeper. Both these rooms communicate with the large inner hall and corridor. Opposite the entrance, and across the inner hall, is a corridor, 10 ft. wide, on either side of which are the offices of the surveying, sanitary, and legal departments. On the left of the main hall is a corridor, 8 ft. wide, in which are the following rooms,—First, the hall-keeper's room, then that of the housekeeper, and opposite these the gas-testing office, and at the further end the rate-collectors' room, with separate entrance and waiting lobby.

It will be seen, by looking at the ground-plan, that the departments are divided into three:—1. The vestry clerk; 2. Surveyor, medical officer, and solicitor; 3. The rates and gas.

The large hall for meetings of the ratepayers is provided at the back, and will in this position afford room for 1,000 persons, this being the number suggested in the instructions.

The principal entrance to the hall will be from the main front, directly down a corridor, 10 ft. wide, with additional entrance in Gardener's-lane, which, in the event of the hall being let on any special occasion, will render it entirely independent of the vestry-hall and offices should it be so desired. The necessary space for accommodating 1,000 persons cannot be obtained without a gallery: this can be formed at one end or by a gallery all round the room. The materials for the exterior would be bricks and terra cotta.

The entrance-hall, staircase, gallery, corridor, large committee-room, and vestry-hall will receive a certain amount of decoration to give them the dignity requisite for a public building.

The roofs of the front are carried up to give height and dignity to the building, surrounded as it is by high structures.

The small scale of drawing for the elevation failed so completely, the designers say, to show the details of the building, that they prepared one on a larger scale; and they further note that they have not made three elevations, as according to their plan only two will be seen: consequently a considerable saving would be effected, by using which the principal fronts could be rendered somewhat more ornamental than could otherwise be the case, having reference to the sum named for the cost.

Sir H. Bessemer and the Freedom of the City.—The Gold Casket, designed and manufactured by Mr. J. W. Benson, of Ludgate-hill, illustrates the process of the conversion from the raw material to the application of the steel. It is of solid English design, surmounted by a modelled figure of Commerce, standing between a stack of pig-iron and the converter. On either side of the rounded cover are vignettes (in *repoussé* work) of a L. & N. W. Railway Locomotive (entirely constructed of this steel, and standing on its steel rails) and of a steel-clad ship.

"THE PRACTICE OF AN ARCHITECT."

We took occasion, some time since, to point out what we conceived to be the errors and injurious tendencies of an article published in the *British Quarterly* and titled "The Profession of an Architect." In the current number of that periodical the editor has allowed a writer, Mr. Roger Smith, also to say something on the other side of the question, and it may be useful to reprint a portion of his article. In the first part of it the writer obviously follows some of our lines:—

A professional man is one who either with his hands or his brain does for the individual who employs him work of more or less consequence or difficulty which the employer cannot perform for himself. A profession seems to have been so called to signify the fact that the person holding it professes or puts himself forward as an expert in some one thing. For example, the profession of law, of arms, of medicine is taken up by men who profess themselves skilled in law, in warfare, or in the healing art. An architect professes to be able to advise about buildings and to represent his employers in conducting the erection of buildings; that is to say, to design, superintend, and direct them. And before we can talk of the fine art of architecture, it is indispensable that all relating to contrivance and construction is first fully provided for. Many buildings, indeed, make no pretension to be called works of art, and in the strictest sense of the term are not architecture; for although all architecture is building, it by no means follows that all building is architecture; but even for such works the experience, the skill, the scientific attainments, and the business tact of the architect are as much required as where there is also an intention to aim at producing artistic work.

In the works which make undoubted claims to be our architecture in the most rigid sense that can be attached to the term, we do not find anything that exempts them from the conditions already laid down. Cathedrals and churches equally require to be planned, drawn out, estimated, contracted for, superintended, and paid for, and there is nothing in their nature which places them in these particulars in a different category from common buildings. When it is complained that architecture has become a profession, the complaint is as unreasonable as though it were directed against the medical or the legal profession. It is a more reasonable ground for both complaint and regret that architecture is sometimes attempted by men who are by no means competent to act as professional advisers. Persons of undoubted ability as draughtsmen, but not otherwise qualified, have sometimes obtained the position of architect to a building, and naturally enough have landed the undertaking in difficulties financial or structural, or both.

The unfortunate facility with which any one may assume the title of "architect," and the chances left open to all comers by the competition system, have together occasionally enabled such men to secure works of considerable importance and prominence. The result has often been severe disappointment and pecuniary loss to the employer, and sometimes complete disaster to the so-called architect, and has unfortunately reflected discredit upon the profession for which he had not fully qualified himself.

It may be assumed, however, as a point which few persons will venture to contravene, that whatever be the artistic excellences of the buildings to which we give the name of Modern Architecture, they must, if they are to be built at the present day, be designed and erected by persons capable of working under such conditions as those just laid down, and not apt to run counter to them. And it is only so far as the profession of the architect is adapted to the conditions under which it has to work that it can fulfil its duty to the public. The nature of that duty, often exceedingly arduous, and never unimportant, may have been to a large extent inferred from the statements already made; but perhaps a slight sketch of the ordinary routine of an architect's usual procedure in connexion with a building may not be out of place.

The first duty of an architect in connexion with a new work is to inform himself exactly as to what is wanted. The variety of the objects for which buildings are required makes very large demands upon the intelligence, the adroitness, and the training of the man to whose lot it falls to design them. An architect has to be quick at seizing the essential idea or ideas upon which his building depends for its success as a contrivance; and he must be sure as well as quick. This kind of insight is only acquired by practice and training, and were there no other reason why an architect must be a man of good special cultivation as well as good natural abilities, this part of his work is in itself sufficiently difficult to require an accomplished specialist.

The design, in its earlier stages, rather implies than sets forth much that will have to be foreseen and provided; but from the first its author ought to be able to see that it is capable of being carried out in all its details, whether of arrangement, construction, artistic design, or cost; and as he advances, he has to grasp all these matters and hold them, so to speak, in a strong grip; for if any one of them escape him, his work is likely to prove unsuccessful.

The design of a building is, moreover, not complete, even if its arrangements are such as to make it fit for its intended use, unless it be thoroughly sound, stable, and well considered as a structure. This requirement—a very wide one—calls for a knowledge of materials, their strength and nature, and the mode of putting them together; of foundations, and the modes of making them secure; and of the forces which are at work sapping the stability of structures, either by way of gradual decay or of a sudden and violent attack; and such knowledge the architect requires to possess, and is called upon to exercise, in a way which varies more or less with every building. It should be remarked, too, that the circumstances of the present day not infrequently call for close economy in the use of materials and the appropriation of space, so that the limit of stability is often unavoidably approached. Now, too, it is more often than formerly necessary to provide for a mode of occupation exceptionally trying to the fabric. Public halls, for example, with their crowded audiences, are, in modern towns, as a rule placed on upper stories, so that the safety of some thousands of people depend upon the provision of ample strength in the construction of their floors. Commercial and manufacturing buildings, again, are often made to support vast loads; the floors of others are crowded with heavy machinery in rapid motion, while such constructions are commonly built with an economy that verges on parsimony, so that it is essential to make them strong and secure without rendering them costly. This is not always, if ever, an easy task.

It has been pointed out that all the appliances and contrivances in use at the present day, and all the building material obtainable in every part of England and many foreign parts, are at the disposal of the architect, and that every portion of the country is open to him as his field. It is consequently necessary for him, if he is to be equal to his opportunities, to know something of the materials, the climatic conditions, and the local building customs of every part of this country; and this alone implies that much varied information has been got together such as is difficult to obtain, and can only be acquired by diligent personal search. The various mechanical and scientific appliances available in buildings also require to be understood. The architect should know which of them will suit his client's purposes, and should be able to secure that those which are selected for employment shall be efficiently and properly introduced. This involves no small knowledge of men as well as inventions; for it is not only necessary to know what contrivances are best, but also what artificers or tradesmen can be relied upon to construct or fix those contrivances in a workmanlike manner, and with a good prospect of their answering the end for which they are to be employed.

The part of the work done by the architect in his own room culminates in the preparation of a complete set of working plans and of a specification descriptive of the materials and labour to be employed. The undertaking then enters on another stage. The architect has to direct the negotiations, measurements, &c., which result ultimately in an arrangement with contractors or tradesmen who shall execute the work, and he then personally and by deputy supervises the carrying of it out to completion. During its progress he has to certify from time to time that such payments on account as are agreed upon have become due; and at its close it is his duty to settle and state the final accounts. Now it is of all things necessary for the successful discharge of these duties that the

architect should be a man of business, and that he should be strong enough not to be afraid of the people with whom he has to negotiate, and over whom he has to exercise control. How far an architectural draughtsman and a superior operative acting together,—the combination recommended in "The Profession," &c.,—would be able to obtain the necessary command over an energetic, unscrupulous, overbearing, and wealthy contractor may be doubted; yet if a man of that class obtains a building contract, it depends almost solely upon the architect's personal influence, straightforwardness, and independence to keep him in his place and to secure the due execution of his contract.

Above all things, the direction of a building operation requires the services of a man of upright, straightforward, independent integrity. The writer of the article under reply has permitted himself to insinuate that it is a common practice with architects to receive bribes, which he dignifies by the name of "sly percentages," from the tradesmen whose work they have to superintend. Either he is not in a position to know, in which case it is unjustifiable to bring such a charge, or he is in such a position, in which case a far more severe term ought to be employed to characterise what he must he well aware is a slander. That there are persons entirely unfit to bear the name, who call themselves architects, has been already admitted, and there can be no doubt that such people take all that they can get by fair means or foul; but men regularly occupying the recognised position of architects of respectability are as honourable as the members of any other profession. To be trusted and trustworthy is the first necessity of professional life. The present writer may, perhaps, be permitted to add that his personal experience confirms him in his belief that the sly percentages spoken of in the article are not offered,* as well as not accepted.

To judge by his language, the author of "The Profession of an Architect" seems to attach something like criminality to the very mode of payment always adopted. The custom has now become universal that under ordinary circumstances, and for the usual services, an architect charges his employers a lump sum equal to five per cent. upon the amount of money spent. For the public this is a very fair mode of making a charge, and the rate is moderate. No building worth attending to at all can well fail to reap advantage to the extent of at least one shilling in the pound from the skilled design and supervision under which it has been carried out. To the architect the payment is, on an average of his works, moderately remunerative. Occasionally it is good pay; often, especially in small intricate buildings, or in the case of buildings in remote situations, it is miserably inadequate; and there can be no doubt that architects would be gainers were this custom abandoned, and the habit of charging for the time actually expended on each work substituted for it. The advantage of payment by a lump sum is that, being known beforehand, there is little room for dissatisfaction or dispute; and rough though the method of assessing the amount undoubtedly is, there is in it substantial fairness. For an architect to reside at one work, and superintend it wholly, as the writer suggests, appears to be in no wise necessary,—at any rate, in this country,—now that railways and good roads have made every part of England easily accessible; nor is it quite certain that the result would answer the expectations of those who tried the experiment. Too much interference might possibly result from the presence of an active-minded man bound to one building every day, and all day long; and nothing so surely mars any undertaking as vexatious interference, however well-intentioned. To the suggestion that this resident architect ought to be an operative, I reply that, at present, so much of supervision as a working-man can give is given, and in a fairly effectual way to the carrying out of work, but not certainly to the design. The superintendence of every building is under the care of a foreman placed by the contractor or builder in charge of the work. He is an operative who has been marked out by his superior knowledge or intelligence, and who can usually understand the plans, and can direct the undertaking so far as materials, the employment of labour, and the putting together of the work are concerned. In most buildings of importance the architect is also represented by a permanent "clerk of works," who is generally a man of much the same sort as the builder's foreman,—that is to say, an intelligent operative. The practical knowledge and experience of one or other of these men,—or both together,—can generally be trusted in all matters that relate to materials and structure, but it is the rarest thing in the world for them to understand the science of construction or the art of architecture. The *meaning* of a moulding, a feature, or an ornament of any sort, seems beyond the grasp even of the operative who executes it; and the best workman rarely proves capable of anything beyond a mechanical adherence to a drawing. With the solitary exception of carvers in stone and wood, much the same may be said of all classes of operatives employed in building,—they seem rarely to possess any kind of artistic feeling in respect of the work they do, and never to be so informed as to be able to act as resident architects in the manner suggested in the article under reply. The most unsatisfactory results, from an art point of view, commonly follow the efforts of any artisan who has had energy enough to establish himself in a small way. The deplorable little structures, known commonly as "weekly property,"* seem to be the limit of the unassisted efforts of the artisan, turned master builder, in most instances; and how far these are from architecture let those say who are most familiar with them.

There appears no sufficient reason why, within fair limits, an architect who is able and skilful should not reap the reward of his abilities in the increasing number of his clients, just as a physician, when he becomes eminent, finds patients flock to his consulting-room. The parallel holds good in another respect; for as the fee of the young physician is not less than that of an established one, so architects of very different professional standing regulate their charge by the same percentage. It is quite true that when very numerous works are entrusted to the same architect much of the preparation of the drawings, and not a little supervision of the work, must be delegated, just as the carrying out of the directions of the physician is necessarily delegated to nurses and other assistants.

In the architect's office the plans which he originates are often, to a large extent, drawn out by assistants. This takes place under the supervision and control of their principal, with the constant addition of his own touches; and the work so done is virtually much the same as he himself would do, did time and opportunity permit.

The amount of personal work in the way of sketching and designing actually done with their own hands by many of those architects whose practice is the most extensive, is, however, enormous. The most busy architect of the present day is, in all probability, the one who has charge of the Palace of Justice now in course of erection in London. Yet it is his boast that all the working and detail drawings of this enormous pile are the work of his own hands, and, in addition, he is pursuing nearly the same course with all his other work. Whatever may be the idea entertained by the writer of "The Profession of an Architect" as to the assistance which he supposes is obtained from clever clerks, he may rest assured that the success of an architect of the present day depends, as a matter of fact, mainly upon his personal skill as a draughtsman. Four abler architectural draughtsmen could not be found in all England than the four gentlemen who, as Academicians and Associates, represent architecture in the Royal Academy,—a position the highest to which any architect can aspire. They are Academicians and Associates, however, not because of the excellence of their drawings, but of their buildings.

That which is most unfavourable to modern architecture is not the perfection of the methods placed at its disposal, but the absence of that universal and spontaneous effort which, during not less than four centuries, made architecture the foremost expression of popular energy, faith, skill, and feeling. Could we once more gather up into this one channel all the force of the most powerful minds in Europe, and leave them without science, and almost without literature, bereft of steam, without the printing-press, without great commercial or philanthropic undertakings, without other paintings or sculptures than works of a decorative character; could we, in short, force back the tide of time that has flowed on for five centuries, and then say to Europe, "Build; throw the best powers of your best men into this channel,"—we should soon find that human activity, administrative, structural, and artistic, concentrated into architecture alone, would infuse a vitality into that art beyond even the vigorous growth which we have witnessed in natural science in our own day. But it is not the part of sensible men to desire the impossible, and there is not the smallest reason to suppose that a return to what it is presumed may have been the methods in which the buildings of the Middle Ages were managed would ever (were it practicable, which it is not) bring us one inch nearer to spontaneous living architecture, unless we could make the whole age move back also.

The idea has been apparently entertained by the author of "The Profession of an Architect" that architects as a rule obtain their practice, or the bulk of it, by competitions; and this unknown, or at least unnamed, critic appears in his hostility to success to be willing to spread this delusion, for no other reason than that some architects who have succeeded in life have also succeeded in competitions. It is quite true that, owing to the prominence given to public competitions, and to the fact that every now and then designs for a really important building are obtained in this way, the subject is associated in the public mind with the practice of architecture. But the truth is that public competitions are resorted to for only a moderate proportion even of public works, and that the designs for all our best buildings, such, for example, as churches, banks, club-houses, and private dwellings, are rarely, if ever, obtained in this way. Men, who as public men, will resort to public competition because it is customary, or because it affords a chance of exercising a little nepotism undetected, or because it affords a convenient escape from the claims of rival architects, are far too shrewd to employ so imperfect and unbusiness-like a method when their own interests are at stake. Still, competitions do take place, and some few architects are frequently competitors, and many occasionally become so. But, we repeat, if it were not for the conspicuousness of competitions, they would not be much taken note of as influencing architectural practice. Even those architects who, having obtained an important building to erect through a competition early in life, have had an opening towards success made for them of which their ability and skill has enabled them to make use, will be found to have really only gained a very small amount of their life's work in competition; in short, nothing can be more untrue than the degrading sketch of an architect's position and mode of procedure given at pp. 335, 336, of the article.

A competition has this great defect, that it forces the architect and employer asunder at the very moment when they ought to be consulting together, and that each is placed at a disadvantage and induced to do his worst rather than his best. The employers make up their own mind among themselves as to what they are going to do at the very moment when they ought to have the opinion of an experienced and responsible adviser to tell them what is really within their reach; they then surround their proceedings with a thin veil of mystery which, on the one hand, makes steps that are in themselves perfectly innocent seem as though they were unfair, and, on the other, offers a ready cloak for any species of unfairness which it may be really desired to perpetrate. Meantime the architects, left to prepare their designs without proper consultation with their clients, are well aware that it is not what they themselves consider best, but what the committee consider best, that is likely to win the day, and are accordingly sorely tempted to launch out into projects far beyond the means really disposable. These evils are more or less mitigated by the employment of a professional adviser, and by some other departures from the stereotyped programmes; but the system has little to recommend it, and is much to be deprecated even at his best; and if it were at all as com-

* Twice, and only twice, in a course of practice extending over twenty-five years, and bringing me into contact with tradesmen of every sort and kind, has any such thing as a percentage been offered or even suggested to me by a tradesman. Were such offers customary, I must have had my share of them. During the last ten or twelve years I have been largely engaged as an arbitrator and a witness in cases arising out of building disputes. These have been varied and not seldom obstinate and angry, and in some cases it would have been to the advantage of one party or the other to disparage the architect; but I have never yet, in any case, heard proof given, or even a charge seriously made, that an architect had received a bribe from any tradesman or contractor, as I must have done were such percentage common.—T. R. S.

* Houses of which the rents are collected weekly, i.e., of the value of about 12s. 6d. per week downwards.

mon as it is conspicuous, might prove more seriously prejudicial to the profession of architecture than it ever has been or will be.

On the other hand, there can be no doubt that in many respects competitions do good to the individuals who engage in them. They offer an opportunity to many a young professional man, little if at all occupied as yet, of preparing designs for real buildings to occupy actual known sites, and to be built for definite purposes and under definite conditions. This is, if taken in moderation, not a bad training for actual practice hereafter, and there is enough of stimulus in the excitement and in the chance of possible success, remote though that chance may be, to induce a young man to do his best. Again, there is a freedom from the restraint of responsibility,—a restraint which often fetters the imagination of an architect sorely,—that sometimes acts like wine to the genius of men of true ability, and induces them to do their best. Competitions thus do actually from time to time become the stepping-stones across which an unknown and obscure artist of real power makes the first stage of his journey in life. In a few rare cases they have called forth the best powers of men of admitted talent and experience, but that has generally been when, as was the case in the competition for the Law Courts, the invitation is restricted to a few well-known names and the prize is a large one.

LARGE SALES OF BUILDING SITES IN THE SUBURBS.

Several sales of building sites on estates laid out for the purpose in different localities around the metropolis have taken place during the past week or two, there being in almost every instance an active demand amongst builders and others for the various sites offered.

On Tuesday evening, the 28th ult., Messrs. Protheroe & Morris submitted for sale, at the Prince of Wales Hotel, Wimbledon, eighty-eight plots of freehold building land, forming a portion of the Woodside Estate at Wimbledon. The several plots offered have frontages of from 20 ft. to 25 ft., with a depth ranging from 109 ft. to 144 ft. There was a good attendance of buyers, and most of the plots were sold, the prices obtained ranging from 5*l.* to 6*l.* per foot frontage. A large corner-plot, having a frontage to Gap-road of 123 ft. in length, with a depth of 90 ft. at one end, and 36 ft. to Alexandra-road, was purchased for 500*l.*, Mr. Shaw, of Tooting, being the buyer. This plot had been reserved by the vendors for an hotel.

On the following Thursday evening Messrs. Protheroe & Morris also offered for sale at the Castle Inn, Tooting, the first portion of an estate now converted into building land, but which has hitherto been known as the Exotic Nursery, at Tooting, situated in Garratt-lane, near the Balham and Tooting railway stations, and about seven miles from the City. The plots offered were thirty-four in number, having frontages to Fountain-road of 20 ft. by a depth of 100 ft. Considering the lateness of the season there was a good attendance, and most of the lots were sold, the prices obtained averaging about 3*l.* 5*s.* per foot frontage.

On the same evening Mr. R. J. Collier held an extensive sale of a similar character in a large marquee, specially erected for the purpose, at the Queen's Head Hotel, Green-lanes. It consisted of the first portion of the freehold building land, known as the Haringay New Park Estate, situated on the high road from London to Southgate, within a short distance of Finshury Park and the Alexandra Palace, and described as advantageously placed within easy distance of four railway stations. The number of plots offered for sale consisted of 145, suited to different classes of purchasers. They varied in dimensions from 18 ft. to 22 ft. frontage, and from 70 ft. to 172 ft. in depth. Several of the plots are appropriated for shop purposes, and others for villas and houses of a moderate class. There was a very large attendance at the sale, and all the lots were sold at prices varying from 80*l.* to 140*l.* each, or at the rate of from 4*l.* to 6*l.* per foot frontage. The total proceeds of the sale amounted to 11,060*l.*

On Saturday evening last, Mr. F. M. Whittingham offered for sale at the Castle Hotel, Woodford-green, the first portion of the Woodford-green estate. The property fronts Woodford-green, and is in the immediate neighbourhood of Epping Forest. The number of plots submitted for sale was 61, having frontages of 20 ft. each, and a depth of from 100 ft. to 173 ft. All the plots fronting the green were sold, realising an average price of 7*l.* per foot frontage, or about 1,900*l.* per acre, and also most of those fronting Higham-road,—a new road made through the estate,—which realised 5*l.* per foot frontage, or 1,600*l.* per acre, the total amount of the sale being 4,059*l.*

DIRT, DISEASE, AND CRIME.

The Recorder of Dublin, in charging the grand jury at the opening of the Quarter Sessions on the 1st inst., referred to the intimate relation which subsists between the presence of unsanitary conditions and the existence of a heavy criminal calendar and a high death-rate. Having quoted particulars of the overcrowding of the city from the report of the Royal Commission which sat last year, he said:—

"We are responsible if we do not,—every one of us publicly or privately connected with this city,—labour to change it. I say deliberately that this state of things,—30,000 people living in the chief city in houses which have been condemned as uninhabitable,—a crime-rate and a death-rate so extravagantly excessive,—are subjects as deserving, far more deserving, imperial consideration than some of the burning questions, the alleged grievances, which are now shaking society through the length and breadth of the land. There are at least four things which must be done. I cannot detain you by stating my reasons here. There must be a revaluation of the city. The incidence of taxation at present is unjust: some property is overtaxed; a considerable portion has escaped taxation, and more still is taxed below its proper value. Secondly, there must be the co-operation of the central Government, at least to the extent of advancing the necessary loans, on exceptionally favourable terms as to the length of time for repayment, for it would be manifestly unjust to charge to the existing generation only the defaults of generations past. In the third place, there must be co-operation of the wealthy suburban townships, for the labouring poor of the city are the labouring poor not only of the city within the bounds, but the whole metropolitan district. In the fourth place, there must be the co-operation of private enterprise, as in Glasgow, where a somewhat similar state of things has been successfully coped with, and where the population displaced by the improvements were provided for by private enterprise, and that without loss. We cannot hope that all this would happen here. We have an Artisans' Dwellings Company, who have done much; but their operations must be necessarily limited, having regard to the work to be done. It may be a little wide of the mark to suggest here the co-operation of private charity; but all have heard of the great work in London for the homes of the poor effected through the beneficence of Mr. Peabody, and it is at least possible that, were the necessity widely known, some one would be led to act in the same direction here. At least, it is unjust and unreasonable for people simply to say, 'the question is one for the corporation, with which we have nothing to do.' No doubt the corporation, as the responsible authority, have the chief burden upon them, and they are already engaged, under the leadership of the Lord Mayor, in carrying out several of the suggestions in this report; but the Lord Mayor himself has stated that this evil of the tenement dwellings,—which is the evil of evils,—is one too gigantic to be dealt with by the Council in the present state of their finances, and those who ask the Corporation to do their duty must be prepared for the self-sacrifice of bearing a portion of the burden of supporting the Corporation in seeking the means by which alone it can be discharged."

AN ANCIENT BARROW IN WALES.

In connexion with the recent meeting of the British Association at Swansea, an excursion was made to an ancient barrow, discovered on Mr. Hussey Vivian's property at Park le Breos, in Gower. It was discovered, says Mr. Vivian, in 1869, under the following circumstances:—Up to that period no road existed in the valley. Finding that its beautiful grassy sward was much destroyed by the haulage of timber, I determined to make a road, and entered into a contract for its construction. Towards the lower end of the valley there was a heap of stones grown over with brambles and shrubs, and surrounded by a few ash trees. The contractor, finding that stones would cost him less from this heap than from the quarry, commenced its removal, and on doing so soon came on human bones. I was at once advised of the discovery, and on examining the place was convinced that it was a cairn. Soon afterwards, in August, 1869, the Cambrian Archæological Society met at Bridgend. I invited its members to come on to Swansea and assist at the opening of the cairn. Sir John Lubbock also kindly responded to my invitation. The cairn presented the appearance of a large heap of stones 60 ft. long and 56 ft. broad, with the top of one large stone protruding from the centre. The small stones were removed, when a carefully-constructed chambered tumulus was revealed, consisting of four lateral compartments leading off from a central passage, two at each side near the end, with a space between. The bearing of the central passage is nearly north and south; it is 18 ft. long by 3 ft. wide. It contained the bones of ten persons. The north-eastern chamber is 6 ft. long by 3 ft. 6 in. wide, and contained the remains of six persons; the north-western chamber is 5 ft. long and of irregular form, 4 ft. broad at the end and 8 ft. at the entrance. It contained the remains of two persons. The south-west chamber is 5 ft. long and 4 ft. wide, and contained the bones of four persons. The south-east chamber is 5 ft. 6 in. long and 3 ft. 6 in. wide, containing two sets of bones. The central passage is approached by a hell-mouth entrance, and roughly walled on each side, 10 ft. in length. The upright stones forming the central passage and lateral chambers vary from 3 ft. to 6 ft. in height above ground, and are irregular, so as to preclude the supposition that covering-stones were used. None such appeared in opening the cairn. The bones were submitted to Dr. D. Morton Douglas for examination, and such portions as appeared to be of scientific value were retained, and the remainder were placed in terra-cotta vessels and re-interred each in its separate compartment. Such bones as are of interest I have now presented to the Oxford Museum through Professor Rolleston. No flint implements were found in the tumulus, but some fragments of rough, unbaked pottery were discovered.

BORING WITH SMALL TUBES.

In the vicinity of Antwerp much difficulty is experienced in obtaining water, owing to the fact of the ground being entirely a deposit of fine sea-sand, of a blowing nature.

Mr. Huger, the agent of the Great Eastern Railway Company at Antwerp, has been trying to ascertain how deep the bed of sand extended, and has made his first attempt on a very small scale, employing an "Abyssinian" tube well, only 1¼ in. diameter, driven by a "monkey" weighing 75 lb. With this little tube he has been able to reach to no less a depth than 152 ft., testing the soil at short intervals the whole way down, and demonstrating that nothing but sand extends to this depth.

It is now very probable the attempt will be followed upon a large scale.

PRESTON.

Health of the Town.—At the last meeting of the Town Council, on the presentation of a report from the Sanitary Committee, containing the recommendation that notice should be given to the owner of two houses requiring that they should be closed as unfit for human habitation, a discussion took place, in the course of which statements were made as to the health of the town which call for immediate attention. Alderman Satterthwaite, for example, said,—Respecting the mortality, they would see that for the past month it had been 37 per 1,000, and for the month preceding it was 32 per 1,000. If they would look at the ages of the persons who died they would find that the mortality had been principally among those under two years of age. From two years and upwards the death-rate had not exceeded the average. For this month 205 out of 316 had been under two years of age. The rate under two years of age was 65 per 1,000 for this month, and 60 per 1,000 for the last. During the past five weeks there had been 145 deaths from infantile diarrhœa among children under two years of age. That was a serious matter, and it was rather humiliating that the exertions of the Sanitary Committee had not had a better result. The report was ultimately adopted—so should fresh measures be.

Floor of the Town-hall.—The council were afterwards occupied for a long time in the consideration of a proposition to take up the particularly firm and solid flooring of the hall constructed under the direction of its architect, the late Sir G. G. Scott, and substitute, at a considerable expense, a yielding or "bending" floor more pleasant to dance on. Alderman Hibbert, in opposing the proposition, wisely expressed a hope that the council would inquire, before passing any motion, whether the town-halls at Manchester, Leeds, Bradford, Hull, Bolton, Rochdale, Halifax, Blackburn, and Chorley, had floors constructed upon a "bending" principle. If they could find such, and could procure testimony that such floors answer in general respects, his opposition would fall to the ground. He succeeded in passing as an amendment,—"That the question of altering the construction of the Guildhall floor be referred back to the committee, with an instruction to inquire and report to the council whether there exist any public hall floors of similar construction to that now proposed."

We learn that the existing floor is constructed as follows:—11 in. by 3 in. single joists, 11 in. apart, with bearings of 13 ft., and resting co-extensively upon the side walls and upon intermediate sleeper walls, which last are carried upon the granite pillars and stone vaulting of the room below. These joists it is proposed to take up and replace to a dancing area extent of 65 ft. by 39 ft., with three beams, 9 in. deep and 1 ft. 1 in. wide, resting upon the walls at each end, having a bearing of 39 ft., and trussed with iron rods; and each beam having under it at two intermediate points of the bearing metal springs or discs, which themselves rest upon the sleeper walls. Upon this yielding basis are to be binding joists, and bridging joists, covered by the present boarding, taken up and replaced. The number of times the hall has been used for balls or dancing assemblies since its erection in 1866 has averaged, we understand, about four or five a year,—the majority private and not public balls. If the council are wise they will let well alone.

PROFESSIONAL REFEREES IN COMPETITIONS.

Sir,—"One who Signed it,"—that is, the memorial to the Institute with reference to Architectural Competitions,—does not treat us quite fairly. He brings forward an instance in which the views of the memorialists were carried out, expresses a very pretty admiration of the successful result, and then proceeds to state that he thinks the memorial will do no good, although he signed it. We are not all of us quite so hopeless. Some of us, and we are glad to have the *Builder* with us, consider the memorial one of the best things done for some time; and are willing to believe that the Institute will not allow the good resolutions to be wasted, but will help every respectable practitioner to be a party to a self-denying ordinance with a view to the general good No reasonable person expects that professional referees will always be perfectly wise, or always able so to deal with conditions conflicting with reason and with each other that no competitor will feel able to grumble if he tries. In the law courts and in arbitrations there are false judgments and glorious uncertainties, but submission to the decisions of unskilled persons has yet to find an advocate. When it becomes the custom to employ the eminent architect who is to act as referee to draw up the conditions, as the memorialists wish that he should, failure of justice will, one hopes, be the rare exception, rather than the rule, as has happened so commonly during the time of haphazard decisions.

If "One who Signed it" has some reasons (beyond a general belief in the awkwardness of human creatures and a despair of things in general) for thinking as he says he does, he will be doing good service by making them known to the signers of the memorial and to the world, in the opinion of

Another who Signed it.

THE EDUCATION OF THE WORKMAN.

Sir,—There is no one who reads the *Builder*,—and who does not?—who will not read "E. G.'s" sensible letter on the above subject with interest. He laments, as others do, the difficulty of getting good general workmen, and yet, if I understand him rightly, he favours specialism, and special schools. Does he not see that this specialisation is one reason why you cannot get the good, old-fashioned, all-round, general workman? "That is not my business," or "That is not my work," is the answer you get from a workman from whom you expect to get general utility. But I fear, sir, there is something lying yet much deeper than this, and "rotten in the state of Denmark." "E. G." almost hits it when he speaks of the want of emulation; but what causes this want of emulation in a nation? It is when *sic vos non vobis* is written on the wall, and men come to believe that if they project any improvement for a master, for a company, for the State, the credit and the reward will be wrested from them either by unscrupulous capital or unscrupulous power. Invent any educational machinery you may, it will not cure this disease; the apathy of the slave sets in, and men will just satisfy the task-master and no more. When a nation has come to this pass of a widespread want of emulation, you may multiply technical institutions as you will without in the slightest degree effecting a cure; the nation that ceases to have the spirit of emulation is a nation on the road to ruin. There are, however, more causes than this highway robbery of men's suggestions, ideas, projects, &c., one of which may be the hard and fast rule that men shall not make a profit of their superior ability; but this, too, when analysed, is simply depriving the individual of his advantage, and of the value of his property. The only remedy for the evil would be the prompt restoration of honest freedom, a fair field and no favour. Then we should again have emulation; men would work with a will; the State would be revivified, and we should never again have to lament the want of a man for any good work: we should find for all departments the good general workman.

W. Cave Thomas.

SUBURBAN BUILDING AND THE BUILDING ACTS.

Permit me to enter a protest against a mode of building to some extent prevalent in the suburban districts,—in my view of the matter a reprehensible and vicious mode of construction,—one, however, not provided against by the Building Act, 1855, viz., the banking up of foundations, on the natural level of the soil, by concrete enclosed by planking. If reference is made to the Act of 1844 we find the following as regards foundations, "Depth below Ground," in reference to the depth below the lowest ground or area adjoining:—"The *top* of the footing of every party fence wall, and of every external and party wall, to be at the least 3 in. *below* such surface." It appears to me trenches cut for walls are an essential element in their stability, and I suggest that, to provide proper foundations, the top course should not be less than 12 in. below the natural surface or level of such ground.

The present Act, 1855, simply enacts that "the foundations shall *rest* on the solid ground or upon concrete, or upon other solid substructure."

Why the salutary provision as regards foundations provided by the Act of 1844 should have been expunged, and the present regulation made, is a "*res difficilis ad explicandum*."

Another defect in building, and one attended with danger, is the late period at which the drains are put in, often when buildings are approaching completion. Before the walls of any building are more than 3 ft. above the ground, it should be compulsory that the drains should be completed.

As regards bad building, on which so much has been written, I cannot conclude without expressing an opinion that no real improvement in these matters will be effected until the legal position of the freeholder or ground landlord is recognised, and he is made jointly responsible with the builder for what is put on the ground through his agency; the legal maxim, *qui facit per alium facit per se*, should be insisted on.

Unscrupulous, careless, or ignorant landlords will always find unscrupulous agents to cover their ground at a minimum of cost. Let the sins of these nefarious proceedings be shared in their due proportions by either delinquent; but for the future the public have only themselves to thank if they allow the real culprit to escape.

R. L. Sibley.

THE GROUPS FOR BLACKFRIARS BRIDGE.

Sir,—Mr. Edmeston's letter is timely, and may be of service to sculptors. That is, supposing the character of the works required and the prizes offered warrant the competition of men of talent. It cannot, however, be disguised that there is a growing disbelief in the honest administration of competitions of the kind proposed. There is a conviction that it is often determined who is to have the commission before the terms of a competition are advertised. If not so flagrant a breach of faith as this, the first appearance of the notice is a signal for the several members of a committee to commence tactical proceedings in favour each of his own *protégé*. The worst work sometimes triumphs. Now, if competitions are really of any advantage to art, they can only be so if carried through with rigorous fairness. The only chance that I see for this would be the appointment of a professional committee of selection, a committee of artists. Painters and sculptors should insist upon this, or refuse to compete.

Observer.

KITCHING'S MEMORIAL READING-ROOMS, MILNTHORPE.

The foundation-stone of this building was laid on the 3rd ult. by Mr. Thompson Bindloss, of Castle Green, near Kendall. The building will be erected as a memorial to the late Mr. John Kitching, M.R.C.S., of Milnthorpe, brother to Mrs. Bindloss. It will be built at the sole expense of Mrs. Bindloss, and will cost over 2,000*l.*, and will be supported, when completed, by that lady.

On the ground-floor there will be a coffee-room, 21 ft. by 15 ft.; reading-room, 16 ft. by 15 ft.; with spacious entrance-hall, &c. On the first floor will be a lecture or concert room, 37 ft. by 21 ft., approached by a pitch-pine staircase. On this same floor will be a library, also retiring-rooms, &c.; above will be rooms for chess, bagatelle, and other amusements. The architect is Mr. Eli Cox, Kendal.

PROVINCIAL NEWS.

Altrincham.—On the 1st inst. temporary premises for a Conservative club were opened at Altrincham. A site for a permanent building has been given by the Earl of Stamford and Warrington. The cost of the premises which it is proposed to erect will be about 3,000*l.*

Derby. — The Derby Tramways Company have now completed the Osmaston-road and Friar-gate lines, which have a total length of about two miles and a half. The lines have been laid by Messrs. Mousley & Co., contractors, under the direction of the company's engineer, Mr. Joseph Kincaid, of Great George-street, Westminster, and under the personal superintendence of Mr. Barlow, resident engineer (on behalf of Mr. Kincaid), Mr. Coultharst, borough surveyor (on behalf of the Corporation), and Mr. A. Johnston, engineer (on behalf of the contractors).

Hull.—At a meeting of the Parks Committee of the Hull Corporation, held on the 1st inst., an informal discussion took place with reference to the desirability of obtaining additional parks for Hull. The chairman said the only property belonging to the Corporation that might be utilised as a park was the Walton-street site. Some time ago they had the offer of the old Botanic Gardens, but it was thought that the position was not suitable, and the cost of the property would be very great. Mr. Downs suggested that the Asylum land might be very well laid out for a park, and it might be made to pay for itself by the building of villa residences around the property. No action was taken.

Lincoln.—On the 1st inst. the new Bishop's "Hostel" at Lincoln,—formerly the old County Hospital,—was opened by the lord bishop of the diocese. The building was purchased of the hospital authorities for 3,800*l.*, and the alterations have cost about 3,000*l.* The old board-room and dispensary have been converted into a chapel, and the large waiting-room into a library and reading-room. The males' ward, on the ground-floor, has been made the dining-hall, the upper end being used as a sitting-room for the students, and what was the operation-room is now the servants' hall, while the kitchen, scullories, &c., remain in almost the same positions as before. There are, on the first floor, a bedroom and sitting-room set apart for the use of the Prebendaries residing out of the city who have preaching turns at the Cathedral. The extreme west wing of the building has been arranged as a private residence for the Vice-Chancellor, Canon Crowfoot. The whole of the floors have been taken out and renewed, likewise the greater part of the ceilings, and the walls have been colour-washed and painted. The alterations have been carried out from plans by Messrs. Goddard & Son, architects; the contract was taken by Messrs. Martin & Sims.

Manchester. — The Manchester meeting of Friends have authorised the committee of the Friends' Hall of Residence to expend a sum of 12,000*l.*,—8,000*l.* of which the meeting itself provides,—in the erection of a permanent and specially-designed hall of residence in place of the temporary premises in Greenheys. The institution was founded in October, 1876, and was mainly due to the presence in lodgings in Manchester of the sons of Friends who had come from distant parts to study at Owens College.——One of the most important improvements which the corporation have recently effected is that which has just been completed at the foot of the approach to London-road railway station. The entrance to

the station from Piccadilly was formerly greatly obstructed by a block of buildings which stood on the east side of that thoroughfare. This has been removed, and the road considerably widened by the construction of a new bridge. The improvement has been carried to Dale-street, where the old bridge has been removed and replaced by one of a much more substantial character, the contract having been carried out by Messrs. R. Neill & Sons, Manchester Together, the improvements will cost about 25,000*l*. The extension of Tib-street from Market-street to Church-street, a work which must (says the *Manchester Courier*) necessarily be protracted in consequence of the terms that have to be arranged with the owners of the property,—is being carried a step farther by the demolition of a portion of the warehouse of Messrs. Rylands & Co. (limited). When the improvement is completed the street will have a uniform width, and the Oldham-street traffic will be much relieved.

Newcastle-on-Tyne.—A meeting has been held here to consider proposals for the formation of a technical college. The Mayor (Mr. R. Cail) presided. Dr. Rutherford read a report, giving information respecting the means adopted for the advancement of technical education by the City and Guilds of London Institute, and said that in connexion with the School of Science and Art, students were found for classes in blowpipe analysis, carriage building, tanning leather, and telegraphy, but no student offered himself for examination in carriage building. The results of the examination were exceedingly satisfactory in regard to the students from the Science and Art School, seven national prizes being awarded to them, thus giving it the first place in the kingdom. The Committee, wishing to do their part, appealed to the public of the Northern counties to extend the area of its teaching, so as to cover the whole of its diverse and important industries, to keep the instruction up to the hour, and to provide for the training of teachers. This could only be efficiently done by the establishment of a technical college. It was resolved, "That the Committee of the Science and Art School be and are hereby appointed the Committee (with power to add to their number) to carry out the scheme."

Ramsgate.—In compliance with a request of the Ramsgate smack-owners, the Local Board have decided to erect a building for the purpose of a fish-market. Plans are now being prepared which will be submitted to the Board of Trade for approval. It is expected the building will cost between 600*l*. and 700*l*. It is to be erected near the clock-house, and will be 100 ft. long and 30 ft. wide.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.

The above Association having selected Sunderland as the *locale* of its seventh half-yearly meeting, the gathering took place on Saturday last in the Board-room of the Sunderland Gas Company, Fawcett-street. Mr. J. H. Cox, of Sunderland, president of the Association, presided, and representatives attended from most of the principal towns in the North of England and in Scotland. The President, in the course of his opening address, mentioned the opening of the new gasworks for the Bishop Auckland District Gas Company, the new retort-house and other considerable extensions at the Hendon station of the Sunderland Gas Company; and last, though not least, the commencement of operations at the Jarrow station of the South Shields Gas Company, where might be seen in full operation the improvements in machinery and apparatus for charging and drawing retorts, the invention of Mr. W. J. Warner. He said that, thanks to the scientific labours of Sugg, Bray, and others, improved methods of street illumination were being extensively adopted in crowded thoroughfares in many large towns, and no doubt the success which had already been attained would cause a rapid development of the system.

Several papers were read, and the works of the Sunderland Gas Company at Hendon were inspected.

The Dublin Town Council on Monday last resolved to invite the Social Science Association to hold their Congress in Dublin in 1881, "as they dealt with a great many subjects most interesting to the Corporation in regard to municipal law and sanitary science."

ART EXHIBITIONS.

Birmingham School of Landscape Art.—The annual exhibition of the works of the present and past members of the Birmingham School of Landscape Art was opened on the 4th inst. in the Young Men's Christian Association Rooms, Needless-alley.

Leek.—An art exhibition, got up for the benefit of the Leek Mechanics' Institute Art Classes, was opened on the 4th inst. at the Union Buildings, by the Right Hon. Lord Norton. The collection of oil paintings includes many famous pictures. Foremost amongst these are Mrs. E. Butler's "Balaclava" and "Quatre Bras." There are also exhibited ninety-two water-colour drawings from the South Kensington Museum, illustrative of the rise and progress of the art in England from 1710.

Edinburgh.—A collection of paintings, &c., illustrative of Scottish art, was opened on Wednesday last, in the Royal Scottish Academy Galleries. The exhibition, which will remain open six or eight weeks, has been made in consequence of the visit to Edinburgh of the Association for the Promotion of Social Science. It includes nearly 600 separate works, the larger number being those of living or recently deceased artists.

Hertfordshire.—On Wednesday last, at the Shire-hall, Hertford, Lord Lytton opened the Herts County Fine Arts Exhibition. The loan collection includes many articles of great beauty and antiquity, some of which were collected in India by Lord Lytton. There are water-colour drawings by eminent masters, ancient needlework, bronzes, Indian, Chinese, and Japanese work in gold, silver, ivory, stone, and wood, and ancient tapestry, &c., exhibited by the Marquis of Salisbury, from Hatfield House; Earl Brownlow, Ashridge House; Earl Cowper, Panshanger; and the Earl of Clarendon. Mr. John Evans and Mr. Robert Hanbury also contribute to the collection. In the art department upwards of 200 drawings are exhibited for competition.

Stray Portraits.—A suggestion for an exhibition of portraits of unknown origin has been submitted to the South Kensington Science and Art Department, and the department has promised to give due consideration to what it terms a "useful suggestion." The number of such works scattered throughout the kingdom is enormous, and it is thought that bringing them under public notice would lead to the identification of many historical celebrities.

ACCIDENTS.

Fall of a Bridge in Lancashire.—On the evening of the 1st inst. a bridge which spanned the East Lancashire Railway at Fernhill, Bury, gave way, and a large portion of it fell on and blocked up the lines for about two hours. The bridge connected the foundry of Mr. Alderman James Park, engineer and paper-machine maker, with Fernhill, Bury, and was a wooden structure of a fragile nature, which had existed many years, but for some time past had been noticed to be in a state of decay, and at the time of the accident it was undergoing repair. At noon on the day of the accident a rag engine, weighing about five tons, was taken over the bridge without accident, and at six o'clock in the evening the workmen in the foundry, to the number of about 100, passed over it on leaving work. Forty minutes afterwards the bridge fell. The supposition is that the weight of the rag engine was the real cause of the accident. A train from Dacie Bridge to Bacup had passed under the bridge only five minutes before it fell.

Fall of a Chapel Floor in Manchester.—An inquest was opened on Monday in Manchester by Mr. Smelt on the body of a widow named Catherine Lynch, aged 70, who lost her life by the falling of the floor of St. Aloysius' Roman Catholic Chapel, Ardwick. The congregation were leaving the room after mass on Sunday, when a beam of the floor snapped in the midst, creating a gap of several yards, through which some scores of people were flung on the benches and desks of a schoolroom beneath. A scene of great distress and tumult followed, and Mrs. Lynch died soon after her removal to a neighbouring surgery. It appeared that a pillar supporting the beam had first fallen from its place, owing, it was stated, to wet-rot. The pillar fell some days before the accident, but it was considered that the beam was sufficient of itself to support the floor in that part. A verdict of "Accidental death" was returned. A mechanic named James Kilty is in a dangerous condition, he being 67 years of age, and having both thighs broken.

Bursting of a Water-tank at the Crystal Palace.—On the 1st inst., at half-past one p.m., while water was being pumped into the two large tanks at the Crystal Palace which supply the fountains, with a view to the firework display in the evening, one of the tanks gave way, and an aperture appeared 16 ft. square, through which the water rushed in a flood. Parts of the tank, weighing several hundredweight, were carried to a distance of 250 ft. One of the servants of the company rushed out to see what was the matter, and was carried away by the water to a distance of 200 yards before he could be rescued. The same thing happened to a man who had just left his cart to take a drink of water at the fountain standing in the centre of the Crystal Palace Parade, but both men were rescued from the water without any serious injury. All the trees and shrubs in the neighbourhood of the water-towers were washed up, some of them being carried away, together with about 60 yards of the fence down the Fountain-road, the water running as far as the Sydenham-hill station, a distance of three-quarters of a mile. The fall of the water left a hole in the ground after the downpour had ceased to a depth of 16 ft. Damage was done also to the grounds of neighbouring residents. The two cisterns supplying the Palace and fountains stand on iron pillars and staging, 80 ft. high, beyond the north-west end of the building, and are attached to each other by communicating pipes. Each tank is constructed of cast-iron plates, about $\frac{3}{4}$ in. in thickness, and each is 48 ft. square, 16 ft. deep, and will contain when full 700 tons of water. The tanks, it is said, had been inspected in due course, and no suspicion seems to have been entertained of their perfect stability until a few minutes before the fracture, when one of the men employed on the spot noticed a perceptible leakage, and hurried off to inform Mr. Carr, the clerk of the works, of the fact. Fortunately for that gentleman he did not happen to be in his office at the moment, or he would in all probability have arrived on the scene just as the tank burst and belched out its entire load of at least 600 tons of water.

St. Gothard Tunnel.—Another accident is reported from the St. Gothard Tunnel. About 150 ft. from the Wattingen, or Göschenen end, upwards of 30 ft. of the roof of masonry, together with an immense mass of loose rock, fell in. Four men, it is believed, were killed.

Fall of a Wall in Dublin.—Dr. Whyte, the Dublin City Coroner, held an inquest on Saturday last on the body of Mrs. Mary Thompson, who was killed by the fall of a wall in Temple-court. The wall formed part of a house which was being demolished by a man named Joseph Lube, who failed, in the opinion of the jury, to take sufficient precautions to protect the lives of passers-by. A verdict of "Accidental Death" was returned.

CHURCH-BUILDING NEWS.

Tywardreath.—The parish church of Tywardreath, near Par Station, Cornwall, was reopened on the 8th ult., after a restoration which, to a great extent, has been a rebuilding, for with the exception of the tower and the arcade, the whole church has now been re-built, a course determined on as necessary in consequence of the dilapidated state of the walls and the dangerous condition of the roofs. The roofs were found to be so defective as to preclude all possibility of restoration, but they have been exactly reproduced. The walls are built of the local stone; the dressings are of Pentewan stone. The tower arch, which has now been opened up, is a good sample of modern masonry, and is of St. Stephen's stone. The masonry in the organ-chamber, and, indeed, most of the internal masonry, is of Pentewan stone. The old oak pulpit has been refixed at the north corner of the chancel step, upon a base of Portland stone. The various avennes are laid with encaustic tiles, supplied by Messrs. Minton, Hollins, & Co. The windows throughout are glazed with tinted and coloured glass, by Messrs. Fonracre & Watson, of Stonehouse. The fine old Perpendicular font has been refixed. It is octagonal in shape, with deep double-membered tracery on every cant. The seating in the nave and aisles is of pitch-pine, open, and with square-headed ends. Eight of the old bench-ends have been preserved, and have been re-used in the transept. They are of massive oak,

traceried, and all hear shields, upon which are curious devices. The stalls are of oak, and of elegant design, richly carved. A new parclose screen divides the chancel from the Rashleigh or south-chancel aisle. This screen is of English oak, about 30 ft. long. Its tracery is very rich, the heads springing between the mullions being ogee and crocketed, and the whole is surmounted by a carved cornice. The carving and tracery-work upon these screens and upon the stalls, including those in the Rashleigh aisle, is by Mr. Harry Hems, of Exeter. The bosses and wall-plates of the roof and the base of the pulpit have been carved by Mr. West, of Plymouth. Mr. Holman, of St. Just, did the ironwork. The church contains several curious monuments, which have been carefully replaced in the walls. The architect under whose superintendence the restoration has been carried out is Mr. Richard Coad, and the contractors were Messrs. Carah & Edwards, of Crowan. The cost has been upwards of 3,000*l.*

Featherstone.—Featherstone church, Pontefract, is now undergoing partial restoration, the south portion of the structure having been in a dangerous state from decay. During the progress of the work, which is entrusted to Mr. Freeman, of Featherstone, many remains of those who fell during the sieges of the castle at Pontefract have been found.

SCHOOL BOARD SCHOOLS.

London.—On the re-assembling of the School Board for London on the 30th ult., after the recess, Sir Charles Reed, the chairman, in the course of a review of the work of the Board during the ten years in which it has now been at work, said,—"At the close of the year 1871, when the voluntary schools had furnished their returns, and our own work had just begun, there was accommodation in all for 262,259 children, or 39·4 per cent. of the estimated population of school age. At Midsummer last the denominational schools had provision for 269,469 children, or 8,000 more than in 1871, while we had provided for 225,236, giving a total accommodation for 494,705 out of a present child-population of 740,577, or 66·8 per cent. Thus, we have now seats for two out of every three children needing elementary education. If we confine our view to the past year, it is seen that the accommodation afforded by the denominational schools has declined 2,884, while ours has increased by 15,008. This latter increase has involved the acceptance of tenders for 24 new schools, accommodating 21,751 children. These schools are planned upon our usual scale, smaller schools being proportionately more expensive. The average cost per head on the tenders of these twenty-four schools last built has been 8*l.* 18s. 5d., which includes the provision of teachers' rooms, schoolkeepers' houses, boundary walls, and, in several cases, extra deep foundations. The buildings, while free from display, are designed to be durable, attractive, and well equipped for their purpose. The Board has now acquired by purchase freehold sites giving a total area of over 151 acres.

Stapleford.—New Board schools at Stapleford, Notts, were opened on the 28th ult. The buildings, which are of red brick with stone dressings, have been erected at a cost of about 3,200*l.*, from the plans of Mr. R. C. Sutton, architect, Nottingham, the contractor being Mr. C. Moult, of Stapleford. The school furniture has been supplied by Messrs. J. Wright & Son, of Nottingham, the desks being of the design known as the "Nottingham desk."

Harborne.—The foundation-stone of new Board schools at the junction of Heath-road and York-street, Harborne, was laid on the 28th ult. by Mr. Thomas Griffiths (chairman of the School Board). The building is being erected to accommodate 500 children,—viz., 266 in the larger school and 234 infants. It will be in the Gothic style, and constructed of red brick, and will comprise a large school measuring 63 ft. 3 in. long by 22 ft. wide for boys and girls, with two class-rooms 20 ft. by 20 ft. each; a committee-room of the same dimensions, and a sewing-room for girls 29 ft. 9 in. by 20 ft. The infants' school will be 47 ft. long by 26 ft. wide, with two class-rooms, each 20 ft. by 16 ft. A master's residence will also be erected fronting the Heath-road. The buildings are being carried out by Messrs. Harley & Son, Smethwick, from designs by Messrs. J. R. Sharp & Co., architects to the Board.

Miscellanea.

A Wooden House.—We mentioned some time ago the changes that were being made at Hollingbury Copse, which was in the past the most unkempt and neglected copse, perhaps, in the neighbourhood of Brighton. The London correspondent of the *Dover Standard* has recently given a graphic description of the Copse, &c., at the present time, from which we extract the following:—"I spent Tuesday in a country residence which, I think, would be very interesting to a great many architects. The owner and occupier has been his own architect, and has had built the kind of place he thought he would like, on a site, which, in itself, is a kind of paradise. Indeed, I was reminded of Morris and his opening stanza: 'Folk say a wizard to a Northern King at Christmas-tide such wondrous things did show, that through one window men beheld the spring, and through another saw the summer glow, and through a third the fruited vines arow, while still unheard, but in its wonted way, piped the drear wind of that December day.' Well, this house I am telling you of (if it can be called a house) stands on a hill. From one window you can see the bleak hills stretching out for miles; from another you look on to the Channel; and from a third you look into the green mazes of a beautiful copse with clear water breaking and brawling over stones, and slipping and singing between ferns and the roots of old trees. But what I started to tell you I have not yet mentioned. This residence is entirely built of wood. The floors are wood; the walls are bare polished wood; and the roofs are bare polished wood. And very rich a picture looks on such a wall, and very bright and dainty is a dinner under such a roof. Let me tell you that this residence is built in compartments, or what would be called chapels, the chapels being connected one with another by corridors. There is a dining-room chapel, and breakfast-room chapel, and a tea-room chapel, and a library chapel, a study chapel, &c., and each has its own particular charm of shape or situation."

Sheffield New Corn Exchange Buildings.—On the 30th ult. the roof-rearing supper to the artificers and *employés* at this building was given at the Pheasant Inn, Broad-street, Park. Mr. Charles Hadfield (of the firm of M. E. Hadfield & Son), presided, and 130 persons sat down. We are informed that a similar entertainment took place at Leeds for the workmen engaged at the extensive establishment of Messrs. Tomlinson & Son, the contractors, where the massive oak roof for the building, and the joiners' work, are being executed. In drinking the health of the Duke of Norfolk, Mr. Hadfield remarked that his Grace had taken a practical interest in all the details of the important work in which they were engaged from its commencement. His Grace was a great builder, and as the most liberal patron of the building trade in the United Kingdom he had additional claims upon them. Mr. Tomlinson, jun., proposed the toast of "The Architects, Messrs. M. E. Hadfield & Son," which was duly acknowledged by the chairman, who proposed "The Contractors," remarking on the loyal interest and good conduct displayed by every man connected with the works from the commencement. Mr. Tomlinson, in replying, gave some interesting details of the quantities of materials in the building, remarking that amongst the rest upwards of two-and-a-half millions of bricks, 150 tons of oak timber, and 200,000 Broseley tiles, had been supplied up to the present time. The clerk of the works (Mr. Payne), the foremen, and the workmen, were duly toasted.

Gas Profits in Manchester.—The annual report of the Gas Committee of the Manchester Corporation was issued on the 1st inst. In spite of the bad trade, and a smaller increase in consumption than usual, the net result of the year's working enables them to place at the disposal of the Improvement Committee the sum of 52,000*l.*, which represents the net profits, except 1,612*l.*, which comes from the reserve fund. The profits of the gas department pay the cost of all the street improvements in Manchester, and several hundred thousand pounds have been received from the Gas Committee for this purpose during recent years.

Art and the State.—The inaugural lecture of the winter session of the Midland Institute, Birmingham, was delivered on Monday evening last by Mrs. Mark Pattison, who took as her subject "The Relations between Art and State created in France by the Policy of Richelieu."

Presentation to an Art-Master.—On the 29th ult. a large number of the students of the Nottingham School of Art and their friends attended at a *soirée* in the institution in Waverley-street, organised for the purpose of presenting to the headmaster, Mr. John S. Rawle, F.S.A. (who, after fourteen years' connexion with the school, is about to leave to take the position of headmaster of the West London School of Art), a testimonial of their appreciation of the ability with which he has conducted the school, and of their personal esteem. The testimonial consisted of two gilt and oxide salvers, with figures and ornaments in bold relief, richly chased and finished, and a vase and stand *en suite*, the whole being fitted into a handsome pollard oak case. These articles were manufactured by Messrs. Elkington, from the designs of Mr. Morel. The testimonial was accompanied by an illuminated and framed address, designed by Mr. G. Staynes, a former student, and executed by various students,—Miss Pitman, Miss Goodyer, and Miss Hopkinson. The four elementary stages of drawing were represented on the address by Mr. Staynes, and Morning, Noon, and Night by Miss Ada E. Fussell. The address spoke in the most cordial terms of Mr. Rawle's fourteen years' labours in Nottingham, and its sentiments were endorsed by Mr. S. Dutton Walker and other gentlemen who spoke on the occasion. The West London School of Art ranks next in size to the central school at South Kensington, having accommodation for 1,000 students.

House Foundations at Hampstead.—At a meeting of the Hampstead Vestry on the 30th ult., upon the consideration of the recommendation of the Works Committee with regard to a road at Kilburn, Mr. Pearse stated that, when the committee went to view the road, he noticed that the floor-joists of some of the houses rested only on four layers of bricks, and there were 6 in. of water in some of the foundations. He considered that this was calculated to produce fever and other illnesses in the houses when inhabited, and he wished to know whether the Vestry had any power to interfere. Mr. C. B. King said that when the drains were put in they would carry off the water. The Chairman said that was a matter for the parish surveyor. Mr. Pearse: That is a myth. The Chairman said he hoped the attention of the parish surveyor would be called to it. To his (Mr. Hawksworth's) own knowledge there were many buildings in the parish that were in a very disgraceful state.

Messrs. Robert Boyle & Son, the well-known ventilating and sanitary engineers, of London and Glasgow, show, at the Ecclesiastical Art Exhibition, Leicester (held in connexion with the Church Congress), a large variety of their air-pump ventilators, specially adapted for the ventilation of churches and schools, to which buildings they have been applied extensively and with much success. Messrs. Boyle have made a speciality of the ventilation of such buildings. The merits of the air-pump ventilators have been too often referred to in our columns, and are too well known, to require any further description here just now.

Worcester Diocesan Architectural and Archæological Society.—A large number of the members of this society paid a visit to Coventry on the 24th ult., and under the guidance of Mr. W. G. Fretton, Mr. M. H. Bloxam, and others, the following places of interest were visited:—Remains of Cheylesmore Manor House, Steeple of the Franciscan or Grey Friars' Monastery, Ford's Hospital, St. Mary's Hall, St. Michael's Church, Holy Trinity Church, Free Library, remains of Benedictine Priory and Cathedral, timber houses in Butcher-row, Hospitium, city walls and gates, St. John's Hospital, timber houses in Well-street, Bond's and Bablake Hospitals, St. John's Church, Peeping Tom at the King's Head Hotel, Palace-yard, Knave's Post, White Friars' or Carmelite Monastery, Carthusian Monastery of St. Ann; south walls of city and Cheylesmore Gate, Martyrs' Field, and Park. In the afternoon the party were entertained at luncheon by Mr. W. Odell, Bishop-street.

A Good Contractor.—The general committee of the cathedral of St. Finn Barr, Cork, have presented to Mr. Delany, who has executed the three towers and spires of the cathedral, under Mr. Burges, an illuminated copy of a resolution unanimously passed, expressing their sense of the skill and ability with which he has carried out the contract entrusted to him.

Slates and other Building Materials, North Wales.—The local correspondent of the *Mining Journal* says:—The shipping of slates to the Baltic ports from Portmadoc is now ceasing for the season. Although not equal to some former years, the summer trade, now closing, has been a decided improvement on last year. An inland trade also has grown up for this district, and large numbers of slates are now forwarded by both the Cambrian and London and North-Western Railways. From the port of Carnarvon a better trade has been done likewise, still the trade will not be what it ought to be until the building trade of Scotland,—on which to a considerable extent this port depends,—recovers itself. Quarry-owners are making sacrifices, in order to get rid of their old stocks of small-sized slates, and only yesterday a large number (10 in. by 6 in.) were sold for 5s. per 1,200. Some of the sett quarries, near Portmadoc, are doing but little, but this is hardly, I think, due to slackness of demand. The Moel-y-Gest Quarry is working vigorously, and the quarry is about to be connected with the railway by a new siding. The brick, tile, and stone trades of the Ruabon district follow the fluctuations in the building trade, and they are, therefore, at the present time not so good as they might be. The trade, too, in common bricks is hardly remunerative at present prices. Mr. Mason, of the Trevor Brickworks, has commenced the manufacture of bricks for the lining of iron furnaces, by mixing with the fire-clays of the coal-measures the sandstones which lie at the base of these, and which correspond to the "gannister" beds of the North. A similar attempt was made some years ago by Mr. Edwards, of Trevor, but for some reason or other the manufacture was discontinued.

A Big Blast of Granite.—The granite quarry of Messrs. William Sim & Co., at Furnace, has been visited by the magistrates and members of the town council of Glasgow for the purpose of witnessing a big blast which it had been arranged should take place immediately on the steamer arriving at a safe position opposite the quarry. The attention of the passengers was directed to a black mark on the eastern side of the quarry face, a considerable height above the quarry floor. This was the mouth of the mine which led to the chambers charged with the gunpowder. The mine penetrated to a distance of 50 ft., where a shaft was sunk to a depth of 50 ft. At the foot of the shaft there were branching mines. One went in a direction towards Loch Fyne to the extent of 16 ft., including the formation of a chamber excavated to contain 5,000 lb. of gunpowder. Another passed in a northerly direction to a considerable distance, at the end of which was a chamber for 3,500 lb. of gunpowder. The chambers were communicated with by means of electric wires, and immediately on the signal to 'fire,"—the blowing of the whistle,—being given from the steamer, there was a tremendous upheaval of a large portion of the mountain side. The lines of displacement were calculated to be equal to about 18,000 cubic yards, or 37,000 tons of material. The blast was entirely successful.

The Stockwell Orphanages.—On the 4th inst., Mr. George Palmer, M.P., laid the foundation-stone of a "Reading House," and the Rev. H. Stowell Brown laid that of a "Liverpool House," as additions to the "Houses" erected on the grounds of the Stockwell Orphanages, in the Clapham-road, founded by the Rev. C. H. Spurgeon and his congregation at the Tabernacle. Mr. James Spurgeon stated that the erection of the buildings would cost 11,000*l.*, of which 7,000*l.* had been subscribed, and 3,000*l.* more promised.

Liverpool Art Club.—In connexion with the above club, it is announced that the opening of the embroidery competition is postponed to the 15th of November. Mr. P. H. Rathbone has promised to deliver an address on the present exhibition of Italian photographs, on Oct. 25th. An exhibition of caricatures will be opened on December 20th, and an exhibition of paintings, drawings, sketches, and designs by amateurs on January 20th.

The Melbourne International Exhibition was opened on the 1st inst. with very promising auguries. We gave a view of the building in our volume for 1878, p. 1305. Messrs. Reed & Barnes are the architects.

Company of Turners' Competition.—The works sent in will be exhibited at the Mansion House, London, on the 12th and 13th inst. The prizes will be presented by the Lord Mayor on the 14th.

The Photographic Society of Great Britain opened their annual exhibition on the 2nd inst., in the Gallery of the Society of Painters in Water-colours, Pall-mall East. It contains a great deal worth seeing. Some landscapes by the School of Military Engineering, and others by Dr. Huggins, Mr. F. A. Bridge, and Mr. E. Gould, all printed in the platinum process, show that this is a method which is gaining ground; it gives the appearance somewhat of a good pencil drawing, besides being quite indestructible. We observe that there is now a Platinotype Company. In the important application of photography to copying famous pictures of large size, the Berlin Photographic Company contribute a silver print of the same size as the picture of the Madonna di San Sisto in the Dresden Gallery. This fine copy was taken in nine separate plates, each about 36 in. by 24 in., and with perfect success. Some landscapes by Mr. W. Harvey Barton, which include water, are very remarkable; Nos. 41 and 42, for examples. No. 201, "In Maiden Meditation Fancy Free," by Mr. H. P. Robinson, has rightly received a medal.

Saving in Parish Work.—At the meeting of the Camberwell Vestry on the 29th ult., the Sanitary committee recommended that they be empowered to negotiate for and purchase, or, if deemed best, to take on lease or otherwise, a depôt for the deposit of the dust. Mr. Lassam, in moving the adoption of the report, said that Mr. Reddin's tender for 1876-77 amounted to 3,400*l.* This was not accepted, the vestry deciding to do the work themselves. The work was done by the vestry at a cost of about 2,400*l.*, making a net saving of 1,000*l.* In 1878-79 the cost was under 2,000*l.*, or about 2s. 6d. per load, as against 5s. 6d. under the old contracting system. In 1879-80, the net cost of collection amounted to 2,060*l.* 16s. 3d., or about 2s. 6d. per load, showing a total saving of 2,000*l.* The motion was carried.

Over Darwen Market House.—The foundation-stone of the above was laid on Saturday, October 2nd, by the Mayor, Mr. Alderman Snape, J.P., in the presence of a numerous company. The stone was of Shap-granite, with an inscription in gilt letters. A chased silver-gilt trowel was presented to the Mayor by the corporation. The works are well in hand, the difficulty attending the diversion and covering in of the river, which runs under the market, having been overcome. The architect is Mr. Charles Bell, of London, and the contractors are Messrs. Orrell & Sons, of Darwen. The Clerk of Works is Mr. Hobson-Haigh.

The Sunday Society.—This organisation intends to be very active during the coming winter. It will be represented at the Social Science Congress, and a paper will be read on its behalf by the Rev. Robert B. Drummond, entitled "Sunday Reform." During the sitting of the congress a public conference will be held in Edinburgh in support of the opening of museums on Sundays; and on October 25th Professor Tyndall will preside over a public meeting in the largest hall in Glasgow in support of the objects of the Society.

Fire at the Louvre, Paris.—On the evening of the 2nd inst. a fire broke out in the Pavillon de Flore, the western extremity of the Louvre buildings, the apartments temporarily occupied by M. Hérold, the Prefect of the Seine. The fire was fortunately confined to the apartment and the story on which it is situated. The event has caused an outcry in Paris against having inhabited dwellings alongside the galleries of the Louvre, where no lights are allowed at all.

Lectures on Architecture.—The directors of the Edinburgh Philosophical Institution have arranged a course of lectures for the ensuing session. The programme includes an exposition of the "Principles of Design in Architecture and Ornament," by Mr. H. H. Statham.

A Statue to Jean Cousin, the painter and sculptor of the sixteenth century, was inaugurated last week, at Sens. M. Turquet, Minister for Fine Arts, presided, and most of the leading artists of France were present.

The Fitzalan Chapel at Arundel.—Complaints are made by visitors that the permission, recently conceded by the Duke of Norfolk, to visit this chapel two days a week, has been withdrawn.

The Princess's Theatre, Oxford-street.—The work of reconstructing this theatre is now so far advanced that it is confidently expected that the house will be ready for opening about the end of the present month.

Christ Church Sunday-school, Cockermouth.—A Sunday-school is about to be erected in connexion with Christ Church, Cockermouth, Cumberland, the Rev. John Green, M.A., vicar. The building will be of white freestone, from Talantire quarry, in the immediate neighbourhood. The roof will be covered with Buttermere slates, with red-tile cresting and terminals. The interior woodwork will be of pitch-pine, varnished, the roof being open-timbered. The architect is Mr. W. C. Jennings, of Cockermouth.

A New Industry.—A new invention has been introduced into the Cleveland district, viz., the manufacture of paint from steel scale for the protection of iron and steel from corrosion.

TENDERS

For three cottages, with cowhouse, stable, &c., at Old Basford. Mr. Herbert Walker, architect. Quantities by the architect:—

Newham, Old Basford	£1,248	11	0
Jew & Hickling, Arnold	1,024	0	0
Cargill, New Basford	1,010	0	0
Hind, Nottingham	995	0	0
Mason, Old Basford	995	0	0
Mason & Pratt, Nottingham	993	0	0
Ellis, Nottingham	958	0	0
Musson, Carrington	940	0	0
Raven, New Basford	927	0	0
Wayte, Arnold	918	0	0
Ingham, Old Basford	891	0	0
Bains & Turton, Old Basford	870	0	0
Scott, Nottingham	868	12	0
Wheatley & Maule, Nottingham	859	0	0
Judd & Cooper, Hyson-green	846	0	0
Stainforth, Bulwell	833	0	0
Price & Hooton, Nottingham	799	10	0
Musson, Hucknall	790	0	0
McCulloch, Bulwell (accepted)	769	0	0

For the erection of a house and sale-shop at Old Basford. Mr. Herbert Walker, architect. Quantities by the architect:—

Richer, Hucknall	£869	10	0
Mason & Pratt, Nottingham	570	0	0
Ellis, Nottingham	515	0	0
Stainforth, Bulwell	514	0	0
Holdsworth, Hucknall	511	0	0
Judd & Cooper, Hyson-green	497	0	0
Cargill, New Basford	495	0	0
Jew & Hickling, Arnold	487	0	0
Musson, Carrington	484	0	0
McCulloch, Bulwell	480	0	0
Mason, Old Basford	471	0	0
Wheatley & Maule, Nottingham	468	0	0
Ingham, Old Basford	463	0	0
Raven, New Basford	463	9	0
Scott, Nottingham	460	0	0
Price & Hooton, Nottingham	449	0	0
Newham, Old Basford	445	8	0
Bains & Turton, Old Basford*	444	0	0

* Accepted.

For the erection of four houses at Bognor, Sussex, for the Bognor Hotel and Residences Company, Limited. Mr. G. Gard Pye, architect. Quantities by Mr. O. Stanger:—

French, Lisson-grove	£5,125	0	0
Nicholls, Brockley, S.E.	4,976	0	0
Lissaman, Leamington	4,813	13	4
Ennor, Julian, & Co., St. George's-road, S.E.	4,677	0	0
Longley & Worth	4,599	0	0
Smith, Bognor	4,540	0	0
Everett & Son, Colchester	4,400	0	0
Huey, Parkstone	4,376	0	0
Garrod, Spitalfields	4,083	0	0
Bull, Chelsea	3,995	0	0
Cooper, Slindon-common	3,659	0	0
Vaughan, Acton	3,488	0	0
Lacy, Westminster	3,300	0	0

For the erection of lodge, stables, and cow-house buildings, Edgware. Mr. James Geo. Buckle, architect. Quantities by Mr. Chas. L. Cadney:—

French	£2,295	0	0
Haines	2,195	0	0
Childs	2,169	0	0
Sawyer	2,136	0	0
Doune	2[illegible]25	0	0
Holloway	2,050	0	0
Parker	2,000	0	0
Hussey	1,958	0	0
Augood	1,890	0	0
R. & E. Evans	1,890	0	0
Beale, Battersea (accepted)	1,650	0	0

For the erection of new infirmary and dispensary, Worthing. Mr. W. Oldham Chambers, architect. Quantities supplied:—

Nurcombe, Hove	£4,031	0	0
Card & Son, Lewes	3,935	0	0
Braid & Co., Chelsea	3,850	0	0
Stevens & Bastow, Bristol	3,799	0	0
Sawyer, London	3,786	0	0
Snewin & Son, Worthing	3,750	0	0
Croak, Southampton	3,747	0	0
Hide & Co., Worthing	3,736	0	0
Blaker, Worthing	3,736	0	0
Woolgar & Son, Horsham	3,716	0	0
Carter, Worthing	3,640	0	0
Longley, Worthing	3,550	0	0
Snewin, Littlehampton	3,508	0	0
Terry, Storrington	3,418	0	0
Morris, East Grinstead	3,412	0	0
Claridge, Banbury	3,350	0	0
Hohern, London	3,335	0	0
Beale, Battersea	3,175	0	0
Bull Bros., Chelsea	3,090	0	0
Peters & Redford, Horsham*	2,987	0	0

* Accepted.

For house at Hayes, Bromley, Kent, for Mr. S. A. Day Mr. W. Berriman & Son, architects:—

Croaker	£1,200	0	0
G. & S. Fisher (accepted)	1,125	0	0

For the Wragg Museum, Free Library, and School of Science and Art, with terra-cotta front, for the Corporation of the Borough of Stafford. Mr. J. B. McCallum, borough surveyor. Quantities by Mr. C. R. Dalgleish, of Stafford:—

Espley	£1,945	0	0
Adams & Pemberton	1,894	0	0
Reynolds	1,881	0	0
Whittome	1,838	0	0
Bridgett	1,810	10	0
Tracey	1,797	0	0
Gee (accepted)	1,775	0	0

For house for Mr. W. Booker, of Redhill, Surrey. Mr. H. Booker, architect:—

Bucklands (accepted)	£349	0	0

For two houses, for Messrs. Needham & Jarrett, Redhill, Surrey. Mr. H. Booker, architect:—

Burton (accepted)	£415	0	0

For re-building Nos. 128 and 129, Aldersgate-street, for Messrs. W. H. & L. Collingridge. Mr. John Collier, architect:—

Hall, Beddall, & Co.	£11,553	0	0
Patman & Fotheringham	10,957	0	0
Williams	10,870	0	0
Wall	10,700	0	0
Holland & Hannen	10,297	0	0
Lawrence	9,994	0	0
Brass	9,973	0	0
Morter	9,927	0	0
Crabb (clerical error)	8,990	0	0

For the erection of an infants' school in the parish of St. Peter's-in-Eastgate, Lincoln. Messrs. Watkins & Scorer, architects. Quantities supplied:—

Martin & Sims	£881	0	0
Harrison & Horton	797	0	0
H. & D. Taylor	770	0	0
Chambers	764	0	0
Cox & Horton	761	0	0
Millson	735	0	0
Pykett	730	0	0
Swaby	725	0	0
Close & Co.	724	0	0
Crosby & Sons	699	0	0
Slingsby	690	0	0
Kendall	689	0	0
Cowen & Lansdowne	666	0	0

For district church, New Swindon, Wiltshire. Mr. Ferrey, architect:—

Hill & Higgs, London	£4,740	0	0
Jarrett, Croydon	4,200	0	0
Wall & Hook, Brimscombe	3,950	0	0
Boyce, London	3,853	0	0
Barrett, Swindon	3,646	0	0
Franklin, Deddington, Oxon	3,643	0	0
Wiltshire, Swindon	3,598	0	0
Estcourt, Gloucester	3,564	0	0
Jones, Gloucester (accepted)	3,480	0	0

For new lecture-room and approaches, to Heath-street Chapel, Hampstead. Mr. W. A Dixon, architect:—

Manley	£1,721	0	0
Burford	1,696	4	3
King	1,634	0	0
Stead Bros.	1,629	0	0
Staines & Son	1,570	0	0
Russell & Cowley	1,480	0	0
Allen	1,479	10	0

For additions, &c., to printing-offices, May's-buildings, St. Martin's-lane. Messrs. Chadwick & Son, architects:—

Kirk & Randall	£1,689	0	0
Laing & Son	1,538	0	0
Patrick & Son	1,448	0	0
Rider & Son	1,448	0	0
Lawrence	1,423	0	0
McLachlan & Sons	1,289	0	0

For house and shop, Pond-lane, Clapton Park, for Mr. G. H. Mitchell. Mr. Frederick Wallen, architect. No quantities:—

Dearsley	£700	0	0
Jarvis	698	0	0
Huntley	657	0	0
Steel & Son	649	0	0
Julia	640	0	0
Jones	600	0	0
Parish (accepted)	500	0	0

For alterations at No. 32½, Walworth-road, for Mr. Gabriel. Mr. G. Treacher, architect:—

Kirk	£877	0	0
Gill	877	0	0
Newstead	875	0	0
G. & S. Fisher	859	0	0
Simpson	760	0	0

For altering and adapting premises in Rupert-street, Bristol, for printing and publishing offices, for Messrs. J. Wright & Co. Mr. Herbert J. Jones, architect:—

Saville (accepted)	£516	0	0
For new Concrete Floor.			
Williams (accepted)	£73	0	0

For alterations at No. 17, Small-street, Bristol, for Messrs. R. B. Lavery & Co. Mr. Herbert J. Jones, architect:—

Saville	£434	0	0
Johnson	390	0	0
Krauss (accepted)	380	0	0

For alterations at No. 12, Bridge-street, Bristol, for Messrs. Wm. Summers & Co. Mr. Herbert J. Jones, architect:—

Eastabrook & Sons	£910	0	0
Humphreys	888	0	0
Passco	804	0	0
Cowlin & Son	779	0	0
Heaven	740	0	0
Krauss (accepted)	720	0	0

For alterations and additions to Fern Villa, Anerley-road, for Messrs. Edie Bros. Mr. Joseph S. Moye, architect:—

Saala	£867	0	0
Marr	720	0	0
Fox	695	0	0
Hollidge & Stuart (accepted)	637	0	0

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Corrwallis (the water companies, as a rule, do not base their charges on *any parochial assessments* It is made on the annual letting value of the house, and the percentage is regulated by their separate Acts of Parliament. In one company within our knowledge 4 per cent. on the rental is the maximum, while in another it is 7 per cent.; and these only provide for water to be used for domestic purposes and on the ground-floor. There is an increased charge for high service. All baths are extra, and so are all water-closets that are more than 10 ft. above the level of the street paving, lavatories, house-maids' sinks, &c. These may be reckoned on the first scale (the 4 per cent.) at from 6s. to 8s. a tap; and the others, of course, in proportion. We know nothing specially of the New River Company.—A. H. (the objection in question to the subway system was raised long ago but is not maintainable).—Vestry (the cistern for drinking water should be disconnected from the water-closet works).—M. F. H. C. (next week).—D. S. (next week).—M. (received).—J. E.—J. S. M.—W. C. J.—M. & S.—W. C. T.—S. & S.—G. & S. F.—H. R.—L. & S.—J. M. J.—S. W. H.—C. W.—D. W.—H. R. & S.—M. W.—E. W.—A. H.—D. & L.—A. L.—G. O. F.—E. K.—T. R. S.—W. D. S. M.—H. J. J.—W. O. C.—C. B. D.—H. B.—J. B.—T. E. P.—Practical Sanitarian.

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The Builder.

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ILLUSTRATIONS.

CONTENTS.

Smokeless London.

HE appearance of fog six weeks before the month of November, the recollection of last winter's experiences, and the fact that all the physical conditions necessary for their recurrence have again presented themselves, afford a gloomy prospect for the millions of men, women, and children who are forced by circumstances to spend the coming winter in London. Persons who have already taken flight, and we know of many, have every reason to congratulate themselves upon the change. An echo of the dismal forebodings of unfortunate journalists who have returned to town after their autumn holiday will reach them on the sunny heights of Italy in time to confirm the wisdom of their early exodus. Their retrospect of London will not be marred by the remembrance of any premature disappearances of the sun at mid-day, nor of breakfasting by gas-light, nor of dangerous gropings in unutterable darkness for the turning into some familiar street. To these fortunate few, London may be only the London of the parks in June, and the story of the fog no more than a subject for kindly commiseration in letters written to their benighted friends from the regions of perpetual summer. But what is to be done for the Londoner by profession or by the decrees of Providence, who, let his wishes or his lungs be what they may, must face this ordeal of an intolerable atmosphere? Some effort ought surely to be made to discover if possible the sources of the evil, and no time should be lost in providing a remedy.

The first part of the problem may already be said to have been successfully solved, for the connexion between yellow fog and smoke, long suspected, has at last been proved. It can be demonstrated experimentally that the ordinary course of nature, in the case of our densely-populated cities, has been arrested. Envelopes of oleaginous tar surrounding the aqueous particles of the mist are discovered to be the medium that retards the dissipating influences of the sun. Dr. Frankland's experiments upon the effects of smoke on the evaporation of water have traced the principal cause of the evil to its source, and the direction in which scientific effort can alone be successful has been pointed out with the certainty of a complete induction. It appears that every inhabitant of a large town is a contributory to the mischief from which the community is suffering; but since the necessities of our civilisation demand the use of coal, it is only natural that the public should turn round upon science and inquire if the supply of these wants is incompatible with the blessings of an uncontaminated atmosphere.

If we suppose the case to be referred to a man of science with a wide experience in this particular field of inquiry, the course he would most probably pursue would be to examine first into all that had already been done to get over the difficulty in the case of fuel used in our great industries. Secondly, he would inquire if any of the apparatus which has been proved to be efficient in these cases can be made applicable to the domestic consumption of coal; and, in the event of his being unable to afford any reasonable hope of their ever becoming generally adopted, he would require to offer some alternative method of getting rid of the evils complained of. We cannot be far wrong in adopting this course, and inquiring, in the first place, if any apparatus is in successful use among our manufacturing processes that could be applied to our domestic hearths.

We will take one or two typical instances, in which the incentives to economy in the use of coal have stimulated efforts that have been crowned with complete success, not only in avoiding waste and saving money, but as regards the purification of the atmosphere, which is the natural consequence. The industry that holds the most prominent position in these respects is the iron trade. For many years the only way to make money in the manufacture of iron has been to save it, or, in other words, to produce it at less expense than one's neighbours. The efforts to attain this object have led to innumerable inventions, many of which are more expressly devoted to the saving of fuel. The escape of smoke is incompatible with this object, and hence the hundreds of appliances that have been introduced for consuming it. Turning to the blast-furnace, which is the most gigantic apparatus in existence for the combustion of coal, and which is fed, not by shovelfuls, as in the case of ordinary furnaces, but by tons, it must be confessed with regret that there is nothing whatever to lead us to hope that what has been done in the past to improve it, or is ever likely to be done in the future, will be applicable to the conditions of a domestic fire.

The first great advance that was made upon the more primitive methods of combustion in the blast furnace was the introduction of the hot-blast. This exceedingly simple appliance consisted of an apparatus made up originally of little more than a fire burning so as to heat a pipe, through which the air required for the consumption of the coal was passed on its way to the furnace. The heated air was a great improvement on the previous method of admitting it at the temperature of the surrounding atmosphere, but though a great economy was effected, the problem of complete combustion was by no means solved by its adoption. The next great improvement has become general only within the last few years, and it is not yet by any means universal. It consists in re-using the waste gases that previously escaped in the form of smoke and flame from the mouth of the furnace, by burning them in the ovens that heat the hot blast. An immense saving of fuel has been attained by the adoption of this improvement, and the blast furnace, instead of being as it once was, one of the most wasteful and offensive appliances in the iron trade, has now become in its more perfect form one of the most economical and the least troublesome as a source of pollution to the atmosphere. Looked upon as a test of what can be done, the improvements referred to are of special interest in their bearing upon the consumption of fuel upon a large scale, but, unfortunately, they are altogether inapplicable when used away from the superintendence of skilled, or at least practised workmen. Here, then, in the case of the most successful apparatus for avoiding the pollution of the atmosphere in the whole range of the iron trade, we find a positive blank as regards the application of these improvements to an ordinary domestic fireplace. The conveyance of the waste gases from the drawing-room fire into a combustion chamber would be as impracticable as making use of them to heat the air that supplied the draught.

In other departments of the iron industry great economies have been effected in the consumption of coal; but there seems to be no more reason to expect them to be applicable to the fireplaces of London than are the improvements of the blast-furnace. But the inference that may be drawn from the apparatus to which we are now about to refer is of wider application. The blast-furnace is an appliance by itself. If we have to turn from its economy and its smokelessness with regret, as not even affording a suggestion as to how these improvements could be applied so as to ameliorate the miseries arising from the prevalence of smoke in our great cities, the disappointment is alleviated by a consideration of the unique character of the apparatus, both as regards its function and its size. But no such consolation is to be found in the case of the recent inventions for saving fuel in other departments of the iron trade, because these really embrace all the conditions that are necessary to the complete combustion of coal in every possible manufacturing process that requires large quantities of heat. The regenerative furnace of Dr. Siemens consists of a practical application of scientific principles that is available for an immense number of purposes besides the conversion of iron. The furnaces of Mr. Spence, which go even further in the direction of theoretical completeness, and which are in daily use at Woolwich arsenal, are also capable of the most various applications; but in neither case is there any likelihood of these ever being practicable upon the miniature scale of a domestic hearth. Not only an intense heat, but a steady heat, is absolutely essential to the success of both, and these conditions are necessarily precarious in the case of a household fire that may at any time be left to go out, or nearly out, at the discretion of those who are the recipients of its warmth.

In the whole range of our national industries

the appliances to which we have referred, more especially the improvements in the blast furnace and the regenerative system of Dr. Siemens, are those which are representative of the progress that has been made, and the inquiry therefore naturally rises, are they applicable in a practical way to the question of the domestic consumption of coal in such a vast community as that of London? We are reluctantly compelled to confess that they have in no way advanced the settlement of this most important problem, and it may even be said with truth that they have not even contributed to its solution. If they have had any influence at all, we are inclined to believe that they have rather retarded our progress than advanced it, because they have held out vague hopes to the great majority of the public that what has been done in the case of the iron trade may one day be applicable to the domestic hearth. If such hopes had even a possible chance of fulfilment, the constant expression of them might contribute to their being ultimately realised, but we confess that they appear to us to be altogether illusory. The reasons upon which this belief is based rest upon the fact that the domestic hearth as used in England differs, not only in degree, but in kind, from every apparatus in the iron trade, or any other industry in which the problem of complete combustion has hitherto been successfully solved.

It is quite true that the fuel is the same, and that the phenomenon of combustion depends in both cases upon an admixture of air with the burning coal. It may even be said with truth that there is nothing to prevent the most perfect system on a large scale being adopted in miniature; but this brings us to what is the real point of departure between the large and the small method of using ordinary coal, and constitutes the difference in kind to which we have already referred. The element of a very high temperature, which is attainable in a large furnace, and which is essential to its economy, is practically impossible in the case of any apparatus on the scale of an ordinary fire-place, and this high temperature is just as essential to complete combustion as a due admixture of the substances that go to produce the phenomenon. Without this element the most perfect reproduction of a large furnace on a small scale, even supposing it to be practicable, would be altogether unavailing as a smoke-consuming domestic hearth.

It is in this absence of high temperature that we discover reasons for the failure of innumerable appliances on a small scale for solving the problem of complete combustion as it occurs in the case of the domestic use of coal. In many of these the quantity of air supplied is in excess of what is necessary, and frequently the mode of applying it is all that could be desired. In others, by ingenious methods of forcing the escaping gases rising from a fresh addition of fuel to pass through the clear heat of a previous charge, from which the smoke has already escaped, an excellent result is obtained. But yet the causes of failure in all these cases is practically the same. Absence of a high temperature in the first set of appliances is just as fatal to success as it is in the second; for in both instances the calculations of the inventor are completely upset by the very common domestic condition of a fire on the point of going out, to which fresh fuel is added in excess. It is then, in spite of every ingenuity, that a state of things occurs which is practically absent in the case of all large furnaces, and the inevitable consequence is an escape of smoke from the chimney.

The point to which we have more especially drawn the attention of our readers is one that has not escaped the notice of men of science, who have made the pollution of the atmosphere their special study. The wonder is that some definite proposals have not yet followed, even from the present state of our knowledge with regard to the combustion of fuel on a small scale. Dr. R. Angus Smith, who has made not only many most important original contributions to the solution of the problems connected with the purification of the atmosphere, but whose special business it has been for many years to digest the labours of others, says, in his work "Air and Rain," when speaking of coal-smoke,—"It is not from want of air, or oxygen, that the black smoke is not burnt, the amount of air here" (referring to certain furnaces and chimneys which he had examined) "is found far in excess of that required. Now, patentees have too much confined themselves to the supply of air, a commodity easily given, but not so easily used. The want is in reality heat." If these remarks are applicable to the case of boiler furnaces on a large scale, they are much more significant in the case of ordinary domestic hearths, where the attainment of a very high temperature, evenly maintained, is practically impossible. If, then, great heat is essential to the complete combustion of ordinary coal, and if it is not possible to obtain it in the domestic consumption of large towns, we are forced to conclude either that the pollution of the atmosphere must go on indefinitely, or that we must fall back upon some modification of the fuel which is at present in use. It must always be borne in mind that conditions of temperature which are quite incapable of coping with the rich carbonaceous products of our coal-mines in their ordinary state, are nevertheless amply sufficient to produce the phenomenon of complete, or at least smokeless, combustion, when a portion of the smoky constituents of the fuel have been removed. It is practically impossible, even in an ordinary open fireplace, to produce smoke from coal out of which gas has been extracted to the extent of from 3,000 to 5,000 cubic feet per ton, and the material resulting from the operation is in every way superior to common coal. It must not be supposed that the removal of one-third, or even one-half, of the total gas contained in coal results in the production of coke. On the contrary, it leaves us with a residue that will produce the cheerful fire so dear to the heart of every Englishman. If the extraction of some proportion of the gas contained in ordinary coal is the only possible way in which a great city like London can be made absolutely smokeless, it would surely be wiser to adopt this alternative at once than subject the community any longer to the continually increasing evil of a contaminated atmosphere.

It is difficult to realise the extraordinary addition that would be made to the amenities of existence within the metropolitan area if such a course were successfully carried to a conclusion. The London of the early morning is full of subjects that attract attention on account of their pictorial charms. The river, the bridges, the great highways, the lofty towers, seem as if witnessed for the first time when first seen in the crystal light of the brightening dawn. But the glory is soon overcast. The toiling millions at their morning meal are the earliest witnesses of the change. The smoke ascending from the humble hearths soon mingles with the denser volumes from the West; and the leisured and professional classes, who rise at a period of the morning when 100,000 homes have contributed their quota of pollution, know nothing of the beauties of London in the early dawn.

In summer a curious spectacle is seen by those who take the trouble to watch the atmospheric changes of the day. In warm weather, as the use of coal is almost entirely confined to the cooking of food, so we find the smoke of the town and the meals of the community are altogether synchronous. The common experience of the wealthier classes is to waken in an atmosphere of smoke or fog. This is the time when London breakfasts. If a gentle wind is blowing up or down the valley of the Thames, the smoke-fog of the morning meal will roll away when the fires that cooked it have gone out, and may be discovered in a murky cloud, as far away as Hampton Court, before the time appointed for rekindling the culinary hearth. It is during this interval,—often about eleven o'clock,—that upon going into the parks, we glory for a few short moments in the simulated freshness of the country air. The mist that rises from the ground is silvery-white, and the sunlight falls on the foliage of the trees unsullied by the dingy haziness which seems at other times to take a refuge among the labyrinth of leaves. Again the workman's meal comes round, and the smoke that rises from the fire that cooks his rasher of bacon is soon seen mingling with the contributions of chimneys connected with the operations of luncheon. Then, except the wind be strong, London is grimy for the rest of the day, and the dinners of the West End keep up the nuisance till the period of the setting sun. But, in winter, no lucid intervals occur. The demand for heat goes on the whole day long, and it only needs the combination of an aqueous atmosphere to produce the horrors of a genuine fog.

If, then, all this can be avoided by the simple expedient of removing a proportion of the gas from the coal, it seems only reasonable that this should be done. The smoke that at present escapes is wasted heat, and only soils our houses and our clothes. If it were first extracted from the coal it would give us light, and the tar, instead of enveloping the particles of mist and rendering them impervious to the action of the sun, would be available for the dyeing of our garments.

We have no wish to disparage the importance of many ingenious and useful inventions for economising fuel in domestic hearths. Many of these, and notably the slow-combustion stoves, in which the important element of time is introduced to allow of the more complete combustion of the fuel with the air, are excellent in their way; but the present deplorable condition of London and all our great cities must be looked upon as a commentary on their inefficiency to bring about a radical improvement. At the best they only economise the fuel, and leave the problem of complete combustion on a small scale, and without skilled attention, unsolved. Meantime, the discomforts and dangers arising from smoke and fog are becoming more pressing every day, and it appears to us that if the removal of a certain proportion of the gas from the fuel used in our great cities is a practicable and economical expedient, and *primâ facie* it appears to be so, then the sooner some such course is adopted the better it will be for the health and the wealth of the whole community.

By cheapening gas, and so leading to its more general use in cooking and heating, the course proposed might, in a secondary way, further assist in producing the desired result.

HEALTH AND THE HOUSE-BUILDER.

Of late years,—truth to tell very much too late,—what may appropriately be called a new school of doctors has been established, the school of "prophylactic" doctors; and a very good school it is. Inasmuch as prophylactic medicine can only give effect to the most radical of its precepts by co-operative alliance with the building trades and the architectural profession, we propose in this article to initiate, not to say a better acquaintance between the two,—for, up to the time being, there has been no acquaintance at all,—but an acquaintance.

We will not hesitate to assume, without offence, that the majority of native builders, and some few native architects, have not learned Greek, and therefore do not know what the word "prophylactic" means. It means *preventive*, and something more; which something we shall acquire a better idea of when we explain that "phylax," or "phulax," is a guard or sentinel, and the prefix of "pro" means that he is stationed well in front in guard over some body or bodies,—some thing, or things,—stationed behind. Prophylactic medicine, then, has for its object the prevention of disease by the adoption of judicious safeguards, instead of the curing of disease when it actually comes. Seeing that English people are not nomads, living in tents,—shifting their tents from spot to spot,—free to the breezes, the breezes free to them, but passing most of their lives,—the whole of their sleeping lives,—in substantial, permanent habitations; seeing that those permanent habitations are mostly constructed without any sort of previous acquaintance or intercourse, much less interchange of view or opinion, between house-constructor and house-occupier; it stands to sense that prophylactic doctors can never have a fair field on which to work with full effect until a good relationship shall have been established between them and the building community.

Unquestionably the most radical point to be kept in view when constructing a house, with regard to permanent sanitation, is the nature of the concrete or foundation upon which it is to be constructed. If the foundation be of festering germ-originating, malarious gas-evolving materials, nothing can go well with the health of those who inhabit that house, until the festering has exhausted itself by lapse of many years,—perhaps many generations.

When, in a neighbourhood where building is going on, we see a board announcing "Rubbish may be shot here!" the public may take it for granted the permission thus liberally accorded will meet with literal fulfilment. Odds and ends will be thrown there,—"rubbish" in its most obnoxious sense. We have had the curiosity, this sometime past, to take stock of metropolitan foundation-building rubbish, and

have got quite accustomed to see the predominance amongst it of preserved meat tin canisters, and old shoe leather. It might have been thought that the manufacturers of prussiate of potash would have had something to say about the old shoes; leather, like horn and hoof, being a factor in their chemical process. This, however, does not appear to have been the case; at any rate, it is not the case to an extent that can satisfy any prophylactic physician. The preservative virtues of tan notwithstanding, leather will rot in time; and whilst rotting will give off injurious emanations. It is the preserved meat-tins to which the most injurious effects of such a foundation as we have described are mostly attributable, and every day those tinned provisions coming more and more into use, the evil is exacerbated.

Coming now to the practical question up to which our remarks have been leading:—What practical means can be adopted for destroying or counteracting the malarious influences due to such a foundation? A mixture with earth would be satisfactory, but real honest earth is not in the majority of cases available to the urban builder. Earth is Nature's own disinfectant for organic decomposable things buried underneath it. We see what earth can accomplish in this way when applied to earth-closets. Well-ordered cemeteries and churchyards, again, supply another example of what earth can do in disposing of organic emanations. In the month of July, 1877, there existed some six-and-thirty thousand graves in Kensal-green Cemetery; and if we assume for present needs that each of these graves held five corpses, the assumption may not be far wrong. This gives 180,000 corpses for the graves alone, without reckoning those in the catacombs. The earth of Kensal-green Cemetery is by no means well adapted for its purposes, being too aluminous,—clayey,—and too wet. Nevertheless, the object proposed to be accomplished is accomplished with tolerable completeness. If, then, urban builders could obtain good honest earth-mould for mixing with their foundation rubbish, injurious emanations would not ascend; this not being available, quicklime is the most practicable, though not the best of substitutes. Lime does not act in the same manner as earth; there being not only difference of degree; the difference is radical. We can only understand in what the variation consists after contemplating the nature of decomposition products that a rubbish foundation such as we have assumed would evolve. Whenever organic matter, of whatever kind, decays, the evolution products resolve themselves into the two classes of inorganic or dead, and organised or living. To the first category belong ammonia, pure and simple; hydrosulphate of ammonia, more popularly known as sulphuretted hydrogen, and more fashionably as sulphide of ammonium; carbonic acid, more fashionably known as carbon-dioxide and carbon-anhydride; marsh gas, together with other products not so important. To the second category belong microscopic organised germs. Whenever animal matter decomposes, nitrogen and sulphur must be evolved in one form or another, seeing that nitrogen and sulphur are invariable constituents of animal bodies. When vegetable bodies decompose, there will be very little sulphur to evolve (most vegetables containing no sulphur), and if we regard the products of vegetable life as a whole, not much nitrogen. Practically every body is cognisant of the truth that decomposing vegetable bodies yield products much less offensive to the sense of smell than animal bodies, the explanation of which is that vegetable bodies contain much less nitrogen proportionately, and very much less sulphur. As for the latter, if such vegetables as garlic, onions, shalot, leeks, and the rest of that tribe, all belonging to the botanical natural order *liliaceæ* be excepted, and mustard, cress, cabbage, together with kindred vegetables comprised in the botanical natural order *cruciferæ* or *apiaceæ*, sulphur may be banished from consideration as an element of vegetable life.

Contemplating now the effects on health of the gaseous products just specified, ammonia,—*i.e.*, ammoniacal gas,—is, sanitarily, the least injurious of the lot; yet such persons as would affirm that ammoniacal gas when diluted by atmospheric air to such a degree that breathing the mixture is not sensibly repugnant to the lungs, and habitual living in the mixture not irritating to the eyes, ceases to be injurious to health, would do well to accompany on his rounds some medical man who has a patient, or patients, living in the small apartments over mews. In these residences the presence of ammonia may always be detected by smell alone; and the injurious consequences of dwelling in such an atmosphere will be seen in the general aspect of the dwellers. With the groom himself things may be moderately well under general circumstances, seeing that he is more out of doors than the others; but even the groom, should he happen to cut himself, will discover an effect of breathing the ammoniacally vitiated atmosphere in the long time it takes for the cut to get well. Ammonia, though about the least injurious of the non-organic emanations from decomposing matter, is assuredly not to be ignored in that respect. As for sulphuretted hydrogen and its combination with ammonia, both are, or can be, deadly poisons. One inspiration of sulphuretted hydrogen, undiluted, would infallibly kill the incautious breather on the spot; nay, even when diluted, rapid if not instaneous death might result, as it has been known to have resulted. Some fifteen years ago the following incident was recorded in the newspapers:—Some individual endowed with more chemical faith than chemical wisdom chanced to live in the vicinity of a street-drainage grating which evolved evil odours; whereupon he, having heard or read that oil of vitriol was a great purifier, threw some oil of vitriol down the grating; then applying his nose and taking a sniff to learn if the purification was complete, fell down dead. So injurious is sulphuretted-hydrogen that, even when much diluted, it may kill by skin absorption, as was proved long ago by some French veterinarians. They put a horse, all but his head, into a caoutchouc bag; then charged the bag with a mixture of atmospheric air and sulphuretted hydrogen, having only sixteen per cent. of the latter. By conditions of the experiment, it must follow that, should the animal be affected by the sulphuretted hydrogen, this could only result from skin absorption. Under this treatment the horse died.

Marsh gas, or light carburetted-hydrogen, already enumerated as being amongst deleterious gaseous emanations, may always be detected in the water of stagnant pools, charged with organic decomposing matter. From the water of such pools it may be collected. Not many years since, indeed, this was the only source from which investigators could obtain light carburetted hydrogen for experiment; no artificial method of preparing it being known. In marshy, fenny situations this gas abounds. These localities are always and everywhere insalubrious, but especially when situate in hot climates. The unhealthiness of localities where rice is grown is proverbial, rice being really an aquatic grass. Habitual inhalation of an atmosphere charged with marsh-gas has been thought by many pathologists to be the immediate cause of ague, or marsh-fever. An equally probable hypothesis is, however, that the disease in question results, not from inhalation of the gas itself, but from inhalation of minute germs or spores, organised, and, by microscopic aid, sometimes, perhaps always, visible, and co-existent with the gas.

The second category of disease-creating, invisible agents,—invisible, that is to say, to the naked eye,—organised germs, have only had their existence visibly demonstrated in quite recent times. Very soon after microscopic inquiry had revealed the existence in nature of an immensity of littleness in counterpart to the long-known and contemplated immensity of greatness, the very probable idea dawned that just as the microscope had rendered visible the existence of certain minute things, which hitherto had not been suspected to exist; so, probably, even microscopic vision had its limits. It was reasonable to suppose the existence of myriad small living things, which not even the microscope could render manifest. Probably this is the case, but, leaving hypothesis for the safer ground of experiment, we will now state how the visible existence of some living germs at least present in the atmosphere was demonstrated. The plan adopted was most ingenious, and when stated will be plain. *Imprimis*, the two points must be apprehended that gun-cotton dissolves in ether, giving a transparent colourless solution; and that gun-cotton wool, like ordinary cotton wool, can be made to act as a filter. Apprehending these facts, a French philosopher tried the following experiment:—Passing a current of atmospheric air for a certain time through a mass of gun-cotton wool, packed tightly in a glass tube, then dissolving the gun-cotton in ether, and examining microscopically the solution, he found abundant germs. Conclusive though this ingenious experiment was up to the stage at which we left it, the truth which it was made to disclose is only half told. The air which had been filtered through the gun-cotton was passed into a glass vessel, into which some broth had been put; and, one time having elapsed, it was found that the broth so circumstanced would not putrefy, though a duplicate sample of broth exposed to unfiltered air for an equal time and at the same temperature putrefied. This beautiful experiment opened a large field of speculation. The fact had been long known to experimentalists that all putrefiable matters, so far as experiments had gone, disclosed to the microscope a crowd of living organisms, in every case of specific kinds according to the species of matter undergoing putrefaction. In this way it was known that putrefying flour-paste was crowded with eel-like animalcules, which, indeed, have acquired the name of "flour-paste eels," from the resemblance. To whatever putrefying thing the microscopist turned his regard, he found specific organised forms. In most cases these organised forms were vegetable, of the fungus or mushroom nature; in other cases, as, for example, in putrefying paste, the specific organisms were animalised, though an abundance of fungoid growths constituting mould were found too. To an inquisitive mind the question immediately presses for solution,—Where do the living things referred to come from? Either they must be spontaneously generated, or else developed from germs, spores, eggs, or whatever else we choose to call those minute initial points of vitality. The belief in spontaneous generation is of great antiquity, but as experimental science advanced, it came to be scouted, only surviving in the minds of tidy housewives, who, one and all, protested, and continued to protest, up to the period of development of the scientific female, that dirt bred (*i.e.*, spontaneously generated) fleas. Of late, however, a school of scientific men, invading the domain of scientific females, pronounced their belief in spontaneous generation too. Many still continue to hold that opinion, but how they can consistently do so in presence of testimony furnished by the gun-cotton experiment repeated again and again up to the time being invariably with the same results, is to the preponderance of thinkers extraordinary. Chemists, when regarding the atmosphere chemically, are doubtless right in defining it to be a mechanical mixture of four volumes nitrogen and one oxygen, together with a comparatively minute but variable portion of carbonic acid. Prophylactic doctors, architects, and builders, however, must form a more extended idea of the atmosphere than this. They must contemplate it as being charged with a multitude of germs all ready to develop into fuller life, on finding resting-ground suitable for their development. If the objection be alleged that the germs are not an integral part of the atmosphere, but extraneous things contained in the atmosphere, the sole result is to import a metaphysical disputation on a practical matter, not altering practical indications of teaching in any degree. It must not be understood that the atmosphere exclusively is concerned in the diffusion of germ life. On the contrary, these little organisms pervade articles of food and drink. Few pathologists would at this time feel justified in denying that Asiatic cholera is alone communicable by the actual ingestion (*i.e.*, swallowing) of specific germs. Asiatic cholera is quite a modern disease, only dating from 1819. Its first victims were individuals who had been eating some rice from a crop on which had been observed a growth of a peculiar mould never previously seen. Not all microscopic germs are prejudicial. Some perform demonstrably useful work in the economy of nature. Without the presence of germ life there could be no fermentation of any kind. We have already seen how, in the absence of germ life, putrefaction (*i.e.*, putrefactive fermentation) could not be established, and the same inability applies to every other variety of fermentation. Hence springs the designation under which certain diseases are classed as being "zymotic" or fermentive. Perhaps the fermentive theory of disease has received more extensive application than is warranted by scientific demonstration. For example, that bane of the English climate,—consumption,—is considered by many pathologists to be refer-

able to the presence and development of specific germs; and on this assumption the hypothesis has been based that the pine-forest cure,—as it has been called,—of consumption, owes its efficacy to the circumstance that patients lodged in the depths of a pine-forest have to breathe, during their sojourn, an atmosphere charged with turpentine; which, like in this respect to carbolic acid, is destructive to minute forms of organic life, whether vegetable or animal. Assuming that we have rendered obvious the intimate connexion which naturally subsists between house-construction and prophylactic medicine, we would ask whether the connexion is not too often violated, and in such a radically important matter as house foundations, whether the violation may not be expected to prove the cause of future disease? If a foundation of chemically objectionable materials there needs must be,—such as the old shoe-leather, sardine-boxes, and meat-cans, to which we have adverted,—ordinary prudence suggests the need of disinfection. It is, unfortunately, too much the custom to go to work empirically in the employment of disinfectants, forgetting that such bodies, though having one common generic name, are endowed each with specific action. It by no means follows that a disinfectant best against a certain class of impurities may not be the very worst against others. Quick-lime, for example, has a sort of popular repute of acting as a disinfectant on every possible offensive thing, and under every possible condition. Its range of efficacy is large, no doubt, but cases may be easily specified in which lime is totally inert,—other cases in which it is injurious. Lime, not being volatile, is not atmospherically diffusive. It cannot, therefore, purify air except the air be forced through it. Quick-lime will be the best available purifier in the case of having to deal with a festering slowly putrefactive mass. It will destroy the germs to the action of which putrefaction is due. It will decompose hydrosulphate of ammonia and fix sulphur. It will rapidly corrode and render unputrefiable all organic materials. These comprise a fair list of advantages to the credit of lime as a disinfectant. On a future occasion we may indicate some of the abuses of lime regarded as a prophylactic agent, and explain the mode of action of certain other disinfectants.

BUILDING AND BUILDING MATERIAL IN CANADA.

Next in interest to the living humanities of a people comes architecture, which, interwoven with all, survives them all,—crystallisation, as it were, of the sum of facts that go to make up a nation's existence. This is what is drawing the attention of new-light students so markedly to the contemplation of old-time monuments, nor can we expect to furnish a less worthy, if less durable, subject for scrutiny to our successors at the far future end of time's vista.

Canada now means an empire covering half a continent, and, rapidly growing homogeneous, must powerfully influence the world at no distant date,—perhaps (such are the mutations of fortune) destined to really become the Greater Britain. Much of our bone and sinew, a good deal of our healthy brain, is being exported to Canada; the workers are building up the country with force and with patience. Of what, then, are built the houses of the workers? Canada is much thought of as a land of snow, but her summers are nearly as characteristic a feature as are her winters; these are hot enough, so that if there are to be found some snug temporary huts composed of snow, there is a wider range of building materials from which to choose. As for these snow huts, however, they are occasionally met with in districts where timber is poorly accessible: mining regions, or the banks of some rivers to which resort the Indians and trappers in winter time. They can only be successfully made after a fresh snow-fall in moderate weather, when the snow is no longer of its usual dry and powdery nature that forbids its being moulded. These huts are, when possible, made over a hollow cone of brushwood, but where this is not possible, they are formed like big ant-hills with a hole in the top through which the smoke of the fire inside may find egress. Over this hole are placed two short columns of packed snow, and upon these a slab of the same material, so that no snow can enter. Doors are extemporised of blanket or bear-skin, the internal fittings of the hut being of very primitive kind; and yet it is comfortable enough.

It is rare, however, that wood is not obtainable in the older provinces, so that the cosy dwellings of the shanty-men are far oftener met with than is the snow-hut. Varying according to the nature of the timber of which they are made, and not intended to last, all agree in being substantial and warm. The shanty-man, or "lumberer," is a man of independent spirit, who, slinging his rifle behind him and shouldering his axe, enters the wilderness with perfect composure, regardless of the lack of milestones and highways. He knows north from south by the "dip" of the trees, and cuts his own road when need be. Being sociable, he prefers company, yet often does his prospecting alone,—his first care, having met with a suitable field of operations, being the erection of his shanty. He carries with him no carpenter's set of tools: his axe is his one weapon. With it he fells trees and cuts them into lengths; how large may be these trees, and in what way he builds his shanty, are points that depend upon whether he have help or not. If alone, he drives two saplings into the ground at each corner of his shanty, and between each pair drops lengths of light timber, slotted close to their points of insertion, so as to receive the cross-bars. These being placed, the roofing is laid on, and the slope made afterwards. One side is modified by the necessity that exists for a door, but the principle remains the same: uprights driven into the earth in pairs, and firmly bound together at the tops, and, sometimes, the centres. Moss or cedar-branch packing does the rest; a chimney is made of four roughly-hewn slabs of wood, a short length or two of timber rolled indoors, when, having spread his couch of fragrant cedar-brush, the shanty-man lies down to enjoy his first pipe. When the lumberer is, as often happens, only one of a large party, his house is more strongly built. Sills having been laid, uprights, grooved on two sides from top to bottom, are tenoned in. Down these grooves are slidden horizontal timbers, squared at the ends, but otherwise "in the rough"; lastly, door, chimney, and windows are provided. Many of these shanties are adapted to withstand a bombardment from all but the heaviest of the old smooth-bore guns. Where timber is valuable, they are taken apart on leaving, and go to make the raft, which is floated over a dangerous course of hundreds of miles, and along the broad breast of St. Lawrence to Quebec. Otherwise they are left standing, to mock the unfortunate explorer who may have lost his way in those wilds with the promise of accommodation that he will not find. Yet, wooden houses do not exclusively belong to the professional lumberman.

So rapid has been the growth of many parts of Canada, that where thriving towns stand to-day, a few years ago was nothing but the unbroken forest. Here, when the settler first came, he staked out his farm and deliberately erected cottages and outhouses of rough timber. These stand to this day to witness to his marvellous upward progress in material prosperity. Toilsome work it was, this felling of trees and drawing of stumps, but here lies his farm smooth as a lawn, except where the plough has left its even furrows, and here still stands the cottage which saw the first "stumping-bee," with its array of immense bon-fires turning night into day. The farmer is proud of his house, and will not have it pulled down; his children may do that, says he, and sure enough they will by and by.

The face of the country in civilised Canada is fast changing. But, if you will enter his house you will admit that the farmer is, not without reason, proud of his dwelling. Neatly wainscoted inside, and well, if roughly, finished, there are no signs visible of the rough exterior. There is an upstairs, too, where the beds are skilfully made to project from the walls, as in the bunks of a ship. Possibly the farmer's first ideas of carpentry were borrowed from the sleeping accommodation of one or other of the badly-arranged sailing-ships that used to be thought fit enough for emigrant ships in the good old days of thirty years ago.

In the infancy of Canada, while towns were thus built of timber, the Government-house was wont to outstrip the rest, both in workmanship and grandeur. Private and public, that those were no contemptible residences may be inferred from the fact that many leading citizens prefer these old structures for their present town residences to any of modern contrivance built of brick or stone. There are, in Canada, still hamlets to be found in which town-hall, school, and churches are all of wood. While such is the case with respect to the older provinces, the same holds good in the prairie regions of the north-west, wherever wood of any dimensions is accessible. There, the half-breeds build with round timbers; from 16 by 16 to 16 by 24 square feet being the usual area of foundations. Sills are laid, as already described, six posts hewn, one for each corner, and two in the middle, lengthwise; grooves of 2 in. are cut in the posts and plates to hold these. Timbers are next cut, tenoned to fit grooves, and slipped in, thus making the sides and ends. The cracks are plastered within and without, and whitewashed. For the roof, poles are laid rafter-fashion, and filled in with clay or mortar, mixed with grass, puddled into the mass at one end, the butts of the grass projecting from and covering the clay. This plan of roofing is recommended to the notice of English farmers, as being cheaper than thatch, and quite as serviceable.

Most people are aware that there is a scarcity of large timber in the north-west, so it may be said that pine is imported to Winnipeg from Minnesota. Poplar and dressed white pine sell at $25 per 1,000 ft. Most of the houses in Manitoba are of frame, but brick is coming into use. It must not be thought, however, that the country is destitute of timber, for spruce, aspen, and stunted oak are found in abundance, and large enough for many purposes. Beyond the Rocky Mountains lies British Columbia, chosen home of giant timber-growths. The Douglas and Menzies firs, and the cedar, reach 250 ft. in height, whilst even the pretty maple attains 150 ft. The birch is thought tall at 70 ft., and is only found at the edges of British Columbian forests. This tree is, however, found beyond the prairies in most of Old Canada, and serves a number of useful ends besides this of house-building. Birch-bark makes the Indian's light canoe, which, when he meets a portage, he carries upon his back to the next length of smooth water, to re-launch it afresh there. Birch-bark is his thrifty squaw's medicine, and is the material of which her husband's leggings are wrought. An inner lining membrane of the birch-tree is used by the Indians as paper, whereon to paint records of prowess in the chase. Birch-bark serves also for the covering of tents, and, twisted into cordage, for fishing-lines. The Old-Country settler, glorying in the sharpness of his axe and the strength of his thews, despises such flimsy material, but the Indian knows better than to do hard work for a sentiment.

Next in order to massive timber for building purposes comes lath and plaster, perhaps at this day the most generally used material. It is a source of wonder to strangers how quickly and cheaply arise neat rows of houses in Canadian suburban districts, but if they watched the process, they would cease to be surprised. Every prosperous labourer hopes to build his house: a feat which he often accomplishes, in spare intervals between working-hours, with his own hands.

This is how he does it. When possible, he makes a good stone foundation, but timber does very well, and then he gets through the heavy work of erecting the frame, as already described, only his corner-posts need no grooves.

When soundly placed and capped, he nails carefully-fitted strips of 1 in. pine between the frame works, top and bottom, so that the edges are presented. Across these vertical pieces he tacks light laths, not too close together, and finally plasters the whole surface with mortar, forcing the plaster between the interstices of the wood work. For the inside, a smooth mortar is used, while for the outside, a coarse kind is thought better; indeed, it is usually thrown, instead of laid on, and often made to take an artificial wavy surface. Occasionally, plastering is altogether omitted outside, and planking substituted, but whichever plan be adopted, the result is a serviceable and comfortable building. The roof is made at a slope sufficient to divert the heavy snow-falls, and upon the rafters, close together, laterally, and overlapping each other, are laid wooden shingles, which take, in Canada, the place of slates.

Only two small nails are needed for the upper corners, and the work is begun at the eaves. It is better to have two rows of shingles. These essentials of a Canadian building are cheap, and, taken altogether, durable, lasting for nine or ten years, but have many disadvantages, among which not the least is their liability to catch fire in the hot months.

Many a street has been burned down by the settling of a stray spark upon the wooden roof of a building adjacent to the one which was burning. So well known is this that no sooner does a fire show itself than householders mount to the roofs and cover them with wet blankets. Shingles also warp beneath the intensity of an August sun, whilst they have a bad habit of absorbing water during unusually protracted rainfalls. In spite of these defects, shingling is a flourishing trade. Numbers of "shingle-mills" exist all over the country, where the hum of circular-saws never ceases during the day. The writer had several months' experience of this craft, and is prepared to state that shingling is, in the late autumn, very cold work, and, owing to the slippery state of the ice-glazed roofs, dangerous. The roofing of houses is possibly a trade in England, as house-painting and window-glazing certainly are, but the writer found it expedient to undertake small contracts in each of these branches, together with a good many more alien to the subject of this paper. Whether slate will ever take the place of the Canadian shingle is uncertain: many public buildings are thus roofed, it is true, but only where expense and weight are of no consideration, and slates have an unpleasant faculty of retaining heat longer than is desirable. Canadian slate, such as is ordinarily used, is not of good quality; that is to say, it cannot be split into thin sections, and is far more absorbent than English or French slate. Where houses are for the most part so light as in Canada, heavy roofing is not desirable, and thus, shingling is, in spite of all to its detriment, likely to hold its own for many a year. But the inventor of a material which, while equally cheap, should be proof against fire and water, would certainly make his mark in the Canadian building world. It may be thought straining a point to bring the ordinary roadway under the head of "building," yet the fact is that in Canada the "side-walks" are usually made of wood. The only exceptions are found in several large cities, where stone has been thought more showy. Bearing upon the matter in hand, attention is drawn to the recent report of the Home Metropolitan surveyor upon pavements: in it, preference is given to wood over both stone and asphalte. This refers to wooden blocks for the carriageway; in Canada such paving is much in favour, but wooden planking for the sideways is not known in England. The only conditions upon which planking can be laid on natural ground are "sleepers" and "piles," as occasion may suggest. When in good repair, nothing could be better than these roads, but sometimes town councils and corporations are forgetful of the public safety, and great holes in the planking beset the unwary.

With the development of the country, timber is in ever-increasing demand, so that, with this home consumption and the large export, no wonder that there are upon the Ottawa river and elsewhere saw-mills by the score, turning out millions of boards each day, while, on approaching the newer districts, the hum of the saw-mill is invariably heard. The immense piles of boards that line the river-banks might seem fabulous to one who had not seen them. Indeed, the rivers are in many instances covered with sawdust so thickly as to conceal the water for miles, while the smaller streams are even apt to be entirely choked. There seems, however, to have been some recent legislation to prevent this growing abuse, so it may be reasonably inferred that the myriad trout-streams which beautify Canadian rural neighbourhoods will not cease to present their seductive promises of healthful recreation to the explorer. If only somebody could utilise this sawdust, what a mine of wealth would be have ready to hand! It has been attempted to mould it into blocks for fuel, but with indifferent results, the cost being too great, and the fuel not burning without being subjected to a constant air-blast. Should, however, a solvent be found which, while ensuring a pasty consistency without changing the material chemically, should permit of its being injected under pressure with air, the result would be a spongy mass that must burn readily. This has not yet been done, but it is quite possible in theory.

Now that Canadian cities are growing in wealth, and have more at stake than formerly in case of fire, an event only too common all over North America, there is a strong feeling in favour of doing away with the wooden streets that court destruction from any chance spark. In all large towns, recent bye-laws provide against the erection of wooden buildings within the town limits. All fresh edifices are being built of stone or brick, usually the former. Whether it be that clay is not plentifully found in some parts of Canada, or whether the cost of brickmaking is greater than that of quarrying stone,—at any rate, brick is commonly regarded more as a curiosity than as the simplification of the architectural executive which it is in England. Such brick buildings as are found are well constructed, although the bricks seem sometimes to have been insufficiently baked in the kiln. Stone of various kinds is plentiful enough in most parts of the Dominion, though large areas of the best arable land are without so much as a pebble. Even here, by digging to a moderate depth, beds of rock are reached which, where they are at their lowest dip, are often found to make natural reservoirs for salt brine or petroleum, both important Canadian industries. In Guelph and its neighbourhood, situated within the fertile peninsula formed by the great lakes, are large beds of magnesian limestone, so that this thriving town,—a city within the past year,—is as substantially built as any place in the world. Taking advantage of this cheapness of building material, the churches and public buildings have been ambitiously conceived. Sandstone and granite are found elsewhere, and upon the Upper Ottawa is an abundance of veined marble.

In the district of Muskoka, one of the free-grant tracts, but poorly adapted for farming, the face of the country is seamed with large, outcropping banks of rock of the sterile Laurentian formation. It is of no use in the neatly-finished applications of modern fashionable architecture, nor, indeed, can it be advantageously wrought at all; if ever utilised, it must be as rough material. Hence it serves only to form the backs of the settlers' rude cabins, or as banks whereon to trail the vines that require a supply of reserved heat during the frosty nights. But when Canada has, in consonance with her hopes, emerged victorious from the peaceful contest of the colonies for supremacy, should she desire to erect a pyramid to hand down her fame to the world's end here is enough stone and to spare. Treated as indicated, these rough boulders could, without much cost for blasting, and for transit, be worked into magnificent faces that should redeem the age from charges often brought against our own—of being puny in conception, in execution feeble. This, however, is of the future, while our subject lies with the present. Meantime, while private building enterprise is not likely to flag, the Dominion Government is not behind the age, its expenditure upon public buildings, for one of the recently-passed years, having reached the amount of 1,360,302 dols., or 272,061*l.* sterling. Large builders in good practice had, of course, better stay in London than go to Canada, but there are many smaller ones who could rely upon plenty of work at the outset, and sure profits. Much is to be done by a judicious combination of building and prospecting. A desirable locality is sure to grow in value, even without buildings upon it.

COUNTING THE COST.

Nothing is more hostile to the true and worthy development of the work of the artist or of the architect than any attempt to surprise people into the payment of a greater sum than they intended to pay for any commission which they put in hand. As far as regards the general prosperity of the tectonic professions, it matters very little whether such surprise is planned or is merely the result of slovenliness and want of due forethought. As regards the character of the professional men concerned, of course the difference is palpable. But this fact ought not to lead us to undervalue the mischief that may arise merely from our ordinary habit of taking things a bit at a time, without a thorough forecast of the whole.

This, we take it, is what is now raising no small amount of wrathful contention in the Court of Common Council. In December last, it appears from the discussion at the meeting of that body on the 7th of October, the Court approved of the project of erecting an architectural memorial on the site of Temple Bar, and the execution appears to have been entrusted to the City Lands Committee. If the Court of Common Council had taken the obvious precaution of naming a sum which they were prepared to sanction, and not to exceed, for the monument in question, all would have gone well. This must not be overlooked. Whatever blame may, rightly or wrongly, be attributed elsewhere, here was the point where due precaution ought to have been taken. It is not for the Common Council to ignore this fact.

The City Lands Committee, it seems, were not more careful in the matter than the Common Council had been. They were content with "a rough estimate," and do not appear, if we may judge from the otherwise conflicting statements of Mr. Bedford, their chairman, and Mr. Horace Jones, the City Architect, to have inquired whether the estimate for the building included the cost of the statues with which it was to be adorned. None of the items seem in themselves to be other than fair and reasonable. The sums of 1,250*l.* each for marble statues of her Majesty and H.R.H. the Prince of Wales are as little as could be offered by the first municipality in the world for such works. A thousand guineas for a griffin (presumably of bronze) is not more than a fair sculptor's charge, supposing the design to be one in all respects commendable. Nor is 300 guineas apiece for four bas-reliefs at all disproportionate. Here, then, we obtain the sum of 4,750*l.* Nor can it be contended that it is an overcharge for the work proposed. It is not quite evident to us how far these items, together with the cost of "about 3,000*l.* or 4,000*l.* for the remainder of the work," make up the sum of "about 10,000 guineas," but it seems tolerably clear, first, that if sculpture is to be introduced, it will not be worth the while of the City of London to pay less for it; and secondly, that it is in this question of the cost of sculpture that the misunderstanding has arisen.

Mr. Phillips gave notice of a motion tending to put a stop to the proceeding with the monument. A somewhat stormy discussion terminated by what we suppose must be taken as the vote of a majority of 75 to 51 in favour of the acceptance of the estimate. The notice of motion, no doubt, still stands, so that the subject cannot be considered as finally closed. Meantime, let us take the lesson to heart, that those who begin to build without fully counting the cost are proverbially likely to come to grief.

The daily press is tolerably accordant in condemning the erection of a monument on the site where such serious obstruction to traffic was so long caused by the old Bar—a survival, as it was, of times when carriages were few and far between. The proposal to form a refuge as a part of the monument is one that ought to receive support from the *Builder*, as the original proposer of these safeguards against the danger of the street. But it can hardly be doubted that the particular site is one where the necessary area of ground can be but ill-spared, whether for monument or for island. The public have not been allowed the opportunity of passing any opinion on the architectural merit of the design, and unless this prove to be in every way suitable, both for the locality and for the purpose of commemoration, it can hardly be doubted that a well-constructed subway would have been far more valued by pedestrians, if not by all frequenters of that great thoroughfare, than an edifice adorned by noble statues, and crested by a prodigious griffin. A dragon, by the bye, not a griffin, is the animal proper to the City arms.

THE SOCIAL SCIENCE CONGRESS IN EDINBURGH.

On other pages we give the substance of some of the papers read in the various sectional meetings of this, the twenty-fourth annual Congress of the National Association for the Promotion of Social Science, which opened on the 6th inst. In point of attendance, at any rate, the Congress appears to have been fairly successful, for by the afternoon of the second day (Thursday, the 7th) nearly 1,000 tickets had been sold, viz., 538 for members, 265 for associates, and 132 for ladies,—in all, 935. This total compares favourably with the 650 recorded at Manchester last year, as well as with the return of the Cheltenham meeting in 1878.

The usual meeting of working men was held, and was largely attended, although a small charge was made for admittance.

We shall give some additional reports hereafter. Dublin is fixed on as the next meeting-place.

THE QUESTION OF MASTER AND PUPILS IN ART.

SOCIAL SCIENCE ASSOCIATION.

In the Art Department, on the 8th inst., Mr. Hubert Herkomer, A.R.A., opened the discussion on the special question, "How far would the revival of the old system of 'master and pupils' be of advantage, and tend to promote the growth of historical art in the country, and the fitting use of painting and sculpture in our public buildings?" He had, he said, modified the title of his paper as follows:—"How far would the revival of the old system of 'master and pupils' be of advantage in the present day, and tend to promote the growth of true art?" Inquiring, first, how far the old system was advantageous, the writer remarked that the imitative faculties of the mind awaken early, and are the first to be exercised; reason and invention follow. It is thus that all art-workers have built their earliest efforts upon what has gone before them. When they have reached the point where originality begins to assert itself, they diverge into other channels—ripening, advancing, or varying the existing art, according to their powers of originality. History is replete with facts showing that all great souls had to shake off, and frequently with an effort, the influences of their masters, before they could do one single touch of that work that has made them immortal. This reflects seriously upon the system of tuition under consideration. Unless the student is led at the very beginning of his education to expect the final appearance of independent "mind-seeing" and interpretation of nature, he will aim little higher than imitating, not nature, but another man's interpretation of her. This individuality is the great mystery and secret of the art-mind. It cannot be transmitted to others, and cannot be stolen, for the best resemblance to another man's originality of style is but an imitation. The highest mental qualities, being originality and loftiness of invention, would appear last. Considering, then, that the qualities which are active at very early stages are the imitative, and hearing in mind that the system of masters and pupils exercises and encourages those qualities almost exclusively at first, it is not strange that those soul-given qualities, which are fixed for later development, should be lamentably impeded in their attempts to come to life. The system retards the growth of those qualities that make the painter renowned; that is one great flaw. Another danger attached to the system is that of the pupil being put under the wrong master, that is, under one antagonistic in all his ideas and aims to the innate but closely-hidden tastes of the student. Imagine the late Frederick Walker put under Maclise. Surely Walker, whose characteristic was to draw out the tenderest passages of nature, would have had the natural bent of his mind irritated and chafed. As it was, he was placed, with but little artificial tuition, under an engraver, and told to draw as much in the style of John Gilbert as possible. Then he had to draw on wood the sketches of Thackeray for his "Philip"—awful drawings—and Walker sorely wanted to try some original illustrations, instead of working out Thackeray's caricatures. He timidly suggested it, tried it, and at once showed, not traces of having imitated John Gilbert, but the originality that was in his mind. Now, this highly nervous, sensitive man, who never showed his work whilst in progress, even to the models who sat for him, and who would have been the last man in the world to have pupils around him, actually but unconsciously formed a school. From his life and works we can gather—first, that this painter would have done nothing greater (perhaps nothing so great) if he had been placed under a master; and secondly, that he would not have exercised a greater influence than he did by his works alone, if his studio had been full of pupils during his lifetime. After further illustrating the effect of a wrong selection of masters, the writer went on to remark that the works of great men have always had a greater influence upon young painters than personal tuition has had. The cleverness of drawing and so-called learnedness of French painters is as much due to the national character of the artists as to their school influences. In England we have certainly no strong school influences, but we have what is nowhere in the world so strongly developed, and that is originality and individuality of style. The French are as unhappy in their selection of subjects as they are certain of their drawing. It is their aim to strike, to startle, to fascinate. English art, however faulty it may be in precision of drawing, seems to take you by the hand and lead you to nature, and bid you love it,—to humanity, and bid you learn its lessons. This is a national characteristic produced spontaneously without any central impetus such as might accrue from the teachings of one man. What more do we want? Do we want more learning? Those who look for "learning" seem to be under an impression that it cannot be found in realism,—that to show any learning you must paint the Classic only. This is entirely erroneous, and is the cause of the word "learning" being misunderstood. Millais's head of Gladstone was full of profound learning, and so was his hastily-painted portrait of Mrs. Jopling. Learning comes with practice; originality never by practice, but it must be awakened by exercise. There is a danger in too early attempts at picture-painting; but this is only dangerous to the weak, and that only in case their first efforts are successful, so as to cause them to get into one groove, and work only for money. On the other hand, it is a significant fact that of those students who draw and paint such admirable studies from the life, and win gold medals, very few ever become eminent painters. Their mistake lies in simply doing what is placed before them, and in not being obliged to exercise originality, so as to make every study a picture. A master either forces the student into imitation of or similarity to his art; for in most cases the master allows the student to work upon his paintings, and the styles must meet. It is as difficult, however, to define the difference between similarity and imitation as it is to find the exact point where borrowing ends and stealing begins. If the pupil is to be a reflection of the master, the master must be unapproachable in his greatness, and there must be but one kind of art, and that his. We have yet to see the work of art that will positively satisfy all intelligent minds, and we have yet to find the master capable of training students of every variety of mind. Some sort of tuition or instruction is, of course, necessary; but its effect is only felt in the art of the time, when the highest grade studentship is paid much attention to. Good schools, with the best masters, might raise a higher level of art, but it is doubtful whether a higher level would produce more great men.

An interesting discussion followed; in the course of which Mr. Robert Herdman, R.S.A., said the subject which Mr. Herkomer had treated had been one of difficulty in all ages, and he suspected it was a question which would still go on undetermined for a very long time. He thought the question involved three points:—First, that of "master and pupil"; second, that of a school of historical art; and third, that relating to buildings. He thought the growth of a school of historical art would be promoted by giving far greater opportunities for artists to develop any faculty which they might possess in that direction. At present our art was mainly of a domestic character. If our municipal buildings and professional halls were more thrown open to the art energies of the country, he was hopeful that a strong effort would be made on the part of the professional artists to meet such a requirement, and art would have far greater influence in the country. Then, when the time arrived there would almost of necessity be a revival to some extent of the "master and pupil" system, because in such circumstances it would be impossible that any single artist could, unaided, carry out such works; and he believed the best thing for many of our younger students would be that, instead of following their own devices,—a course often leading simply to a restricted and rather useless mannerism,—they should be called in to assist in carrying out such important public works, where they could really give useful aid.

Mr. H. C. Boyes, speaking from his experience as an architect, contrasted the English and Continental systems of education in architecture. In England, he said, a young man was apprenticed to an architect, and learned from his master the technique of his profession. This was not the case abroad. On the Continent, the architect was trained, especially in Paris, more in schools and academies, and they saw the results in the architecture of England and France. In Paris they missed that originality observable in English architecture, which, of course, sometimes degenerated into vulgarity, but which always gave an air of picturesqueness and variety to our buildings. He thought the same thing applied to painting. We had in our painting in England very much greater variety and picturesqueness, though we had less of the French academical precision.

Mr. George Barnett, advocate, discussed the education of architects in this country and in France, and said he thought the result of the Continental system was that they had there a living school of architecture, which he did not think we had in this country. He knew of no building in Edinburgh, with, perhaps, one exception, which appeared to him to be designed as a natural result of the feeling of beauty in the artist, working upon the plan which was required by his employer and upon his materials.

The President (Professor Richmond) wound up the discussion. Touching in the outset of his remarks upon the question as to what should be the education of the student before his powers of selection had been formed, he pointed out, in the first place, that the technique of art was enormously difficult. The hand had to be trained to express what the eye saw or the mind conceived. Mr. Herkomer appeared to think that it was rather detrimental than otherwise for a young painter to be placed under a master with whom he did not entirely sympathise. With that he ventured to disagree. A student might have a great turn for form, and in that case the best master for him would probably be one whose strong point lay in colour, so that the student would have prominently brought before him that in which he was most deficient. He did not agree with the idea that learning was not necessary to art. By learning he meant knowledge of construction, and particularly of the construction of the human form. That knowledge could only be got by being taught intimately and in the studio of a man who was conversant with it. Then there were such things as laws relating to drapery, which, if known and understood, were of immense assistance to any painter. He could not see why both anatomy and those laws governing drapery,—simple enough things to learn,—should not be taught by a master to his pupil, and why that sort of teaching should not be of infinite value. In regard to wall-paintings, the art of the world, he remarked, had been done on walls, and he thought that was the sort of education that was necessary in England to enable men to paint on a large scale. Unless they got some system of art which would enable them to paint large subjects upon walls, he thought their art would degenerate into mere *genre* painting. As to the master and pupil question, it is clear that they could not create originality, but they could further it by educating students in such a workmanlike manner that, when it came to them to express themselves, they should be able to do so in clear language. They should know the grammar of their art, and if they possessed any originality it would come out. After alluding to the influence of allegorical painting, Mr. Richmond, reverting to the subject of education, said that what they wanted, after all, was to further the cause of art. They did not care how the education was got; they wanted the education. On the whole, he believed that they were inclined to think that the teaching gained under the direction of a master was better than that gained under the direction of an academy.

A SCHOOL OF DRAMATIC ART.

SOCIAL SCIENCE CONGRESS.

In the Department of Art, on its first day of meeting, Professor Richmond in the chair,

Professor Fleeming Jenkin, Edinburgh, submitted the first special question:—"Ought there to be a School of Dramatic Art, subsidised by private subscription or endowment, or by the State?" He began by apologising for appearing without his paper, which, he said, had been written and sent to London more than a week ago, and had not been returned. When asked to write about this question, he considered it his duty to go to Paris, with the object of ascertaining what was done there in the way of dramatic teaching at the Conservatoire. This he had done, and though he had not succeeded in being present when a lesson was given, inasmuch as the classes were not open, he had had the very great advantage of talking at considerable length on several occasions with two of the most distinguished teachers in the Conservatoire, and also with one of their most distinguished pupils. Proceeding to describe the method of examination, he pointed out that the jury consisted of twelve or thirteen men representing

the Government, letters, acting, and teaching,—a very efficient body to select the students who should attend the Conservatoire, and there receive gratuitous dramatic teaching. The French National Theatres and the Academy of Letters were essential parts of the system by which dramatic art was taught in France. He feared that, without support from analogous institutions in England, a mere Dramatic College would be barren in results. We could not transplant foreign institutions to our very different soil. The dramatic profession might, however, well consider whether it might not benefit by some such organisation as had been found advantageous in other professions. Almost every other profession had its professional society, and why should actors not have a Royal Dramatic Society? He thought that now the profession was in such a state that the public would accept such a proposal. The society might be founded with statutes, based partly on those of the Royal Academy, and partly on those of such professional associations as the Institution of Civil Engineers. It should be incorporated by Royal Charter, and placed under distinguished patronage by an honorary president of the highest rank. There should be two classes of corporate members. The higher class, of fellows, should consist of a fixed number of really distinguished men and women. The number should be so small as to make the distinction of belonging to that body as great as that of being a Royal Academician. In a profession there was nothing which conduced more to the advancement of the members than their directing their ambition into high channels, and there could be no better distinction with this end than that which was conferred by the profession itself. That was a very important point. There was no necessity for looking for patronage outside the profession. A profession itself could always confer its highest honours. So far, then, the society he suggested would be very closely copied from the Royal Academy. The second class, of associates, should be limited in number, but election even to this class should be so conducted as to make sure that to be an associate of the society would be a real distinction. The persons eligible as associates or fellows would be actors, actresses, and dramatic authors and musical composers whose works had been represented on the stage. No one unconnected professionally with the stage should be eligible, though a limited number of honorary members of marked distinction might be admitted. The intention should be that no actor should be admitted even as an associate who did not practise in what might be called the higher branches of the profession. It would be impossible by verbal distinction to secure this, but the following mode of election would effect the desired result. Each candidate should be recommended from personal knowledge by say three fellows and six associates, and a sketch of the qualifications should accompany the paper, stating definitely what parts the candidates had acted. This paper should be submitted to the Council, and unless the Council passed the candidate the election could not be proceeded with,—the election to be by all corporate members, and a certain number of "black balls" to exclude. A life composition should be paid on entry. The vacancies in the list of fellows should be filled up from the associates of a certain standing. Such a constitution would give a very much larger and more popular body than the Royal Academy, approaching more nearly to the Institution of Civil Engineers. What would be the functions of such a society? In the first place, it would be a fountain of honour. It could confer distinction on the most prominent members of the profession. To be president of such a body would be as laudable an ambition as to be president of the Royal Academy. It would encourage the ambitions and promising younger members by admitting them to its ranks. It could give valuable aid to students by holding competitions, awarding prizes, certificates, even scholarships. We should have a body representing the profession, whose decisions would command respect. We should have a substitute for the Société de la Comédie Française in many of their functions. Secondly, this Society would be a nucleus round which would gather many useful minor institutions. Thus it could administer grants and receive bequests. It could institute and manage benefit societies. It could institute reading libraries, portrait galleries, even a theatre itself could follow. It would be impossible for the fellows to avoid occasionally giving representations in which every part would be taken by a fellow, and these would be so successful that the national theatre would *grow*. The society would encourage the association between writer and actor so necessary to the stage, and would hold meetings at which every subject connected with the stage would be discussed. In a word, they should have an organised profession. Once grant the organisation, and the growth was sure to follow. The dramatic profession must teach itself, raise itself, honour itself, and in the present condition of the stage nothing was wanted to these ends except self-organisation, such as other professions had already adopted. He suggested that the Council might name a small, but distinguished, committee to promote the establishment of such a society as was described in the paper, if, after inquiry, they considered it possible and desirable.

Mr. Philip H. Rathbone, of Liverpool, said he had the very highest hopes of an organisation such as that sketched by Professor Jenkin. The principal difficulty would probably lie in the question as to who should be the first members of the association. Directly they had the association started, he agreed with Professor Jenkin nobody but those professionally connected with the stage should have one finger in the pie; but till it was started he was afraid the names of the first members must include a considerable proportion of outsiders. They knew the difficulty of starting any project when wrong men turned up, and had to be rejected. All that sort of invidiousness must be taken from the profession and placed upon outsiders, and the question arose, upon whom should it devolve? He thought it must devolve on some of those who had taken a great non-professional interest in the drama. Some of the very highest in the land had taken such an interest, and would be prepared to make the first list of members. He thought the idea of a Royal charter was an exceedingly happy one, and that Royal charter ought to name the first members. That done, he did not see the slightest difficulty in the members naming the associates. There was one very important class whom he should like to see much more numerous than it was at present,—that of managers who were not actors. There were very great disadvantages in having a manager who was also an actor, and he did not think they could have a good all-round company till they had as manager of that company a man who was precluded from appearing on the stage at all. He thought very great advantages would accrue from closer communication between the actor and the painter. In Germany the greatest mutual benefits had resulted from the actor and the painter working together in the question of grouping. He also alluded to the importance of the provincial theatres serving as preliminary schools for actors.

Mr. Robert Herdman, R.S.A., having referred to the power of the stage as a means of education and cultivation, and to the fact of its not being at present all that it might be, said that, believing something like what Professor Jenkin had put before them was likely to prove of service, he should certainly be very glad if at the present meeting of the Social Science Congress some step were taken by which the experiment might be made. He therefore moved that the Council be asked to appoint a committee to promote the establishment of a Royal Dramatic Society, if on inquiry they should consider this possible and desirable.

The Rev. William Vincent, Norwich, seconded this proposition. He had listened with interest to the very able address which had been given by Professor Fleeming Jenkin, and he thought it would be a great pity were any movement such as this to fall to the ground for want of being definitely taken up. He looked upon the stage as a very important element indeed in the education of the people, as well as in their recreation, and he thought it was a very great pity that any country like ours should be in the position of not being able to recommend the stage as a means of intellectual enjoyment for all classes of the people. It seemed to him that a very great step would have been taken towards their being able to recommend it, and set it forward as an educational and moral educator, when it was put upon some more satisfactory basis than at present. Having seen the great difficulties that there were to any national recognition of the stage, he thought it was desirable that what seemed to him the most practicable way suggested by Professor Jenkin should have a trial.

The resolution was put to the meeting and carried unanimously.

Mr. H. C. Boyes read a paper by Mr. Bogg on "Dramatic Art and the Dramatic Reform Association"; Mr. Rathbone one by Mr. A. G. Symonds on "Dramatic Reform"; and Mr. Archibald Constable a paper by Mr. Charles Rowley, jun., on "Remedies for Staginess."

ON THE RELATION OF ART TO SOCIAL SCIENCE.*

Holding the office of President of the Art Section of this Congress, I feel in a position of some difficulty and responsibility. Difficulty, because this office has been filled with great ability in previous years, and much has been said of useful wisdom by my predecessors in this chair, and little new can be said concerning purely high-art questions. Responsibility, from the natural feeling lest any words of mine should hinder rather than help the cause of art, and the considerations concerning it which are taking place. It would ill become me to delay the important business upon which we are called together by expressions of personal feelings. But I may express my sense of the honour done to the position I hold at Oxford, by my being invited to take the President's chair at this meeting.

After somewhat careful thought, it has appeared to me that more good may be gotten from an address in this Social Science gathering, dealing with art from a social point of view, rather than with art from its very highest standpoint. Further, being called upon to lecture at Oxford upon the "History and Philosophy of the Fine Arts," it will be a rather pleasant change to address you upon matters of great importance (as they appear to me) relating to the existence or non-existence of the chances of art progress in the United Kingdom. And by that progress I do not mean alone the increased power shown in the painting of pictures, in the making of statues, in the building of cathedrals; but rather I would ask whether, taken generally, art, or the love of the beautiful, is getting to have any firmer grip upon the minds and lives of all classes,—that is, whether the necessity for being the possessor of a beautiful object rather than an ugly object is gaining ground? And if not, what are the chief impediments to the growth of refined tastes among the middle and lower classes? The driest philosopher, or the stiffest-necked utilitarian, will no longer now fail to give art an important place among the necessities of civilised existence. We certainly have an advantage in living in an age of reformation; in an age of freedom of speech, of intellectual growth, of courageous attitude against vices, narrowness, and pedantic usages of all kinds. There is a general desire for improvement among all classes, and a growing wish to cultivate taste. All this must be acknowledged, and yet we are far, very far, indeed, from being an artistic nation. South Kensington's vast machinery for art education, together with its beautiful collection of ancient and Mediæval art, has done something, indeed, to civilise design, and to educate designers into something of more reasonable artists than those who, previously to the Exhibition of 1851, exhibited the lowest corruption of taste. Our National Gallery in the great metropolis has, within comparatively few years, become one of the noblest collections of pictures in Europe. The great towns, Manchester and Liverpool, yearly open an exhibition of pictures, and there are signs in both cities of a desire for monumental art, a desire that the bare walls of their buildings should be decorated with mural paintings.

This great city has its Royal Academy of Arts, among whose members may be found not only distinguished painters belonging to its own nationality, but others, foreigners in blood, but brothers in art. The Universities of Oxford, Cambridge, London, and, as I am informed also, Edinburgh, have, within but a few years, recognised the importance of art as a branch of education by accepting bequests to form art professorships. The Grosvenor Gallery, through the noble enterprise of a single gentleman whose name is well known here, whose name can only be heard with respect by every artist, Sir Coutts Lindsay, has given to the public the chance of seeing a class of pictures long denied to it by

* By Professor W. B. Richmond, M.A., read as President of the Art Department at the Social Science Congress, October 11th.

the persistent non-recognition of their value by the Royal Academy of London. All this looks like vitality, and no doubt does prove a growing interest in art. But we must remember that these museums, these exhibitions, and these lecture-rooms, are visited by a comparatively small class of people; that the very heart of the population, standing mostly in need of æsthetic culture, or of its refining influences, is yet untouched by art; and that outside those whose appetite for what is lovely can be satisfied, there is a hungry crowd which would be satisfied too if it had the means, and were not dragged down into the slough of bad taste by daily influences acting unconsciously upon the minds of it. The vast strides of science, the rapid accumulation of wealth, railways, telegraphs, have created needs to be realised quickly. New towns have sprung up like magic. Old towns have been pulled about without regard to the historical or artistic treasures contained in them; the ruthless reign of iron has prevailed, the unfeeling hand of destruction has satisfied its lust, well nigh, let us hope. The reaction has come. But where are we?

Something worse almost than pulling down our churches has taken place. Restoration has caused even more ruin than the progress of railways. Many of the most interesting and beautiful creations in architecture have been swept away, and this done in no spirit of destruction, but with the mistaken idea that it is possible to restore old work at all: with the idea, too, that neatness and mechanical exactness will not only serve in the place of spontaneity of design, but that it is in point of fact superior and more desirable to it. If one-tenth part of that money spent in so-called restoration had been expended in preserving, by the simple means of adding a buttress to a weak wall or tower, or by strong oak timbers, unplaned, where the roof was weak, or by such-like structural repairs, monuments of the love and skill of those in bygone times, whose simplicity of life rendered simple their faith and ideas, would still remain to us, in the place of what may be called pious frauds. It was with a view to check the headlong and heedless rush of the restoration mania that the Society for the Protection of Ancient Buildings was brought into being. Late in the day through this admirable society has come (too late, indeed, to save much beautiful work from destruction), through the energy of its workers and the enthusiasm and courage displayed by its secretary, Mr. Morris, old work has been protected and respected under the advice of the society; and out of our own country, in Italy and France, the influence of the salutary example set by the Ancient Buildings Protection Society has borne fruit. The mother church of Western Europe, St. Mark's, at Venice, was threatened with destruction, — that noble façade, the labour of the twelfth, thirteenth, and fourteenth centuries, was to be pulled down and rebuilt. Through the exertions of the Ancient Buildings Society such a memorial was drawn up, signed, and sent to Italy, and by reason of the number of its signatures, and the importance of them, we cannot but hope and believe that it has brought the lovers of art in Italy to consider again before they withhold their words of expostulation at a project which would rid the world of one of its greatest treasures.

I have ventured to make use of the term "pious fraud." Restoration pretends at best to be what it is not, and never can be; it pretends to restore work to its pristine beauty, it gives new lamps for old ones, and, as in the ancient story, the new lamps are found to have no virtue in them. The magic of old work disappears under the hand of the modern workman, for the conditions under which the eleventh-century carver and the nineteenth-century carver have worked are so totally at variance that their labours cannot for a moment bear comparison, and it is out of all question that the modern work of to-day can have one iota of the spirit of the ancient work. Therefore, restoration has in it the nature of a deception, and must be most misguiding to those very classes whose correct and chaste taste we must be desiring to cultivate.

Architecture is such a generally necessary art to all, it enters into the wants of every-day life, that it should be, and is, one of the chiefest factors in art cultivation, and hence it can be made to retard or advance the progress of general artistic tastes. So that the placing of new and cold workmanship in the place of old, truly artistic and loving work is defrauding a very large class of people indeed, rich and poor, of the refining influences of superior and nobler work.

The very rapid and easy means of communication by railway and telegraph have in great measure broken down those local characteristics, both in architecture and manners, so interesting in older England. A general, very natural, and to be applauded desire towards greater equality among classes, brought about by modern facilities for their coming daily more and more into contact, has acted in making the lower class ape the appearance of wealth and show of the class just above it. So that, instead of being content with real stability, it demands ornament in its dwelling-place, in its furniture, in its costume. Hence vulgarity, bad work, bad building, bad design, and in the end a tumble-down and demoralising appearance of rottenness or flimsy raggedness. Few sights can be said to be more depressing than the ill-built, stuccoed labourer's house now erected in a village street, mean to the last extent, he it understood, having no inch of good work or interest about it. Sad is its cold slate roof, indeed, in contrast to the old thatch, cool in summer and warm in winter. Melancholy the contrast between its bad bricks and the oak timbers, joined and well mortised, which had stood often the wear and tear of centuries in an old cottage. The taste of the inhabitant of the senseless edifice is lowered. Rarely do we find the same sign of care taken over his cottage garden, the same pride in his creepers of roses or grapes, as was visible in his more primitive dwelling. Yes, very naturally the man, though poor, is influenced by the vulgar want of association, and his pride, in his unsympathetic dwelling, of the comeliness of its surroundings, is ground out of him by it; he becomes vulgar, no longer simple, liking his imitation and really comfortless house because it has window-sashes like the squire's house, and he deceives himself into the thought that so he is a bit higher in the social scale. This instance is only at the confines of the general ostentation which is the product of modern civilisation, and can only be checked by the energy of art.

Checked by those who have taste, and who have a right to speak, saying without fear and in perfect faith in their own convictions, that where the heart is not simple, where there exists a grasping for another's social place, there will exist neither beauty nor morals. It is admitted, of course, that the old will not last for ever, that new cottages must be built; but let them, these new ones, at least be built (in an age boasting of its superior science and superior facilities) as well, and as lastingly, as the old were built. It comes to this really in the long run, that those who desire their dwellings, their clothes, or their furniture, to appear more costly than they really are, are the true delinquents. These are they who pervert taste. Solid stone or brick walls, well roofed, the strongest and simplest furniture, without the overlay of cheap and bad ornament, woollen or linen unadorned garments, will never be vulgar. If this fact could only be made clear to the minds of most of us, a better style, both in house building and house furnishing and dressing, would come about. From a clearly practical point of view, it is so evident that although the first outlay may be greater in building, furnishing, dressing in a solid or simple manner, repairs so expensive and constant need be but rare, and, too, that mental demoralisation where repair cannot be afforded, caused by the rapid decay of showy but bad work, will be avoided.

No one will deny the moral influence exercised, even unconsciously, upon the whole human race, and, too, even upon animals, by the nature of their daily and hourly surroundings from earliest years. That this influence may be good or bad, in morals and æsthetics, needs no words from me.

Now, believing this, and being anxious for that large lower class which composes our labourers, agricultural and others, more especially for the sake of those who will exercise themselves in any craft, such as building, carving, carpentering, cabinet-making, what can we do during the few early years of their education which might guide their tastes in a good direction? And further, what agencies are there at work in the general surroundings of our great cities which tend to degrade rather than to elevate the love for what is beautiful and refined?

I take it for granted that those who are here to-day are interested in art, and that there will be found no one who will say that any child will be less fitted in after-life to perform the simple duties of an artisan or labourer who has been led by daily contact with beautiful objects to prefer them to ugly objects. And though I quite think there are none here who believe that dulness is moral, joy immoral, ugliness chaste, beauty unchaste; yet (though chiefly exploded) this theory has not been without its votaries among excellent though misguided moralists. Now, science has provided us with a means in photography, cheap, and by recent discoveries permanent, by which at small cost any quantity of reproductions of noble works of art in all its branches may be obtained.

I have mentioned that there is a very large class which, through various causes, either from want of desire brought about by faulty early education, or want of means, from overwork, or want of holidays, do not make use of the advantages possible to it of visiting museums, galleries of pictures, or attending lectures upon subjects of æsthetic import. This being so, are there no means by which this present failing may be made up to the next generation? I think there may be.

Since the Education Act has been brought into full play in England, a chance offers itself to get at the very class we want to touch and educate to love what is beautiful and refined; and, as I venture to think, this class would be vastly improved, even morally, by early contact with beautiful objects.

No doubt many here have observed in their passages through picture-galleries, as I have, that the very poorest, those in rags and tatters, are often found rapt in admiration before early Italian pictures, and especially before those of a religious character. This fact has been most noticeable to me in the National Gallery of London. And when we come to think of it, it is reasonable that this should be so. The direct simplicity and reverential treatment of the early pictures has a charm to natures ignorant, perhaps idle, perhaps dissolute, concerning which there is no reasoning; but that bright spark of human feeling, wellnigh, perchance, snuffed out by the degradation of surroundings, is rekindled by its contact with the fire of pure love ablaze in early religious art. So that we must admit the possibility of touching the sensibilities and the nobler emotions of those in the lowest scale of life by the elevating influences of art. Photography being the cheapest and most exact means at hand for the purpose, I would suggest that our Board schools, each and every one of them, and our parish and Sunday schools too, should, under wise guidance of a committee of taste, provide themselves with photographs of fine works of art. And these should not be confined to reproductions from pictures only, but should include architectural details, furniture, patterns, and designs of all sorts. And further, I would have casts from fine carvings, which can be purchased at such a moderate rate as few are aware of; these, with the photographs, should be hung in order upon the schoolroom walls. Every child who can learn to write, one would think, could learn to draw, up to a point to be of great service in after life. Think of the numbers and numbers of artisans who in the departments scattered over the country under the supervision of the Art Department at South Kensington, whose rough and hard-worked hands during the day handle the pick-axe, or trowel, or even spade, endeavour in the evenings to train themselves by tracing the delicate curves of a Greek honeysuckle carved on a stele, or by copying the fanciful ornament designed in years gone by by a Gothic workman. No better was he than these present workmen are, only, having lived in a more artistic and vital atmosphere, his art had life and meaning in it.

What difficulties to such as these artisans are would have been overcome, if in early life, while yet supple, as not yet rendered stiff and difficult of command by the daily exercise of rough work in order to exist, their hands had been cultivated, even up to a limited point of control and sensitive delicacy of touch. And if, at the same time that the young hands are learning, the impressionable youthful mind be cultivated through the eye to dwell upon beautiful objects, what a seed of profit and delight is sown. Of course, it is easy enough to see that there would be many failures attendant upon such a scheme, and a pessimist may say, "Ah, yes! but what good would come out of such super-refinements? You are only training a side of the mind which will never be brought into play in after-life; you will only make your people discontented with their lot in life, and

unwilling to fulfil its drudgeries." But the answer to all this is, "You are only presupposing a result upon a scheme not yet tried; you are only begging the question in stating that cultivated instincts towards refinements weaken self-control and the exercise of severer duties." Further, by teaching children of the artisan class to draw, you are furthering them with advantage in the pursuits that may be in store for them in after-life, and by accustoming their young eyes to dwell upon beautiful design, you are stimulating a faculty where it exists, though latent, perhaps. Again, morally, by teaching the elements of drawing, you put amusement within reach by which spare hours may be enriched, time employed otherwise spent in the tavern.

Healthful amusements, occupations for the eye and hand, are enemies of vice, and the strong armour of probity.*

THE HEALTH DEPARTMENT AT THE EDINBURGH CONGRESS.

SOCIAL SCIENCE ASSOCIATION.

On the 7th inst. the special question for discussion was: "What are the best areas for sanitary purposes, and how far should there be a revision of the mode of electing and continuing the services of the officers under the Public Health Acts?"

Several papers bearing upon it were read, and there was a discussion, in which a number of gentlemen took part.† A general opinion was expressed as to the failure of sanitary action in Scotland, and that an amended Health Act was necessary.

Mr. Greig, inspector of the city parish, Edinburgh, quite concurred in the call for extension of areas for local sanitary authorities. He thought that parochial boards were now very much hampered by the narrowness of the localities they had to deal with, and the objections of the ratepayers to incurring any heavy expense. He thought, at the same time, that the constitution of the parochial boards required improvement, and that an extended area was required as much for Poor-law as well as sanitary administration. He would not, however, increase the number of boards. He thought, rather, that local boards should be consolidated.

Mr. H. H. Collins, hon. secretary of the Department, said he had carefully read over the Edinburgh Act, and he could not understand how, if that Act were carried out in its integrity, and it was not obstructed more than it was in human nature to obstruct, it should fail to prove satisfactory. With it the inhabitants of Edinburgh would be protected, in the question of public health, in a way which no other city in the United Kingdom was at the present moment protected. In that book they had the Bible of public health. Their Act, in fact, should serve as a model for them in other parts of the United Kingdom in their efforts to lower the death-rate, and in that way to lower all the other rates to which they were subject.

Mr. G. W. Hastings, M.P., president of the Council, pointed out that the recommendation of the Royal Commissioners in favour of the adoption of the union as the rural sanitary area, on which the last Public Health Act was framed, had been carried only by a majority of one. The minority had been in favour of the county as the sanitary area. Now, the result of adopting the union had been to make it impossible for rural sanitary authorities to pay their medical officers salaries which could, under any circumstances, induce them to give up private practice and devote themselves to sanitary work. In his opinion, it was a fatal error to cause a medical officer of health to engage in private practice; first, because sanitary functions at the present day were such as demanded not only all the time, but also all the thought and energy of the medical officer who undertook them; and, second, because very often his duties as a public officer conflicted with his own private interests in the pursuit of his own private practice. Accordingly, this adoption of the union as the sanitary area was one of the first things which the Legislature should undo. Even if no other thing were done, this alone would be productive of great good. In his own county of Worcester they had ten rural unions, and, between them and the small burghs, from 800*l.* to 1,000*l.* could easily be paid to one skilled and efficient medical officer, who could do the whole sanitary work of the county.

On the 8th, the special question for discussion was, "What is the best mode of amending the present laws with reference to existing buildings, and also of improving their sanitary condition, so as to render them more healthy, having due regard to economical considerations?"

Councillor Gowans, Edinburgh, opened the discussion. There were, he submitted, radical flaws in our present system of regulating the erection of buildings. The Public Health Act of 1867 was a step in the right direction, but it was intended chiefly to apply to small towns, and was largely permissive; therefore, one community might observe proper precautions, while another was permitted totally to neglect them. Hitherto advances in sanitary science had almost invariably been the result, not of precaution, but of the scare from time to time produced by some frightful visitation of contagious disease. Progress, therefore, had necessarily been spasmodic and unsatisfactory. At the present day the conditions of sanitary well-being were becoming better understood; and he submitted that the following reforms should be given effect to:—(1) There should be drawn up a code of public law on the subject of health applicable to the United Kingdom, and compulsory throughout. (2) There should be appointed a Minister of State for Public Health, with a seat in the Cabinet, to whom local authorities should be directly responsible for due administration of the law. And (3) that no person other than an architect, educated, examined, and qualified as a lawyer or a doctor now was, and under a corresponding responsibility, should be permitted to submit plans to a court. Whilst economical considerations must not be overlooked, they must not be, as at present they were, nearly the main consideration; and Parliament ought to step in and enact that no mere money considerations should interfere to prevent proper sanitary appliances for the preservation of the public health.

Professor Fleeming Jenkin, Edinburgh, read a paper giving an account of the Sanitary Protection Association, founded at the suggestion of the writer in the spring of 1878, to effect the objects indicated as desirable in the question before the Congress. In consideration of an annual payment,—usually of a guinea,—the member obtained:—1st, a report on the condition of his house; 2nd, inspection of alterations made; 3rd, an annual experimental test of the condition of the drainage system. The society was a mutual benefit society, closely analogous to steam-boiler associations. The association numbered about 500 members, and had worked smoothly and effectively.

Sir Robert Christison supplemented Professor Fleeming Jenkin's paper by stating, as president of the association, that the inception and successful results of the association were due to the Professor. He had large experience of the great good which the association had already done. His only surprise was that, instead of their now having 500 subscribers in Edinburgh, they should not have 5,000. Referring to the new Edinburgh Municipal Act, he said the proprietors of buildings might erect buildings one-half higher than the width of the street in which they were built. It was a gross error to allow any street to be so constructed. It ought to be the very reverse.

Dr. Wallace, Greenock, stated that in Greenock many of his suggested improvements were defeated by the action of the Dean of Guild Court, which, he was sorry to say, was too largely made up of speculative builders. But he hoped, as the result of recent action in the town, the Local Authority would be enabled to see that the houses to be erected on certain vacant pieces of ground would be built in conformity with proper sanitary requirements.

Dr. Alexander Wood, Edinburgh, thought, with regard to Councillor Gowans's proposal to secure better-educated architects, that was not what was wanted; but what was wanted was a provision that, when an architect, from carelessness, or something worse than carelessness, built unhealthy and dangerous houses, he should be amenable to be punished by law. The question they had to answer was this,—Were they to allow the poorer classes to remain in houses that generate vice? When a house was unsanitary, it should be pulled down and got rid of. But the work of meeting this evil would not be done by Parliament. It must be done through a philanthropic movement among such of the upper classes as were willing to give their money to the removal of the people from these houses.

Mr. H. H. Collins pointed out that in London they had what Councillor Gowans desired in the way of the better education of the architects, in the shape of the Institute of British Architects, whose certificate was necessary to the appointment of district surveyor, which he himself held.

Sir John Rose Cormack, Paris, remarked that sanitary and domestic architecture were in Edinburgh, and in Great Britain generally, very much in advance of their state in Paris. In fact, all that he could say of them in Paris was, that they were deplorably bad from our point of view,—bad for health and bad for morals. They were nevertheless, deserving of study, as they showed the natural outcome of the evils against what sanitarians were in this country raising a warning voice. In all our large towns the increase of value in property had a dangerous tendency to lower the health-standard of the inhabitants. Even in Edinburgh there was reason to fear that buildings were becoming too much crowded together; the back greens in the new town, Sir John believed, were in danger, which was much to be regretted, as they were, as open spaces, invaluable to the public health. Sir John said that in Paris it is not difficult to point to architectural peculiarities, and social arrangements contingent on these peculiarities, which perpetuate *foci* of infection, and disseminate contagious diseases. The stranger admires the Avenue de l'Opéra and other spacious avenues, with their tree-adorned cleanly-swept pavements, the carefully-watered dustless roadways, and the stately houses. But let him take a back view, and he would turn away in disgust. The building plan which has been followed with wearisome sameness prevents the possibility of cross ventilation. Light and air are excluded. The windows at the back are hemmed in by lofty side walls. Then, again, the servants of each family living on the different flats are crammed into the top story, where they form a population by themselves, in constant communication with the worst slums of the town. This is the plague-spot of Paris. Walking one day in one of the superb streets now adverted to, a French friend truly remarked to Sir John that each fifth floor was a *foyer de perdition*—a hotbed of moral and physical pollution. This architectural peculiarity of Paris, Sir John said, was a thousand times more demoralising than the much-reprobated "bothy system" of agricultural Scotland. Sir John went on to show why typhoid fever and diphtheria were becoming more and more endemic in Paris. He also said that the suppression of cesspools now being carried out was fraught with danger, for the house supply of water was inadequate to the flushing, and the plumber work and masonry were imperfect.

Mr. Allan Carter, C.E., pointed out that an architect was expected not only to know all kinds of sciences, but also to be able to charm his clients out of all opposition, whether that were financial or prejudicial. There was, notwithstanding these difficulties, a very large number of architects in Edinburgh who were thoroughly competent both as artists and as practical men.

The President (Dr. Beddoe) in summing up the result of the discussion, said that in England about 64,000*l.* a year was paid to medical officers of health, besides various amounts paid by various districts who did not accept Government aid. That sum, if judiciously divided, should provide the services of a sufficient number of competent medical men, who should give their entire time to the work. It was worthy of notice that in the last few years the mortality in the seven large towns was considerably less than that in the towns next below them.

Professor Fraser moved, and Councillor Gowans seconded the motion,—"That the meeting strongly recommends that the Council shall consider the question of the sanitary rural areas of Scotland, with a view to an amendment of the law by their extension," and it was unanimously adopted.

On the 9th Dr. Beddoe delivered

THE PRESIDENTIAL ADDRESS.

We are compelled to restrict ourselves to a few of the more salient paragraphs:—

"The subject of modern houses for the working classes—how they are built, and how they

* The remainder in our next.

† We recommend those who are interested to see the *Scotsman*, in which journal, day by day, full and careful reports have been given.

ought to be—has frequently been debated in this section, and would furnish material for a dozen addresses such as mine. I will make but two or three remarks on it in passing. Landlords, whether from philanthropy and a sense of duty, or influenced by public opinion, have done much to improve the dwellings on their estates, and speculative builders have, to some extent, been coerced by building Acts and bye-laws; but I do not think the improvement is so great as is usually supposed. If it were, one would expect to see a decided improvement in the death-rate from phthisis, from pulmonary diseases, and from rheumatism; for warmth, dryness, and proper ventilation ought to act favourably upon all these; whereas, in fact, if phthisis has decreased, other pulmonary diseases have quite made up the difference; and there is no improvement in rheumatism. I should say that, as a rule, the requirements of decency are more studied than they used to be, and that, perhaps, dryness of site and foundation is more looked to; moreover, by the persistent action of medical men and sanitarians, including many names well known in this section, so much has been done for water supply and sewerage, and disposal of refuse, that the great scourge of enteric fever is being gradually abated; but thin walls, bad mortar, and flimsy roofing cannot make warm and dry houses. One curious and unexpected result of building improved cottages has been brought to my notice. I am informed that in a certain Highland district where the proprietors have exerted themselves to build decent and air-tight dwellings for their small tenants, crofters, and labourers, instead of any improvement in health following, consumption, formerly uncommon, became very rife and deadly. Similarly, the natives of New Zealand, though their ordinary mode of lodging is about as ill-contrived and unwholesome as can be conceived, are said to suffer in health, and specifically to become more phthisical, when they take to living in houses of the European pattern. In the case of the Highlanders it is probably want of ventilation which is the fault of the new and comfortable houses. On the whole, it would probably be well to adapt to cottage-building the primary rule of British politics, correcting the evils of the local type of dwelling, whatever it may be, rather than seeking to introduce an entirely new one. The present Earl of Derby, in an address delivered to this association several years ago, recommended that the difficulty put in the way of constructing workmen's dwellings in towns by the exorbitant price of sites should be met by increasing the vertical elevation of the buildings. And we see that the elevation of buildings is constantly being increased, though not so much in the case of workmen's dwellings as of upper class houses, hotels, and warehouses. The change is not one to be commended. A street 50 ft. wide, with houses 80 ft. high, is scarcely more pervious to sun and wind than a lane of 20 ft., with houses of 32 ft. The population on the same area will probably be about the same; and Dr. Farr has shown us that, *cæteris paribus*, the rate of mortality increases as the density of population. Lofty staircases tell unfavourably on the health of those who frequently ascend them; hence the anæmia and functional affections of the heart which are the plague of London housemaids. And there are other evils connected with over-lofty houses well known to the citizens of 'Auld Reekie.' . . . . As for dwellings, though the multiplying of enactments is had, and the multiplying of officials is worse, increasing expense and making openings for jobbery, I am disposed to favour a moderate extension of legislation, especially in the direction of prohibition of what is certainly known to be mischievous or unsafe. Thus it seems monstrous that men should be allowed to build new houses within ordinary flood-mark, as has been done in hundreds of cases within my own knowledge of late years. There are other offences against the laws of nature which are so clearly proved to be such that they are almost criminal, such as carrying a soil-pipe under a house, or placing a water-closet in the middle of it, neglecting to trap a main-drain, and so forth. Surely the perpetrator of these things ought to be held responsible in purse or in person. When an overworked or muddle-headed signalman or pointsman commits a blunder which has fatal consequences, he is amenable to the criminal law; much more should the artisan be so who by scamping his work brings death into an unsuspecting household. I cannot agree with those who say that the public, the house-tenants, are generally indifferent to these things, because they avoid putting themselves to an expense they can often but ill afford in investigating their house-drains for the sake of a doubtful benefit. I should say that among the upper and middle classes at least there is a great though vague horror of 'bad drains,' but they have not usually the skill nor the power to protect themselves, the mason's and plumber's work, good or bad, being covered up or concealed. Few principles in building seem to me more valuable than this,—that the whole work connected with the drainage of a house, sinks, soil-pipes, ejects, and so forth, should be so placed as to be readily inspected and investigated. Meanwhile, as the public are incompetent to protect themselves, it seems to me that the liberty of builders and plumbers to do mischief should be closely restricted."

THE WRECK OF THE SCOTCH EXPRESS.

Railway collisions are becoming a stock-entry in the weekly journals,—not to say in the daily papers. The subject is assuming a magnitude that demands special treatment, rather than such space as can be spared from columns like our own. But there is one lesson which, in our opinion, has been loudly proclaimed by disaster after disaster of late; that is, that we have been too much in the habit of looking to mechanical instead of to moral safeguards. So strongly was the danger of this temptation felt by some of our earliest and most experienced engineers, that they set their faces, perhaps with too much prejudice, against anything like automatic appliances on a railway. This, no doubt, is erring in one direction, but it is quite as unsafe to err in the other, and to throw on any real or imagined scheme for the perfecting of mechanical appliances the responsibility which really depends on the human agent.

With regard to the latter, the obvious importance of adequate pay, limited hours of work, provision for old age and illness, and pecuniary interest, to some small extent, in the safety and in the profit of the working of the establishment, is not less than that of perfect discipline, clear regulations, duly apportioned responsibility, and sure punishment for neglect or breach of order. To that the experience of the wreck of the Scotch express near Leicester, on the 9th of October, teaches us to add uniformity of occupation. In such matters as the working of signals, or the driving of an engine, where a man has one thing to do, which he has done, and done well, for a long time, there is a certain danger incurred by setting him to do something else. Thus Hill, the driver of the wrecked train, is a man of good conduct, long experience, and high character. But on the night in question he was driving an engine of a different construction from his own; and to that fact his overlooking the condition of the gear is no doubt primarily to be attributed. This is a very serious warning to railway managers, as to the distribution and employment of even their best men.

Even more serious than the question of personal responsibility is that of volume of traffic. Looking back to the very commencement of the railway system, we find that this subject has occupied the anxious thought of the fathers of the English railways. How much revenue can be earned from a track of rails with safety is a question that has never been duly investigated. Intervals of ten minutes between following trains were at one time thought to be indispensable. But on the Metropolitan Railway, in 1874, 193 trains left the Moorgate Station, on one line of rails, in every day of eighteen hours, so that the succeeding despatches were only five minutes apart. This enormous traffic, which earned in 1878 38,600*l.* per mile per annum, is carried on safely, because the trains all run at one speed. The moment difference of speed for different trains is introduced, a source of danger springs up; the effects of which, on the one hand, reduce earning power, and, on the other hand, render the avoidance of collisions almost impossible. The London and North-Western, the Great Northern, and the Midland Railways together, have twelve tracks of rail for more than twenty miles out of London. With all these twelve, carrying a traffic that varies in speed from twelve to fifty-four miles an hour, they earn a gross revenue per mile of their aggregate course of less than half that earned on the two tracks of the Metropolitan. And carefully managed as these three great lines are, we find that, in 1878, twenty-six reported accidents to passenger-trains occurred upon them, that being the safest year on record. Thus it is incontestable that the introduction of different speeds on the same railway at the same time limits the earning capacity of the line, and increases the liability to collision to an enormous amount. This is the problem we now have to face, and we only wish that we saw any good reason for concluding that we have come to the close of the chapter of disasters for 1880.

CAST-IRON WATER-TANKS.

It is not very creditable to the constructive skill of English engineering that so many cast-iron water-tanks should have been destroyed by failures, the side plates having been ruptured. In all the cases the failure has been attributed to the inner tie-bolts having given way through rusting at the point of connexion, or the cast-iron "snug" has broken, or the tie-nuts have been too few or imperfectly placed, and too weak. A few plain and short rules may probably prevent, or tend to prevent, such failures in future. "Accidental" failures they are not, but constructive blunders. Cast iron is used for railway-station tanks; but these are not, as a rule, very deep, seldom exceeding 6 ft. in depth, 5 ft. of water, and it is in vertical depth that there is danger. Cast iron is used for tanks in preference to wrought iron, because it endures longer under exposure.

As to the rules. The pressure of water against the sides and ends of a tank is in proportion to the vertical depth of the water, and without going into nice calculations, may, for safety, be roughly taken as ½ lb. per square inch for each foot of depth. A tank to hold 10 ft. in depth of water may therefore be assumed to have a pressure against the sides equal to the full pressure at half the depth, or, say, 2½ lb. on the square inch.

For tie-rods.—The best wrought-iron bears a breaking strain equal to 25 tons on the square inch, but it will not be safe to use more than 5 tons of this assumed strength.

The whole of the support to the sides and ends of the tank (in large tanks) should be assumed to be given by the inner stay-rods, the strength of the tank-plates not being noticed.

In a tank to hold 10 ft. in depth of water safely, there should be two tiers of tie-rods. The lower tier, 3 ft. 6 in. from the bottom of the tank; the upper tier, 7 ft. The top of the tank will be tied by the roof-timbers.

The tie-rods must not be allowed to swag, and so strain themselves and the tank, but must be supported by vertical supports inside the tank.

Every tie-rod must go through the tank-plates at right angles, and be secured to a large outside washer, say from 1 ft. 6 in. to 2 ft. square, and the screw-threads at the inner couplings must not weaken the tie-bolt, but be forged, so as to leave the full strength of the tie-rod.

There must be no diagonal ties, but each tie must have a direct pull, not on the tank-plate, or upon inside brackets, or cast snugs, but on the outside washers. A tank so constructed and so stayed will not burst. It is assumed that the bottom of the tank will be securely supported; the pressure on the bottom plates of a 10-ft.-deep tank may be taken as 5 lb. per square inch.

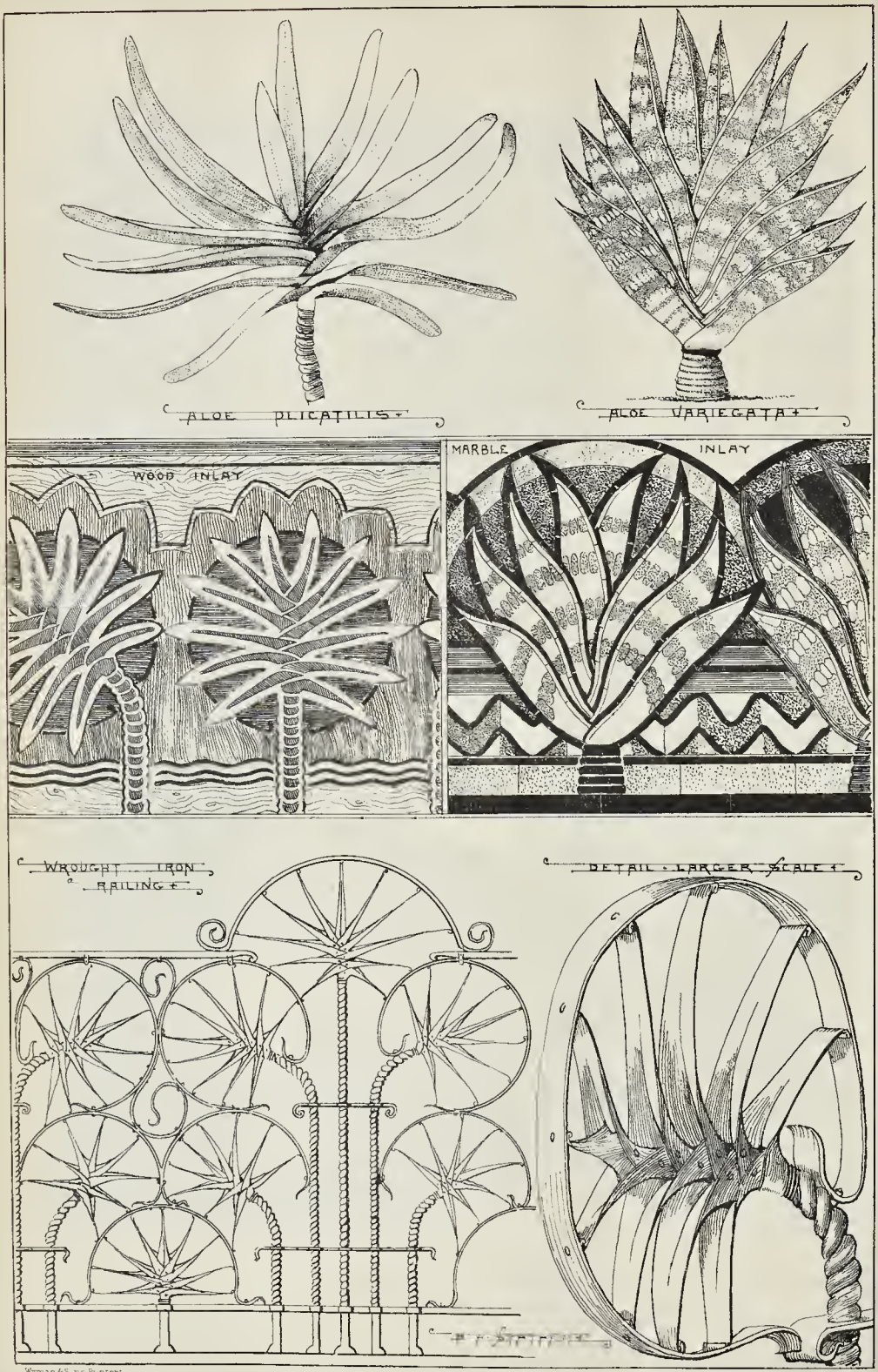
It will not be desirable to construct elevated cast-iron tanks much deeper than 12 ft., as it will be safer to increase the area rather than the depth. Cast-iron will, of course, bear a very much greater strain than 10 ft. head of water; but there would be a complication of tier-above-tier of tie-rods, and in filling and emptying the sides of the tank would expand and contract unless the tie-bolts were cottared or screwed up tight, and maintained tight.

Civil Engineer.

P.S.—2·3 ft. in depth of water equals 1 lb.

Museum of Sanitary Appliances for Edinburgh.—A correspondent suggests the desirability of establishing in Edinburgh an offshoot of the Parkes Museum. That Edinburgh should have a museum of the kind is certain, and this would be a good moment, while the attention of its citizens is awake to the importance of sanitary measures, to attempt the foundation of it.

AN ARCHITECT'S TOMB IN TORONTO, CANADA.



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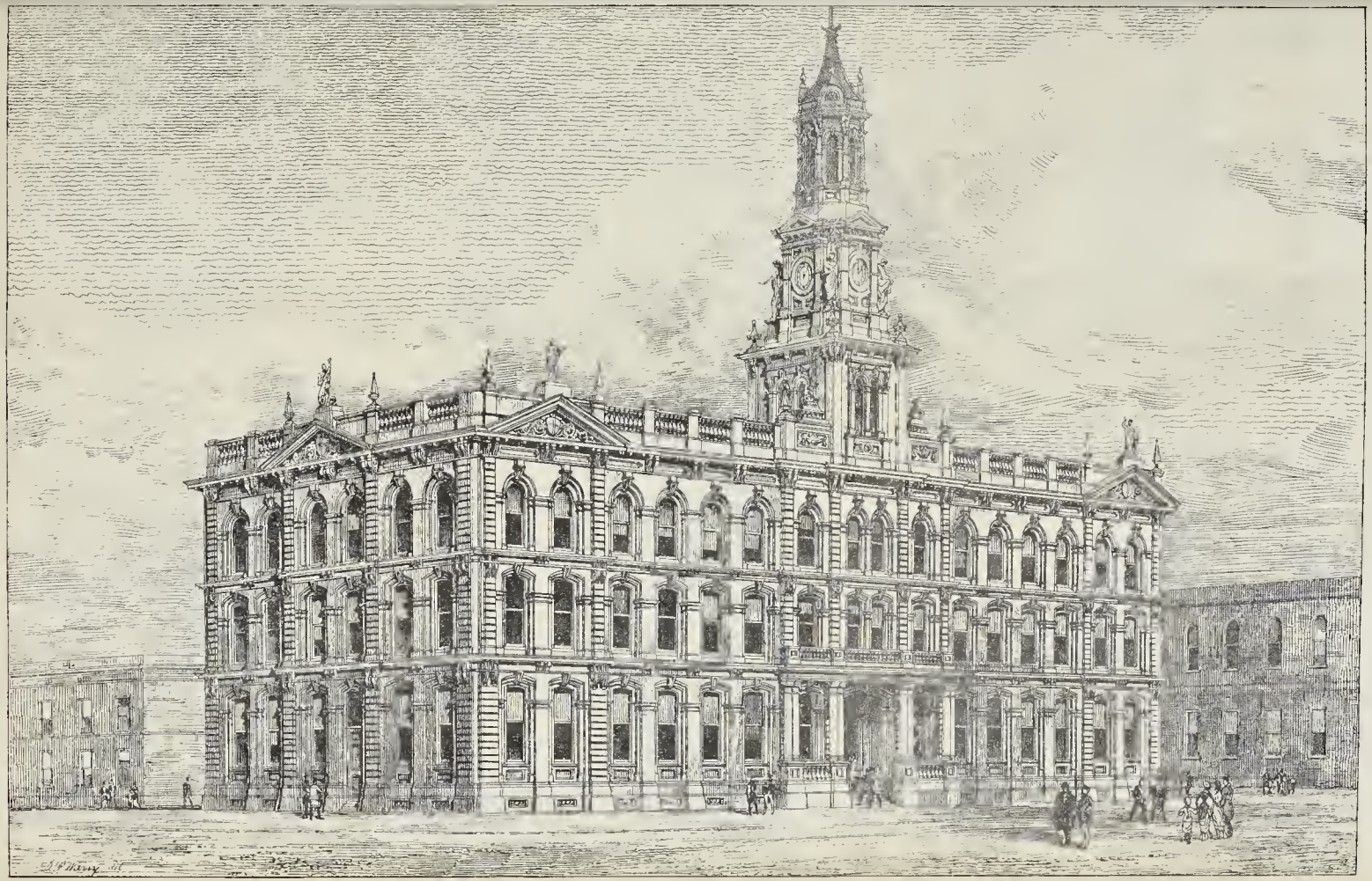
DECORATIVE SUGGESTIONS FROM NATURAL FORMS. — No. 2.



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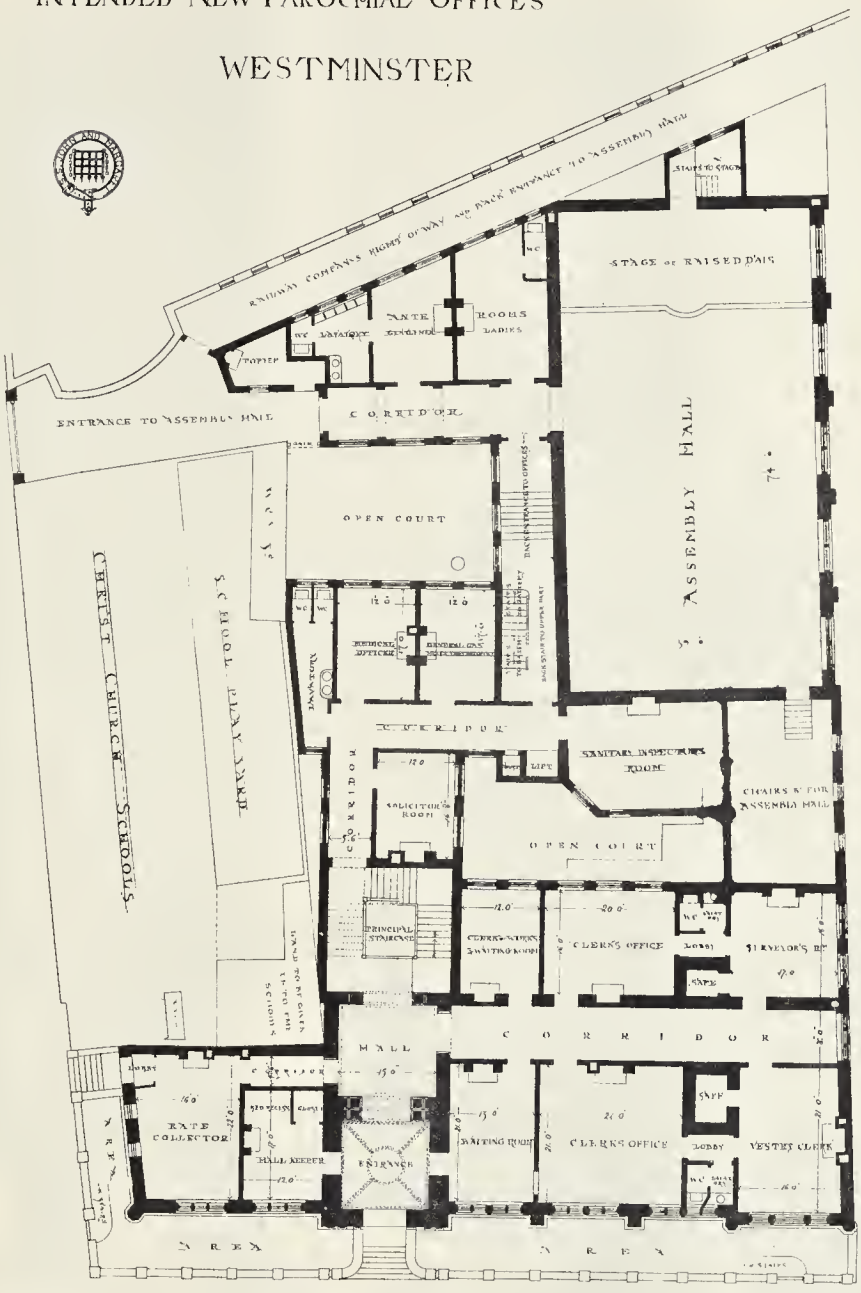

GROUND PLAN

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THE EQUESTRIAN STATUE OF CHARLEMAGNE, PARIS.—The Messrs. Rochet, Sculptors.

AN ARCHITECT'S TOMB IN TORONTO.

THE RAILING FROM ST. PAUL'S.

The tomb of which we give a view has been erected on a portion of High Park, Toronto, by Mr. John G. Howard, of that city, architect, in memory of his wife and in readiness for himself. The cairn is constructed with granite boulders. Mrs. Howard was a Scotch lady, which accounts for the cairn. Mr. Howard himself "is a Masonic Knight Templar,—therefore the double pedestal, terminating with the Maltese cross." The consecrated ground on which it stands is inclosed with some of the old iron railing which surrounded St. Paul's Cathedral, London, England, for 160 years. The cost of erecting the tomb, including vault and iron railing, amounted to $3,120. The granite boulders are all bedded in Portland cement against a brick shaft in the centre, which supports the marble pedestal. This weighs over 10 tons, and came from the Rutland Quarries, Vermont, U.S. Engraved on a brass plate, and fixed round one of the gate-posts of the old iron railing, is the following inscription:—"Sacred to the memory of John George Howard and Jemima Frances, his wife. John George, born 27th July, 1803; Jemima Frances, born 18th August, 1802, died 1st September, 1877. Aged 75 years." On a brass plate fixed round the other iron gate-post:—

"St. Paul's Cathedral for 160 years I did inclose.
Oh! stranger, look with reverence.
Man! man! unstable man!
It was thou who caused the severance.
J. G. H.
Nov. 18th, 1875."

The vicissitudes of the railing are curious. After its removal from St. Paul's it was purchased by Mr. Robert Mountcastle, Waverly-place, St. John's-wood, London, of Mr. J. B. Hogarth, iron merchant, London, and shipped by him in good condition, on board the steamship *Delta*, for Toronto, on the 14th of October, 1874. The *Delta* went on shore about five miles below Cape Chat Light, on the 8th of November. A portion of the railing was recovered from the wreck, and sent to Montreal by the salvage men in the spring of 1875, in a very mutilated state, but was brought from Montreal by Mr. Howard, 17th of August, in that year, and arrived in Toronto on the 21st of the same month. It was repaired by Messrs. William Hamilton & Son, at the St. Lawrence Foundry, Toronto, and finally fixed on the stone curb where it now stands, on the 18th of November, 1875.

Mr. Howard has bebaved munificently to Toronto. High Park, which contains 165 acres, was his property, and had cost him $50,000. Having been largely employed as an architect and civil engineer in Toronto and Canada generally, be considered it his duty to return a portion of the property be had accumulated to the Corporation of Toronto, and the land has been conveyed in trust to the citizens for a public park. One hundred and twenty acres they already occupy, and the other forty-five acres, with all the buildings thereon, they will have after his death, with the exception of the consecrated eighth of an acre, on which is erected the tomb we have illustrated.

DECORATIVE SUGGESTIONS FROM NATURAL FORMS.—No. II.

The aloe and cactus tribe of plants are for the most part rather eccentric than beautiful in outline or style, and not sufficiently decisive in design to furnish much suggestion for ornament; but there are some varieties which are exceptional in this respect. Of these, *aloe plicatilis* is remarkably effective and very regular in design. Its leaves, if they can be so called, grow in a radiating arrangement from the end of the stalk, but the lower leaf only actually and visibly springs from the stalk; the next leaf springs from within the folds of the springing of the lowest leaf, in the opposite direction; the third leaf in the same way develops from the springing of the second leaf, and so on to the top. Thus the bases of all the leaves form a considerable mass in prolongation of the line of the stalk, and regularly folded one within the other in alternate directions, hence the specific name *plicatilis* (*plica*, a fold). The leaves generally lie all in one plane, more so for the most part than in the specimen sketched here, which is a little more irregular; the growth has thus a remarkably artificial and contrived appearance, and requires in some respects less conventionalising than is often the case in translating natural objects into ornament. It is here shown adapted for a wrought-iron railing or grille, in which the folding of the leaves one within another can be carried out almost as in the natural plant, and in a manner perfectly in accordance with the character and the working of wrought iron. It may be added that the turn of the sprays in various directions, falling to one side and the other in the general design, is also almost directly borrowed from the natural plant, in which the collections of leaves grow,—some upright and some drooping in graceful curves to one side or the other, the curves being merely made symmetrical in adapting them to the present design. A more conventional treatment of the plant for wood inlay is suggested, such as might form the border of a wainscot.

The *plicatilis* is a tree aloe, with the stalks growing from a central stem, thus differing from the most typical form of aloe, which is only a mass of thick fleshy leaves all springing from one short stump. This typical form of aloe, as was remarked above, is little suitable for decorative use; but a little specimen of *aloe variegata*, which is here sketched (the plant is only 4 in. or 5 in. high), though keeping the general character of the aloe type, is exquisitely graceful and finished in its lines and construction and its varied arrangement of tints (white and green). In plan the plant is triangular, with slightly hollowed sides, and is almost as regularly constructed as a work of art. It is, however, perhaps for that very reason, difficult to treat ornamentally; an attempt is here made in the form of a marble inlay for a border.

PROPOSED POST AND TELEGRAPH OFFICES, WELLINGTON, NEW ZEALAND.

It always gives us pleasure to comply, so far as we may be able, with requests from our distant colonies that we should make known "at home" what they are doing. In our present number we therefore publish, with some other colonial matters of interest, the design by Mr. Thomas Turnbull, which has been selected in competition, for the Post Office and Telegraph Office proposed to be erected in Wellington, New Zealand, and will, we believe, be carried out. The offices will occupy the whole of the block from Grey-street to Panama-street, the frontage to Custom House-quay being 172 ft., while the Grey and Panama street frontages will be 70 ft. each. The building will be Italian in style, and will be 61 ft. in height, a clock-tower rising from the centre of the front 150 ft. in height. The centre block will be accentuated by eight detached columns standing on pedestals, and surmounted with an entablature and balustrade, the angles being also accented by rusticated quoins and pilasters. The first and second stories will have segmental-headed openings, with pilasters between, those of the third story being circular, and the whole will be surmounted with a handsome entablature, and a parapet with balustrade over it. The pediments at each angle will contain the royal arms, and will be ornamented on the Post-office portion of the building with a statue of Mercury, while Jupiter will occupy a similarly commanding altitude at the Telegraph portion. The public entrance will be in the centre of the Custom House-quay frontage, a flight of steps giving access to an open vestibule, 28 ft. by 12 ft. The Post-office portion of the building will be between this entrance and Grey-street, the remaining, or Panama-street portion, being allotted to the Telegraph department. The postal boxes will be in the vestibule, and to the left will be the public room, 40 ft. long by 19 ft. wide, in which money orders, letters, stamps, &c., may be obtained. The private boxes will be in the rear of the mail-room, the entrance being from Grey-street, and the arrangements on this floor also comprise a strong-room, lavatories, and a letter-carriers' room, the dimensions of the latter being 15 ft. by 23 ft. The upstairs portion of the Post Office will be reached by a staircase from an entrance in Grey-street, and also a stair in the tower. Facing Custom House-quay will be a clerks' room, 39 ft. long, by 19 ft. wide, and another room for the chief clerk, 15 ft. by 19 ft. The secretary will have a room, 24 ft. by 19 ft., and the Postmaster-General and Commissioner of Telegraphs another apartment, 19 ft. by 20 ft. The inspector's room will be also on this flat, and will be 19 ft. square, in addition to which there will be a dead-letter office, 37 ft. by 19 ft., a messengers' room, 23 ft. by 12 ft.; a strong-room, 8 ft. by 12 ft.; and a cloak-room, 15 ft. by 13 ft.

The Telegraph Office will have its public entrance also by the vestibule, the public room being on the right, 31 ft. long by 17 ft. wide. This will be divided by a glass screen from the clerks' office, the latter being 32 ft. long by 10 ft. wide, and lighted in the rear from a paved court or area, 36 ft. long by 19 ft. wide. Upstairs, on the first flat, the whole of the frontage to Custom House-quay, will be an instrument-room, its dimensions being 73 ft. by 28 ft., and the rear portion will contain a storekeeper's room, 50 ft. by 18 ft., and another, 27 ft. by 18 ft. The building will be of brick, cemented, and the estimated cost is 17,000*l.*

PROPOSED WESTMINSTER PAROCHIAL OFFICES.

SECOND PREMIATED DESIGN.

In our present number will be found illustrations of the design by Mr. John E. Trollope, architect, to which the second premium was awarded. As in the case of the design selected for the first premium,* we condense some portions of the architect's own description. It was proposed that the whole of the basement-walls, including the footings, should be constructed in concrete; the external walls above the basement to have an external facing of stone, a lining of brick, and a core of concrete; the principal stair to be of stone, and all the main corridors of concrete, covered with mosaic pavement; the roof to be covered with Broseley tiles.

On the ground-floor the rate-collector has his separate apartment, with entrance from Gardener's-lane, and also internal communication with general offices. The other officers of the Vestry have the accommodation required, each being provided with a separate lavatory.

As to the elevations, the designer says,—"It will be seen that I have kept all the rooms on two floors, and avoided attics. I had two reasons for this; first, I felt that to produce a satisfactory effect, the vestry-hall ought to have an open roof. This at once precluded the idea of having rooms above it; and, secondly, that it appeared to me that any new building so much higher than its surroundings would have a most disastrous effect, and look obtrusive."

The tower is covered with a wooden roof, provided with a bell stage; below, a clock is placed, and again below is the great water-tank.

The cost of carrying out the design for the offices is estimated at 15,000*l.*

At the back of the general offices, with a separate entrance, is placed the assembly-room, provided with a stage or raised dais, gallery, ante-rooms for performers, ante-rooms for visitors, a porter's lodge, and a room for refreshments and the storing of chairs. The assembly-room, it was estimated, would accommodate 500 persons, and could be used for meetings of ratepayers, theatrical representations, concerts, lectures, balls, &c., and could be made self-supporting. The cost of this building could not be included in the sum of 15,000*l.* allowed by the Vestry, and was estimated at 3,800*l.* The assembly-hall, being entirely separate from the vestry-hall and offices, might be built at any future time. The architect has purposely kept the hall as plain in design as possible, retaining flat walls for colour decoration. The ventilation, he considers, would be perfect, and the acoustic properties good.

THE EQUESTRIAN STATUE OF CHARLEMAGNE, PARIS.

Visitors to the Paris Exhibition of 1878 will perhaps remember, among the many features of that great show, the colossal equestrian statue of Charlemagne, of which in our present number we give a view. As a portion of the exhibit of the well-known bronze-caster, Thiebaut, the group attracted, notwithstanding that its position was far from calculated to show to advantage the merits of its design, no small share of attention. At the time when the statue was placed in the Champ de Mars, no site had been decided on, and only recently, after much discussion, has its destination been

* See pp. 449, 453, *ante*.

settled. The remarkable design of the two brothers Rochet.—one of whom, Louis, died, it may fairly be said, in harness,—will at length find a worthy resting-place in the square of the Parvis Notre Dame in Paris,—a spot thrice hallowed by ecclesiastical, secular, and romantic recollections, and additionally interesting as being the original nucleus of this great capital, the island in which the primitive city for many centuries was concentrated. No spot, indeed, could have been chosen which would have been more in accord with the wishes, not alone of the authors of the statue,—both no mean archæologists,—but of the designer of the simple pedestal, the late M. Viollet-le-Duc, whose name is indissolubly connected with Notre Dame.

The brothers Rochet are, as perhaps may be remembered, the authors of the remarkable colossal equestrian statue of William the Conqueror at Falaise, as also of the Don Pedro (another equestrian and colossal statue), which stands in Rio de Janeiro. For France, a peculiar interest is connected with the memory of the Great Charles, whose reign shone so brilliantly in the Dark Ages over his vast empire, and particularly over Gaul, then but recently, to speak comparatively, freed from Roman rule. It was not the intention of the brothers Rochet, in creating this statue, to claim for their country the honour of having given birth to Charlemagne, whose name stands so prominently in the pages of French history. Germany, as is well known, has long set up her claim as the fatherland of Charlemagne, but the Rochets, after patient research, have satisfactorily proved, to Frenchmen at least, that the grandson of Charles Martel was born, not at Salzburg, but on the banks of the Oise, where resided, at the moment of his birth, Pepin and his family.

In the composition of their group the sculptors have, it will be seen by the illustration, most skilfully avoided the difficulty met with so often in equestrian statues, where the principal figure is not in violent action. The days have passed, apparently, when a Colleone, or indeed a Charles I., can be successfully designed by a new Verrocchio, a Donatello, or a Le Sœur, as quietly seated in calm repose; but the brothers Rochet, earnest as they have been in their literary and archæological pursuits, cannot, we suppose, be expected to study with the minute care of a Leonardo da Vinci the pose of an equestrian statue. The difficulty of the single equestrian figure has therefore been overcome by flanking the Emperor with the two famous and almost legendary figures of Roland and Oliver, sung of by Ariosto and the troubadours of old. The paladins leading the horse of Charlemagne, his hands are free for action; the left is firmly planted on the hip, the right grasps proudly the sceptre which the wise and good monarch wielded over the vast empire he had gathered under his rule.

The group is to be erected, as we have already mentioned, in the great square before Notre Dame, which has only recently been opened up by the demolition of the old Hôtel Dieu, to which reference was made not long ago in these columns. Here the statue will, in course of time, stand; but as yet no visible preparations have been made on the spot. The group, which is of bronze, and no less than 25 ft. high, will be placed on a granite pedestal,—designed, as above stated by the late Viollet-le-Duc,—and itself 16 ft. 6 in. high.

For France, a peculiar feature connected with this colossal group consists in its having been purely the work of private initiative, undertaken entirely at the risk and cost of two worthy artists, unassisted by the usual support of a Government subsidy. It is but a fitting recompense to their united labours that they should receive the reward of having their work at length erected in Paris, where their reputation stands high in the esteem of the world of art and of letters.

The Exhibition of Gas Apparatus, Glasgow.—On the 8th inst. Professor A. Vernon Harcourt, of Oxford, delivered, in the Barnhank Drill Hall, the first of a course of special lectures under the auspices of the Philosophical Society of Glasgow, on subjects illustrated by the exhibition of apparatus for the utilisation of gas, electricity, &c. Dr. A. Fergus, the president of the society, occupied the chair. The Professor gave an interesting address on "Domestic Gas-lighting," for which he received a hearty vote of thanks.

RHIND LECTURES IN ARCHÆOLOGY.

The second of the Rhind Lectures in Archæology was delivered last week in the Freemasons' Hall, Edinburgh. Sir Walter Elliot occupied the chair, and there was a large attendance.

Mr. Joseph Anderson, the lecturer, said he meant that day to deal with "Decorative Stonework." The St. Vigeans group first occupied his attention. In the course, he said, of repeated alterations, and latterly of a very extensive re-construction of the fabric of the church, it was found that the twelfth-century builders had utilised a large number of fragments of sculptured monuments as building material. After describing in detail the features of the various remains, the lecturer said he would group the points of interest of one of these remarkable monuments. It bore the cross on the obverse side, symbols and figure-subjects pictorially treated on the reverse. The cross was long-shafted, and the full-length of the stone. It was also peculiarly formed. The long-shafted cross was often called the Latin cross in contra-distinction to the cross with four arms of equal length, which was the common Eastern or Greek cross. But the lines of the Latin cross always made angles at the intersections of the arms. The cross he spoke of was not of the usual form of the Latin cross. It had semicircular hollows at the intersections of the arms with the shaft and summit. This was a peculiarity specially Celtic. The stone also bore an inscription in the Celtic language, written in the alphabet used in the Celtic manuscripts. It presented pictorial representations, which included the human figure, and a variety of animal forms, some of which were true to nature, while others were only imaginary. It presented pictorial representations of objects such as the mirror and the comb, which were true to the reality; and also of objects such as the double disc or crescent, which were found frequently recurring with a remarkable persistency of form on other monuments, although it was utterly impossible to give them names or tell their significance. Apart from the ornamental work on this monument, there are two distinct phases of art—a pictorial, which followed nature and reality, and a conventional, which followed arbitrary and unknown rules. After considering briefly what mode should be followed in the inductions from these rules, the lecturer said that from these features and these considerations to which they gave rise it was evident that, in contemplating the monument as a whole, we stood in the presence of a work of art which did not link itself on with any custom or usage existing in the locality at the present time. The Celtic language still survived in a small proportion of the place-names of the parish, but not one in a hundred of those to whom these names were familiar had any suspicion of their Celtic origin, and this inscription was now the only surviving witness of the fact that the Celtic alphabet as well as the Celtic speech was once known in the lowlands of Angus. The characteristic ornamentation of the monument was unfamiliar to modern eyes, and perplexing to modern ideas. Its symbolism was even less familiar than cuneiform inscriptions and Egyptian hieroglyphs. The stone remained, but the ideas which its art embodied have passed away with the culture which produced them. It had outlived that culture so long that the language it was intended to speak was now unintelligible. Yet that it once spoke eloquently to all eyes, who could doubt? Men did not make monuments without a meaning, unless when their poverty of invention obliged them to have recourse to obsolete forms, and to appropriate the symbols of a dead faith. In St. Vigeans they had a very remarkable group of monuments, remarkable alike as regarded their number and their character, for thirty such monuments was a very large number as compared with all the others existing. If they pictured this group of thirty such monuments clustered round the pre-Norman church on its isolated mound, if they considered the quality of the art, the interest of the one fragmentary inscription that remained, and the mystery of the symbolical representations that occur among them, they could not but regret that a group of memorials so singularly interesting, impressive, and instructive, should thus have suffered irretrievable destruction. They could judge of what had been lost by what remained of these mutilated products of a national school of sculpture, to which the special culture of the present day did not disdain to turn for instruction and for inspiration. He could only draw their attention to the fact that these memorials were neither poor in design nor feeble in execution,—that they were, on the contrary, the productions of able minds and practised hands. Mr. Anderson then went on to speak of the form and characteristics of the Aberlemno group, and their relation to that of St. Vigeans, passing on to describe the Meigle group, and the general features common to the three groups. Special attention was directed to the intense Celticism of their decoration. The transition from the purity of Celtic art to twelfth-century types was then sketched, followed by a consideration of the special features of the pure Celtic type, the area of the type (which is extremely limited), the ruder type which became associated with it, leading on to the period of incised symbol stones. The relative sequence of the two types, and their association with a third, brought the lecturer to deal with the two varieties,—earlier and later,—of free-standing crosses. Speaking of one of the specimens at Iona, Mr. Anderson said it presented no figure-subjects, but was decorated in the purest style of Celtic art with such inimitable beauty, intricacy, and harmony of design, that he was safe in saying of it that no finer specimen of art-workmanship in stone exists in Scotland. Somewhat similar in style, and not inferior in workmanship, was the beautiful cross at Kildalton in Islay. The special feature of its ornamentation was the intense Celticism of its art. No other specimen exhibited this in such a striking manner. Its two panels were filled with divergent spirals and trumpet patterns, and mingled with circles enclosing groups of spirals, and wherever they might be found, and in whatever material they might be executed, would be certainly recognised as products of Celtic art. Nothing like them could be instanced among the art products of any other people or any other time. It might appear to some that he made such remarks as these with what might be regarded as needless iteration. But he did so because he wished to set clearly in the broad light of the present culture the important fact that many of these little-regarded relics of the earlier culture of our country were worthy of attention, for this reason, if for no other, that when they were gone there would be no more like them in the world,—the species would be extinct. It did not seem as if they yet realised the fact that as a nation we were the sole possessors of a series of art products unique in their character, and possessed of such merit as works of arts that the great world of culture would not willingly see them perish.

ELECTION OF TWO DISTRICT SURVEYORS.

At the meeting of the Metropolitan Board of Works on the 8th inst., the first business was to receive the following report from the Superintending Architect on a letter from Mr. R. L. Sibley, District Surveyor for Clerkenwell, requesting the Board to determine the amount to be paid to him, as *interim* surveyor of the late district of West Islington, by the incoming surveyors of the two districts into which the greater part of the district has been divided by the Board:—

"Mr. Sibley, in offering his thanks and acknowledgments to the Board for the recent addition made to his district,* also requests that the Board will determine the amount to be paid to him for his services as *interim* surveyor of West Islington. Mr. Sibley has been acting as *interim* surveyor for a period of ten weeks, and as comparatively few building works have been commenced and completed during that period, he will obtain no adequate return for his services unless the Board order the surveyors who may be elected to pay such a sum to him as the Board may consider equitable.

The fees received in the district during the year 1879 amounted to 1,084*l*. Assuming that the portion of the late district of West Islington, to which Mr. Sibley has been appointed, will produce 8*l*. per annum, and that the remaining portion is of the value of 1,000*l*. per annum, the proportionate value of the latter for a period of ten weeks would be 192*l*. Should the Board see fit to accede to Mr. Sibley's request, I think that the surveyor to be elected for the North-west Islington District might fairly be asked to pay Mr. Sibley 10*l*., and the surveyor for the South-west District 90*l*., in consideration of Mr. Sibley surrendering to them all fees to which he may have become entitled for work within the respective districts."

(Signed) George Vulliamy.

After some discussion, the Board resolved to accede to Mr. Sibley's request, and to adopt the recommendations contained in the Superintending Architect's report.

The Board then proceeded to the election for the two vacant surveyorships, taking that for

* See *Builder*, p. 246, *ante*.

North-west Islington first. There were thirty-three candidates for each appointment. The usual practice was followed of first voting for all the candidates in alphabetical order, and then selecting the six candidates who obtained the highest number of votes from whom to make the ultimate selection. For convenience sake, we give side by side the names of the candidates, together with the number of votes received by them in the preliminary voting for each appointment, viz.:—

	North-West Islington.	South-West Islington.
Ashbridge, A.	19	12
Bridgman, H. H.	22	18
Brooks, C. W.	15	10
Burton, W. J.	1	2
Carritt, E.	18	22
Conder, A.	14	14
Dale, D. R.	20	22
Edmeston, J. S.	8	11
Elkington, G., jun.	12	13
Ferguson, J. M.	9	6
Grellier, W.	3	2
Hammond, F.	29	0*
Hanbury, C.	0	0
Hewitt, E. R.	12	13
Hunter, P.	13	14
James, J. W.	13	10
Karslake, L.	8	7
Large, W. A.	20	19
Lees, W. H.	10	13
McDonell, G.	24	22
McLachlan, H.	12	13
Mundy, T. E.	7	5
Notley, F. C.	12	10
Pownall, R. E.	4	1
Quilter, J. S.	11	14
Seymgour, W. H.	15	12
Smallpeice, W.	7	6
Stenning, A. R.	21	17
Stone, T.	3	5
Street, E.	22	18
Taylor, A. T.	4	6
Todd, F.	17	15
Waine, W.	1	2

North-West Islington.

The five candidates who received the highest number of votes for North-West Islington were therefore Messrs. Bridgman, Hammond, McDonell, Stenning, and Street. There being a tie between Messrs. Dale and Large, a vote was taken as to which gentleman should be included in the six for subsequent voting, with the result that Mr. Dale received 19 votes and Mr. Large 12. Mr. Large was therefore out of this contest. The subsequent voting was as follows:—

	Second Vote.	Third Vote.	Fourth Vote.	Fifth Vote.	Sixth Vote.
Bridgman	9	—	—	—	—
Dale	16	16	16	16	—
Hammond	28	29	24	29	22
McDonell	24	20	20	23	12
Stenning	18	17	16	—	—
Street	19	12	—	—	—

Mr. Hammond was therefore declared to be the successful candidate.

South-West Islington.

The six candidates who received the highest number of votes in the preliminary voting for the South-West Islington surveyorship were Messrs. Bridgman, Carritt, Dale, Large, McDonell, and Street. The subsequent voting was as follows:—

	Second Vote.	Third Vote.	Fourth Vote.	Fifth Vote.	Sixth Vote.
Bridgman	10	—	—	—	—
Carritt	18	11	—	—	—
Dale	20	19	23	17†	14
Large	17	14	14	17†	—
McDonell	21	21	23	21	20
Street	15	17	13	—	—

The result, therefore, was that Mr. McDonell was the successful candidate.

Both the successful candidates thanked the Board for their election, and promised to fulfil the duties of their offices subject to the usual conditions imposed by the Board. They also agreed to conform to the Board's order as to the payments to be made by Mr. Sibley, the *interim* surveyor.

ROAD FORMATION AND STREET PAVEMENTS.

Sir,—I have read "Civil Engineer's" letter on the above subject with great interest and pleasure. Taking a great interest in macadamised roads, I agree with him it is of the utmost importance that the granite should be of the hardest description, especially in this time of steam rollers.

Could not "Civil Engineer," or other of your numerous readers, give some particulars as to the crushing strength of the principal granites now in use, for I am sure this information would be of great service to many of the readers of the *Builder*.

One Interested.

* Previously elected for North-West Islington.

† There being a tie here, the Board voted as to which name should be retained; Dale 20, Large 15. Mr. Large was therefore out of it.

THE SUNDAY SOCIETY IN EDINBURGH.

A largely and influentially attended conference under the auspices of the Sunday Society was held on Monday afternoon at the Royal Hotel, in Edinburgh, convened to consider the desirability of extending the Society's organisation in Scotland, particularly as regards Edinburgh.

The Rev. John Glasse, of Old Greyfriars (Church of Scotland), presided, and, in the course of an able defence of the objects of the Society, he ridiculed the idea that the friends of the Society were endeavouring to secularise the Sunday,—a fear engendered by ignorance and prejudice. The Sunday Society simply asked these people, since they could not interest the "lapsed masses," to allow the Society to try to do so by elevating their tastes and engaging their attention in loftier pursuits than those usually indulged in.

Dr. Andrew Wilson, Edinburgh, in a well-considered speech, which was much applauded, proposed the first resolution, approving the objects of the Sunday Society. This was seconded by the Rev. Alexander Webster (Church of Scotland). He said the question of opening museums and galleries on Sunday had made great progress in Scotland. Those who took part in it were now no longer talked of as irreligious. It was simply said that the change was not expedient.

Major-General Forlong seconded this resolution, and it was supported by Mr. Mark H. Judge (London), and carried. Petitions to Parliament were settled, and after several other speakers had addressed the Conference, it was agreed to establish a branch of the Sunday Society in Edinburgh. The meeting was very enthusiastic, and was one of the best of its kind ever held north of the Tweed.

COMPETITIONS.

Liverpool Conservative Club.—The Committee of the Liverpool Conservative Club some time ago offered three premiums for the best designs for a new Conservative Club to be erected on the site in Dale-street. The competition was limited to Liverpool Conservative architects, and twenty-seven competed, sending in twenty-nine designs, comprising 300 drawings. These have been hung in two large rooms in the Stock Exchange Buildings, and inspected by Mr. Waterhouse, who has awarded the premiums as follow:—First premium (100*l*.), Messrs. F. & G. Holme; second premium (50*l*), Mr. C. O. Ellison; third premium (25*l*.), Mr. George Bradbury. The committee of the club have endorsed these awards. A feature of the competition was that the motto system was discarded, each design bearing the name of its author. The site of the proposed building has an area of 1,100 square yards. The cost of carrying out the plans to which the first premium has been awarded is estimated by their authors to be 28,000*l*. They represent a building whose cubic contents are 710,000 ft. The front elevation (according to the *Liverpool Daily Post*) exhibits a rather striking façade to the main thoroughfare, with the chief entrance near Cumberland-street. The club will contain four stories, and the whole of the building is to be devoted to club purposes, with the exception of the basement, in which the offices of the Constitutional Association will be placed. The design is Classic in style. The plans of Mr. Ellison represent a building having cubic contents of 645,000 ft., the estimated cost being 26,855*l*. Mr. Bradbury's plans are estimated to cost 31,000*l*., representing a building having cubical contents of over 776,500 ft.

The Rowland Hill Memorial.—On the 8th inst. a meeting of the Committee of the Rowland Hill Memorial Fund was held at the Mansion House, the Lord Mayor presiding. There were present Mr. Alderman Nottage, Mr. Alderman Staples, Sir Francis Lycett, Sir John Bennett, Mr. S. Hope Morley, Mr. Charles Barry, Mr. Deputy M'George, Mr. Rokeby Price, Mr. James Whitehead, and others. The fund, including interest, amounted to 17,065*l*., most of which was invested. The sub-committee, with reference to the erection of a statue of Sir Rowland Hill in the City, and the provision of a bust of Sir Rowland in Westminster Abbey, recommended that they should be empowered to spend a sum of about 2,000*l*. on those objects. The City Commissioners of Sewers had granted a site for the statue at the south-east corner of the Royal Exchange, facing Cornhill, and the sub-committee recommended that from the twelve sculptors whom they had selected one should be chosen by competition under conditions which they detailed. The report was received. The sculptors who were stated to have consented to compete were Mr. Birch, A.R.A., Mr. Eli Johnson, Mr. J. Bell, Mr. E. R. Mullins, Mr. J. H. Thomas, Mr. Charles Bacon Mr. Adams-Acton, Mr. Keyworth, Mr. Williamson, Mr. E. O. Ford, Mr. Bruce-Joy, and Mr. Forsyth. Mr. Bell, however, writes contradicting the statement that he had consented to compete, and enclosing a copy of the letter which he sent in reply to the invitation to do so. In that reply he wrote,—"Although not unready, under certain circumstances, to contribute to a competition for a subject of two or three figures, presenting the opportunity for variety of design, I do not take part in unpaid competitions for a portrait statue by itself, not being able to afford to give thought and time for only the chance of employment." In reply to Mr. Bell's disclaimer, the secretary of the committee writes to say that Mr. Bell's letter "was only taken as declining to enter into an 'unpaid' competition. As the committee have decided to remunerate competitors for their designs and models, it was thought fair to Mr. Bell to give him an opportunity to compete under this very different aspect of the case. Of course the committee are quite indifferent as to whether the competition is to be without or with Mr. Bell." This epistle is not only impertinent, but, unless each of the competitors is to be remunerated for the design he sends in, somewhat disingenuous. If the writer has authority for the statement that the committee are "quite indifferent" as to the sculptors who compete, it is to be hoped that the subscribers to the memorial will not tolerate such indifference, likely as it would be to eventuate in a very indifferent statue to a man who has rendered the world a great service. [Mr. Bruce-Joy also writes to say that he did not accept the invitation to compete.]

St. Matthew's Church and Vicarage, Bayswater.—In a limited competition for rebuilding St. Matthew's Church and Vicarage, Bayswater, the committee unanimously selected the design submitted under the motto "Columns avoided," the author being Mr. John Johnson, of Queen Victoria-street, City. It is proposed to proceed with the church as soon as possible, the estimated cost of which, with tower and spire, is 16,000*l*., and the vicarage 3,000*l*. Messrs. Dove Brothers, builders, of Islington, will carry out the works under the superintendence of the architect.

MONUMENTAL.

Major Whyte Melville.—A memorial of the late Major Whyte Melville, the gifted novelist, whose untimely death a year or two ago was so widely lamented, has just been completed at St. Andrew's, N.B. It takes the form of a drinking-fountain, on which the sum of 700*l*. or 800*l*. has been expended. Occupying a well-chosen site in the long and wide thoroughfare of Market-street, it will form one of the most conspicuous objects in the town, being of sufficient height to engage attention from a distance. The stone used in the structure is (according to the *Scotsman*) principally Dumfries red sandstone, the columns and copings being of polished Dalbeattie granite. The lower basin of the fountain, which, like the two higher ones, is of red sandstone, but has a granite coping, and is approached by a step of the same material, measures 14 ft. in diameter, and rises 3 ft. 4 in. above the ground. From the centre of this basin there rises a cluster of five granite columns, surmounted by carved capitals of sandstone, which, in turn, support the second basin. On this basin, which is quatrefoil in plan, a great deal of work has been bestowed, the stone being elaborately carved in designs representing water-plants. On each face of the quatrefoil there is placed a medallion in white marble,—one showing a bust in bas-relief of the late Major Whyte Melville, by Mr. J. E. Boehm, A.R.A., the second and third bearing respectively the family arms and the shield of the Coldstream Guards, in which the deceased was an officer, and the fourth being occupied with an inscription. The third stage of the fountain is a reproduction of the second on a smaller scale, the arrangement of a basin supported by granite columns being repeated,

with the variation that the columns in this case are octagonal. Above this there rises a moulded finial of red sandstone, carrying the fountain to the height of about 14 ft. from the ground. Water will be discharged from gurgoyles, four of which are disposed round the second and four round the third basin, as well as from five jets, four of which are on the second stage, while the fifth is concealed within the finial. The design for this monument, and those for the tomb-stone at Tethury and for a mosaic tablet in the Guards' Chapel at Wellington Barracks, were prepared by Mr. Edis, F.S.A., London; the carving was executed by Mr. Earp, of London; and the work of erecting the St. Andrew's fountain was entrusted to Mr. G. Wallis, London.

Mr. Charles Larkin.—The memorial erected by public subscription to the memory of Mr. Charles Larkin (an orator of more than local renown) in Elswick Cemetery, Newcastle-on-Tyne, was unveiled on the 30th ult. by Mr. Joseph Cowen, M.P. The memorial is Classic in style. It consists of a broad base arranged in step form, upon which is placed a square pedestal, panelled on all four sides, and finished with carved ogee pediments and a dentil course. Above this is the bust of the late orator, surmounted by a pedimented canopy carried on four groups of clustered columns with Ionic caps. The canopy is domed internally, and externally finished with a richly-carved and moulded monumental urn. The whole has been executed in Denwick stone, by Mr. G. Burn. Messrs. Oliver & Leeson were the architects.

Archdeacon Thorp.—A memorial of the late Archdeacon Thorp has just been placed in Kemerton Church. When the chancel was rebuilt by Cambridge friends of the archdeacon, about thirty-five years ago, an arched recess was constructed in the north wall of the sacrarium, destined to receive a monument to his memory as the re-builder of the church. The back of this recess has been filled with diaper work, copied from an example in Canterbury Cathedral. On the floor of the recess, and raised a few inches above it, is the recumbent figure of the late archdeacon, vested in surplice, stole, and hood, and bearing between his hands a chalice resting on his breast. On either side of the head are shields bearing the family arms, and the same impaled with the arms of the Archdeaconry of Bristol. In a slab of Red Emperor marble, of a soft dove colour, the figure is incised in bold lines. These are filled in with black mastic, the larger spaces, such as the stole and shoes, being of black marble. Round the figure is a diaper in yellow Sienna and black marble, while the head reposes on a diapered cushion. The whole surface, which is perfectly flat, bears a high polish. The monument has been erected under the direction of Mr. R. Herbert Carpenter, architect, son of the architect who restored the church. Messrs. Clayton & Bell designed the incised slab, and the whole work has been carried out by Mr. George Hill, of Chelsea.

Mr. James Cassie, R.S.A.—The monument to the late Mr. James Cassie, R.S.A., erected by private subscription over his grave in the Dean Cemetery, Edinburgh, was placed in position on the 5th inst. Designed by Mr. George Reid, R.S.A., and executed in red granite by Mr. Alexander Macdonald (of Macdonald, Field, & Co., Aberdeen), the memorial resembles in form one of the picturesque crosses so frequently met with in the West Highlands, and rises to a height of 11 ft. from the ground. The cross, however, in itself only measures 8 ft., as it rests upon a base about 3 ft. high. The span of the arms of the cross measures 3 ft. 9 in., and the diameter of the wheel connecting these with the upright is 2 ft. 3 in. A bold boss marks the centre of the intersection. A small panel just above the base is reserved for the inscription recording the name, together with the dates of birth and death, of the deceased painter.

Lieut. Hearsey.—On the 2nd inst., the memorial erected by his old schoolfellows at Ockbrook School to the late Lieut. C. J. R. Hearsey, of the 9th Lancers, who fell in the charge against the Afghans in the Chardeh Valley, on December 11th, 1879, was unveiled. It is situated in the entrance to the school-house, and consists of a mural tablet of Caen stone, with statuary marble slab, and Sienna marble columns, the Gothic moulding being ornamented with ivy leaves and berries. The memorial was executed by Messrs. H. & T. Green, masons, Nottingham, from the design of Mr. John S. Henson, architect, Nottingham.

THE DUKE OF CONNAUGHT'S CONSERVATORY AT BAGSHOT.

THE DUKE OF CONNAUGHT'S CONSERVATORY AT BAGSHOT.

The conservatory of his Royal Highness the Duke of Connaught forms an agreeable contrast to the usual run of conservatories, in so far it is not the conventional square usually considered indispensable in conservatory buildings. It is built on to an angle of the wall, and thereby enables an entrance to be obtained from the boudoir at one end facing the garden entrance. At the far end, on entering from the boudoir, a pleasing surprise is obtained as the visitor advances, the angle of the house doubling the width, and producing an effect scarcely expected from the narrow approach as viewed from the boudoir. In the centre of this wall is the dining-room; to the right and left of this, taking advantage of the angle in the wall at the left side, a piece of rockwork has been built with waterfalls, streams, and fish-ponds,—at all times agreeable features in conservatory decoration. The view from the dining-room is charming, disclosing one of the most extensive scenes across the park. To preserve this the decoration has of necessity been kept low; a fountain in the centre is the chief object of attraction seen from the dining-room, and it is only on entering from this door that the main features of the decoration are disclosed. Considering the short space of time allowed, the gardener (Mr. Barden) is to be congratulated on the effective appearance of his plants. The dwarf brickwork is charmingly covered with growing ferns, lycopods, mosses, &c., by a very simple and effective arrangement in tufa, the material of which the whole of the rockwork is constructed, and which enables the walls to become a mass of living foliage, forming a lively and permanent background, and giving effect to the show-plants from time to time arranged in the borders in front. The rockwork and internal decoration have been carried out by Messrs. Dick Radclyffe & Co., of High Holborn, who make such work a special feature, seeking to imitate nature in the display of floral treasures. The illustration is taken from the angle of the wall entering from the boudoir-door.

The conservatory illustrated is designed to accord with the dwelling-house (of which we have given a view).

The materials used in the construction were oak and yellow deal, and especial attention was paid to making provisions for the internal condensation, an item of recognised importance. This was effected by providing water-grooves to each sash-bar, connected with the main gutter, with successful results. In the coldest nights hitherto there have been no signs of drip.

The arrangements for ventilation consist of French casements to the sills, and lifting sashes in the roof, arranged to open simultaneously by an arrangement worked from below.

The floor is laid with Minton's tiles of special design, with ornamental fountain in the centre.

The house being much exposed to the sun's rays, it has been found necessary to protect every part by means of spring-roller outside blinds, arranged to be raised and lowered from the inside. The warming is effected by means of hot-water pipes connected with the boiler serving the dwelling-house. These pipes are placed under the floor and covered with gratings, with valves for regulating the heat.

Hot and cold water is laid on to the conservatory. The decorations are of a quiet description, so as to show the plants to the best advantage, in accordance with instructions from the duke.

The contractors for this work were Messrs. Rosser & Russell, of Charing-cross, who have also fitted up the hot and cold water supply, cooking apparatus, &c., throughout the dwelling-house.

The water supplied to the house is brought from a reservoir three miles distant, and is pumped into three large tanks provided in the tower. The motive-power is obtained from a small stream running through the grounds. The overflow from these tanks is utilised to work a water-engine placed in the basement to pump up the rain-water from an underground reservoir to a fourth tank in the tower. This is automatic in action and requires no supervision.

The architect of the mansion was Mr. Ferrey, under whose superintendence the works have been carried out.

TRURO.

Service was held for the last time in St. Mary's Church, Truro, on Sunday, and the next day the building was handed over to Mr. Jas. Bubb, the clerk of works, for demolition. All will be pulled down save the south chancel aisle, and the eastern end of the southern arcade, which, from the interesting and ornate character of its architecture, is to be incorporated bodily into Mr. Pearson's design for the new cathedral. The spire and part of the tower had already been taken down. They were of grey granite, built some 120 years ago. The mortar in which the stones were bedded was of the poorest quality, being simply earth; and the granite itself was much disintegrated by atmospheric influences. The foundation of the tower, instead of being planted upon the solid rock, was placed a few feet underground, upon a mixture of clay and stones, which appeared at

one time to have been the old bed of the neighbouring river. There are many interesting old monuments in the church; these, together with the bells, the bulb-shaped inlaid pulpit, of Dutch-like type, and all else of historical or architectural value, are to be carefully preserved on the spot, until required again. The church was reseated with open oak benches a few years ago, and these are to be at once removed into the temporary wooden church that has been erected on the north-east end of where the cathedral is to stand. This place, designed by Mr. Henderson, C.E., has been built at a cost of 430*l.* by Mr. Trethowan, and will be used until the choir is built.

TESTIMONIAL TO PROFESSOR DONALDSON.

At a quarterly court of the Scottish Corporation, held in their new hall, Crane-court, Fleet-street, on the 6th inst., Mr. Webster proposed that the best thanks of the Corporation were due, and were thereby tendered, to Professor Donaldson for the excellent manner in which as architect he supervised the erection of the new hall, and the splendid accommodation he had provided for the discharge of the functions of the institution. Mr. Gooden seconded, and suggested that the vote should be inscribed on vellum; and it was eventually left to the secretary to present the testimonial in a suitable manner. In acknowledgment of the resolution, Professor Donaldson remarked that it was above half a century since he had become a member of the court, and his father had been connected with it before him. The interests of the Corporation had always been very near his heart, and he was proud of having been allowed to undertake the erection of the new hall.

GLASGOW ARCHITECTURAL ASSOCIATION.

At the usual monthly meeting of the above association, held on the 5th inst., the secretary, Mr. Russell, read a letter from Mr. Honeyman, honorary president, announcing that he had succeeded in getting the names of six gentlemen for the series of lectures on practical subjects to be commenced this winter. The following is a list of the subjects, with dates of lectures and names of lecturers:—

Nov. 16th, 1880.—Mr. Jas. Thomson,—"Foundations."
Dec. 21st.—Mr. John Honeyman,—"The Building of Walls."
Jan. 18th, 1881.—Mr. Jas. Salmon,—"Drainage and Ventilation."
Feb. 15th.—Mr. John Baird,—"Roofs."
March 15th.—Mr. John Burnet,—"Floors and Partitions."
April 19th.—Mr. David Thomson,—"Interior Arrangements."

All the lecturers are Fellows of the Royal Institute of British Architects.

GREAT DESTRUCTION OF BRICKS.

Correspondents in a position to know, write:—The unparalleled floods of the last ten days have destroyed one-eighth of the season's make of bricks, and at a time when it is utterly impossible to make up for the loss. The total make would probably have been about 900,000,000 if the weather had continued favourable. After a careful comparison with the makers generally, it is computed that the loss is greater than the excess of manufacture over that of last year. Unless the low state of the market should alter, many of the smaller manufacturers will have to cease making after such a disaster.

In the districts of Rochester, Rainham, and Sittinghourne, some of the low-lying fields have been absolutely under water, and the drainage so choked as to be utterly unable to carry off the flood-water. In consequence of this, many millions of bricks in the backs have been washed down, and a large portion washed away irretrievably. The deluge came so unexpectedly that in most instances the makers were totally unprepared for it. In some cases we hear that the actual loss of bricks has been quite one-third of the quantity in backs.

The Proposed Opera-House on the Embankment.—It is stated that the project for the erection of the new Opera-house upon the Victoria Embankment has been finally abandoned.

A BLACK SPOT IN DARLINGTON.

Within the last ten years the Corporation has erected a large Fever Hospital, purchased land and formed a sewage-farm, and bought a site for new corporation offices. During the last five years, from private subscriptions and bequests, have been erected an educational training college for women, and a new grammar-school. 10,000*l.* have just been bequeathed by the late Mr. Edward Pease for a free library, and at this moment, after only a few days' notice, and in spite of the bad times, local subscriptions are pouring in for the purpose of purchasing a second-hand Baptist chapel to form a new parish church. While all this has been done, indeed for ten years before it, there has existed, and still exists, a cottage hospital, which is little better than a plague-spot,—badly designed, badly planned, and badly ventilated, and standing cheek-by-jowl with a tallow-factory! One medical officer after another has been disheartened in his labours in such a hole, and has not hesitated to speak his mind to the powers that be. The poor ironworkers and others continue to subscribe to it, the "kind ladies and gentlemen," some of them enjoying the best social positions in the town and neighbourhood, attend the committee meetings, and visit the patients; but by them not a hand is lifted, or a voice raised, to alter this miserable state of things in this "good old Quaker town of Darlington." A. B.

CASES UNDER METROPOLITAN BUILDING ACT.

PENALTY FOR NOT GIVING NOTICE.

At the Marylebone Police Court, John Allen, 24, Kilburn Park-road, was summoned by Mr. Alexander Peebles, district surveyor, for neglecting to give notice of certain building works, and executing them before giving such notice.

Mr. Peebles said that on the 30th of September in Abbey-road Chapel, St. John's Wood, he found the defendant, a builder, carrying out some alterations. An apse or alcove was being formed, and the wall of the gallery had been considerably reduced in thickness. No notice of the work had been given.

Mr. Sampson, for the defendant, said a new organ was being put in, and they were going to add externally the strength they had taken away internally. The defendant had been away, and left it to his people to give the proper notices.

Mr. De Rutzen said it was absolutely necessary that these preliminaries should be complied with. The defendant would be fined 3*l.* and 12*s.* 6*d.* costs.

WESTMINSTER VESTRY-HALL COMPETITION.

Sir,—In your exceedingly just article on this subject, with almost every word of which I agree, you say, "In all games it is considered very bad form to question the decision of the umpire." In such cases, however, the umpire has been known beforehand and accepted by the players, but not so in this.

You note that "the instructions have no reservation with regard to the public hall"; and you ask, "Has there been any subsequent understanding on this point? and, if so, did all the competitors know of it?" To this, as regards the competitors, I answer, No!

You continue, "If not, it appears to us that 'Unitas' [myself] may have a technical ground of complaint."

Such being the case, I have raised the same question as you have, but a majority of the Vestry have voted that my letter upon it *be not read*.

Now, I am painfully aware that the question, as to which you say some explanation is desirable, is an unfortunate one to be raised at this time, when it is being urged that all competitions should be settled by professional referees.

Mr. Barry, however (not I), is responsible for this misfortune. If professional men are to be judges they cannot be irresponsible ones. To whom, then, are they to be responsable? At least to the profession, in cases such as this. I look, therefore, to my professional brethren and to the professional press for support in my effort to prosecute this inquiry. John P. Seddon.

SIGNBOARDS.

Sir,—There has been going the round of the papers recently the history of hotel and public-house signboards. Will you allow me to point out one of a peculiar nature? In Sobam, Lincolnshire, there is, or was, an inn called the Steam Fire Engine, with a lively oil-painting of that valuable invention. The house was kept by one George Hills, for many years head carman in the firm of Messrs. Merryweather & Sons. The painting was executed by the heraldic painter of the firm, and was presented by his fellow *employés* on his entering into a new sphere of business. M.

VARNISHING OLD FLOORS.

Sir,—I shall be glad to hear from any of your many readers a useful way to varnish or wax floors of a large public hospital. The floors have for fifty years been scrubbed, and this seems to make the varnishing more difficult. G. H. S.

Institute of Art.—The Winter Exhibition of this Society, 9, Conduit-street, W., will open on Monday, Nov. 1.

Miscellanea.

Colonel Beaumont's Hot-air Engine, on which we commented at length some time ago (*Builder*, p. 36, *ante*), was, on the 6th inst., tried on a more extended scale, with such success as to afford hope that before long humanity and economy may be promoted by the abolition of tramway horses, and that the sufferings of travellers by the underground railways may be mitigated by the substitution of atmospherical power for sulphurous locomotives propelled by steam. The engine, which has been designed by Major Beaumont, Royal Engineers, has been for some time running on the short lines of the Royal Arsenal, Woolwich, and although weighing but 10 tons, it has proved capable of hauling a burden of 16 tons up a fair incline. On the 6th inst. arrangements were made to try its powers in a more extended run, such as engines of the kind would have to encounter on London tramways and rails. The air reservoir, which contains only 100 cubic feet of air, was charged at the torpedo pumping-house in the Royal Arsenal, Woolwich, up to a pressure of 1,000 lb. to the square inch, and with this store of energy it was proposed to run to and from Dartford, about 16 miles. Major Beaumont explained the methods which he had adopted in his invention, the chief feature of which was the introduction of an almost imperceptible supply of steam, by which the air, as it is admitted to the cylinder from the reservoir, is largely heated, and, as a matter of course, greatly increased in force. The engine is driven by six cylinders and a double set of machinery at one end, and, having no smoke-stack, resembles in appearance a locomotive tender rather than a locomotive. It runs on four wheels, and in size is less than an ordinary omnibus. It left the Royal Arsenal Station at 12·22 p.m. with a full charge of 1,000 lb. to the inch, passed Abbey Wood Station at 12·27 p.m. with 940 lb. on the gauge; Belvedere, at 12·33, with 860 lb.; and Erith, at 12·36, with 760 lb., arriving at Dartford at 12·50 with a remaining energy of 540 lb. on the square inch. Shunting at the station reduced this pressure somewhat, and at 1·35 the return journey commenced with a store of 510 lb. Although the minimum for effective working is considered to be a pressure of 200 lb., Plumstead Station was reached again at 2·10, but the engine was nearly pumped out, having a pressure of barely 80 lb. remaining. It was stated that another engine is under construction, much more powerful, capable, in fact, of travelling double the distance with a single charge. The operation of pumping the compressed air occupies about fifteen minutes, and it is calculated that an air-engine on this principle, as large as the usual steam locomotive of 50 tons weight, would be considerably more powerful than any locomotive yet made.

River Pollution.—At the Berkshire Petty Sessions, on the 25th ult., the Corporation of Windsor, as the Urban Sanitary Authority, were charged by the Thames Conservancy with polluting the river by causing offensive matter to flow into the stream near the sewage works of Old Windsor, on June 14th. The magistrates fined the Corporation 5*l.*, with 5*l.* 5*s.* towards the costs.——At the Blackburn County Court, on the 11th inst., Mr. W. A. Hulton, the judge, gave his decision in a case brought before him under the Rivers Pollution Act, 1876. The plaintiffs were the Mayor, &c., of Over Darwen, and the defendants were Messrs. Shorrock, iron-founders. It was admitted that the defendants had caused certain rubbish and cinders to be put into the river, so as to interfere with its due flow, but these practices, it was urged, had been openly and as a right carried on for more than twenty years. The Judge, however, decided that the defendants had committed an offence against the Act, and issued an order that they should abstain from further commission of the offence.——The Severn Fisheries Conservators threaten to take proceedings against the Corporation of Worcester, and other public bodies, as well as private persons, on account of the discharge of sewage matter into the Severn.

Burns's Cottage.—"The Auld Clay Biggin" in which Robert Burns was born, hitherto occupied as a public-house, is about to be transferred to the trustees of the Ayr Burns Monument and converted into a sort of Burns Museum. There is a considerable area of ground attached, and this is to be attractively laid out. The price of the whole was 4,000*l.*

The Fall of a Church Floor in Manchester.—Another death (that of a man named James Kilty, aged 67) has resulted from this catastrophe, mentioned in our last. A verdict of "Accidental Death" was returned by the coroner's jury on Monday last. At the inquest held on the body of the first victim, the Rev. Bartholomew Flynn deposed that two weeks before the accident occurred he had noticed that one of the iron columns supporting the floor had moved. The schoolmaster called his attention to it. The pillar was about an inch out of the perpendicular. Mr. Walsh, the schoolmaster, tried, he believed, to put it right by placing a wedge in. Witness saw the pillar again on Tuesday before the accident. It had "gone" a good deal more. He put his hand on it and found that it was loose. He called the schoolmaster's attention to it and went out. In a few minutes after he found that the pillar had fallen. He saw that the pillar had been resting on a log. The log was not sound. Did not think that the falling of the pillar materially weakened the floor. Mr. William Nicholson, architect and surveyor, testified that about twelve months ago, at the instance of Father O'Callagan, he made an inspection of this building. Father O'Callaghan seemed to have no fear of the building, but he was going to have a mission. Witness, as the result of his inspection, told Father O'Callaghan that the floor was quite capable, provided the material was sound, to bear any weight he could put on it in the way of people,—and without the columns. Witness did not think there was any dry-rot about at that time. Was not at that time told of any cracking or giving way. He had seen the building since the accident, and he came to the conclusion that the accident was the result of dry-rot. Was with Mr. Allison, the city surveyor, there on Tuesday, and he believed that that was his opinion. The iron pillar was an element of destruction to the beam. The fungus from the foundation would go up to the beam.

St. Alban's Abbey.—Mr. Henry J. Toulmin, the hon. sec. to the St. Alban's Abbey Restoration, writes:—I hear from good authority that Sir Edmund Beckett has now given orders under a faculty lately granted to him to destroy Abbot Wheathampstead's west window (of the date of Henry VI.), and to replace it with a window of his own composition, which may be exceedingly effective to those who admire the high art of the nineteenth century, but extremely distasteful to those who respect bygone times and the historical associations of this ancient abbey. If the Society for the Protection of Ancient Monuments, aided by a small public subscription, would now proceed against and obtain an injunction, they would prevent this iniquitous proceeding, as Sir Edmund's faculty was to repair the west front, and not to destroy any portion of it. Sir Edmund is carrying out his own wilful way against the remonstrance of his bishop and the wish of the arch-deacon, rector, churchwardens, and sidesmen of the abbey church; and a petition, signed by the Lord-Lieutenant and many of the leading inhabitants of the city of St. Alban's and its neighbourhood, has lately been sent to the bishop of the diocese, requesting him to interfere. Even a lavish expenditure of money from ample resources in this pseudo-restoration will hardly recompense the men of Hertfordshire for the injury done to their great county church. A sum of 400*l.* to 500*l.* would be, I believe, sufficient to repair the window to make it last for a great many years to come. I may say Mr. John Scott, whom Sir Edmund promised to consult (but on such terms as no leading architect could submit to), deprecates and deplores this iconoclasm as much as we do."

Cemetery Chapels and the Burials Act. On the 30th ult. the Hove Town Commissioners, Brighton, held a special meeting to discuss a question which has arisen under the new Burials Act. In November last a resolution was passed for the laying-out of a new cemetery, with two chapels. As the Burials Act now permits Nonconformists to officiate in consecrated chapels, and Church of England clergymen in unconsecrated chapels, it is held that two chapels have become unnecessary. Mr. W. Olding proposed that the resolution of November should be rescinded, and that only one chapel should be erected in the new cemetery, such chapel to be consecrated. On a division 17 voted for the motion and 14 against, but as it requires a clear majority of the entire Board, — namely, 22 votes,—to rescind a resolution, the motion fell to the ground.

The Turnery Exhibition.—The tenth annual exhibition of specimens of hand-turning, under the auspices of the Turners' Company, was opened on Tuesday last at the Mansion House. The collection was a very good one. On Thursday morning the Lord Mayor distributed the prizes. The following were the judges:—In Wood—Mr. J. J. Holtzapffel; Mr. C. H. Gregory, Past Pres. Inst. C.E.; Mr. H. Law, and Mr. E. R. Robson. In Ivory—Mr. A. P. Bower, Mr. J. Jaques, Mr. T. B. Winser, Mr. Morgan Yeatman. In Precious Stones—Mr. Herbert Grueber, British Museum; Mr. J. N. Hunt, Mr. J. Jones, Mr. L. Keller, and Professor Tennant. The judges in their report say that the majority of the exhibits displayed much excellence of workmanship, in many cases novelty of design, and in several considerable appreciation of form and design. The first prize for work in wood, — a silver medal and the freedom of the Company,—was awarded to Mr. F. Nickolay, of Rupert-street, Haymarket, for a pair of vases in wood; and the second,—a bronze medal and four volumes of Holtzapffel on Turning,"—to Mr. John S. Conlson, of Thirsk, for two vases and a card-dish, also in wood. In each class a medal was to have been given provided the specimens entered were considered worthy, and under this regulation the judges have withheld the first prize for ivory turning, awarding the second, which is the same as for wood-turning, to Mr. John Hegley, of Ivy-lane, Hoxton. The silver medal and freedom of the Company, for skill in manipulating precious stones, was taken by Mr. Louis Islar, of Oval-road, Regent's Park; and the bronze medal and 5*l.* by Messrs. Reuter & Warner, of Wardour-street.

The Vyrnwy Water Scheme, Liverpool. At the meeting of the Liverpool City Council on the 6th inst., the report of the Water Committee contained the following recommendations:—That the joint tender of Messrs. Laidlaw & Sons and Messrs. Robert Maclaren & Co., to supply 500 tons of 12-in. and 500 tons of 7-in. iron pipes for the sum of 4*l.* 11s. per ton, be accepted. Also that the council accept the tender of Messrs. Coobrane, Woodside Ironworks, Dudley, for 8,000 tons or thereabouts of iron pipes for the first section of the works between the Vyrnwy Reservoir and Parc Uchaf. Mr. Wilson moved the adoption of the recommendations. Alderman Bennett objected to the contract for the 8,000 tons of iron pipes being passed that day. Iron was coming down in price, and if they waited a little longer it might come down much lower. Mr. Picton thought the council ought to be furnished with some distinct information as to the exact relation of Mr. Hawksley to the scheme. Mr. Wilson said that as soon as the draft agreement with Mr. Hawksley was made up it would be submitted to the council, and all the necessary information given. The Mayor explained that if they employed Mr. Hawksley to carry out these works his charge would be 2½ per cent. commission on the cost of them. If he was not to be the engineer, then they would have to pay Mr. Hawksley some fair amount of money for the work he had already done. The motion was carried.

The New Cattle Market at Kettering was opened on the 1st inst. It has an area of about an acre and a half. The cattle-pens, which are of wrought and cast iron, and paved in granite, afford accommodation for about 800 beasts, and the sheep-pens, which are of similar construction, will hold about 1,400 sheep. In the south-eastern corner there is a public weighing-machine by Kitchener, of Warmington. The whole of the works were designed by Mr. R. W. Johnson, architect, Melton Mowbray, and Mr. George V. Henson had the contract for the general works. The contract for the iron-work was commenced by Mr. F. B. Wallis, and finished by Messrs. Keay, of Birmingham. Mr. Coleman was clerk of the works. The total cost of the market has been 8,000*l.*

Sanitary Legislation.—Mr. William White, F.S.A., in a letter to the *Times*, says,—The reform most urgently required at the present moment is the extension of the Act which is designed to allow tenants and sanitary authorities, even in the absence of agreement, to compel landlords to amend defects in the drainage of rented houses. The Act is almost inoperative on account of the difficulties, or supposed difficulties, of exercising the coercive power without expensive litigation; but apart from this it contains no adequate provisions for the correction of defective soil-pipes and water-service.

Payment of Architects, Birmingham School Board.—At the meeting of the Birmingham School Board, on the 7th inst., the Rev. H. W. Crosskey read the report of the Sites, Buildings, and Repairs Committee. They reported that the resolution passed at the adjourned meeting of the Board on the 8th of July respecting the salary to be paid to the architects, was referred to Messrs. Martin & Chamberlain, and the decision of the Board had been accepted. For some time the work of the building surveyor, which includes the preparation of the quantities for the contractor, and the final measuring up of additional works or variations from the original contract, and the preparation of accounts, was performed by a firm of building surveyors; but considerable delay and difficulty being found to result therefrom, it has for some years past been undertaken by the Board's architects. It was, however, altogether apart from the architects' ordinary duties, and the committee considered it advisable that the work should still remain in the architects' hands, and they recommended that they should be allowed the usual professional charges for taking out and furnishing quantities, viz., 1¼ per cent. and 2½ per cent. for the final measuring up of additional works and preparing the accounts. The report was approved.

Appointments.—Mr. Alfred Horne has been appointed town surveyor by the Worthing Local Board.——At the meeting of the Metropolitan Board of Works, on the 8th inst., the Works and General Purposes Committee reported as to the arrangements for filling up the vacancy caused in the engineer's department by the death of Mr. James McCleary, and recommending that Mr. H. T. Wakefield, who has for some time past been temporarily engaged in the department at a salary of 3*l.* 3s. per week, be appointed during the pleasure of the Board to fill the vacancy, and that he be placed in the third class of officers, at a commencing salary of 130*l.* per annum. This was agreed to.——The Liverpool City Council, on the recommendation of the Finance Committee, on the 6th inst., resolved that Mr. Frederick Holford be appointed a junior architectural draughtsman in the surveyor's department, at a salary of 90*l.* per annum.

The late Mr. Asahy.—The will and codicil of Mr. Richard Ashby, formerly one of the members of the Court of Common Council, late of Manor-road, Stamford-hill, who died on the 3rd ult., was proved on the 22nd ult. by Miss Ann Breakspear Ashby, the daughter, and sole executrix, the personal estate being sworn under 30,000*l.* According to the *City Press*, the testator gives a sum of upwards of 10,000*l.* due to him from his late partnership business (as builders, in Bishopsgate-street) and a policy of insurance on his life in the National Provident Institution, as to one-half thereof to his son, Richard Vaughan Ashby, and as to the other half upon trust for the widow and children of his deceased son, George Scarlett Ashby. All his real estate and the residue of the personalty he leaves to his said daughter.

Bad Building at Brixton.—At the meeting of the Lambeth Vestry, on the 7th inst., the Sewers and Sanitary Committee reported that they had visited some buildings in course of erection on the Elm Park Estate, Brixton Hill, and they requested that the Vestry would call the attention of the Metropolitan Board of Works to the quality of the bricks used in the inside walls of the buildings upon the estate, contrary to the Act of 1878. They further requested that the Board might make the necessary inquiry into the matter. Mr. Fowler said the material used was extremely bad, and it appeared that the builders had not been interfered with in consequence of the district surveyor (a bed-ridden old gentleman) being unable to attend to his duties. The recommendation was agreed to.

Lecturee on Sanitary Mattere. — On Monday evening last Dr. A. Maxwell delivered the second of a series of "Medical Talks" at the Young Men's Christian Association, Aldersgate-street, the subject being "Dangers to Health; or, Unhealthy Houses." A number of pipes and other utensils were lent by Messrs. Doulton & Co., of Lambeth, and Messrs. J. Tylor & Sons, of Warwick-lane, for the purpose of illustrating the lecture.

Burning of Arbroath Guildhall.—Between two and three o'clock on Sunday morning a fire broke out in the Guildhall of Arbroath. The building was completely destroyed, with documents of local and antiquarian value. The cause of the fire is unknown.

Building Societies and the Parkes Museum.—At a meeting of the directors of the Nineteenth-Century Building Society, Mr. George Palmer, M.P., chairman, held on the 6th of October, the following resolution was passed unanimously, on the motion of Miss Richardson, and seconded by Mr. Henry Rntt:—"That as, in the opinion of this meeting, a course of Lectures at the Parkes Museum of Hygiene, on House Sanitation, would be most valuable to the members of building societies (who to a very large extent own the houses they live in), the secretary of this society he requested to ask the Committee of the Museum whether such a course of lectures could not be given gratuitously during the ensuing winter."

A Roman Amphitheatre at Buda.—The Pestb newspapers describe the finding of a Roman amphitheatre at Altofen during excavations carried on there by Karl Torma. The first traces were met with on the 20th of September. That the remains are really those of an amphitheatre was fully established by the 26th. It is a striking fact that the axes of the ellipse, in which form the building was constructed, were directed with mathematical accuracy to the four points of the compass, the large axis from east to west, the small from north to south. It was also interesting to find that the size of the amphitheatre considerably exceeds that of the famous amphbithеatre of Pompeii.

Llanrwst, North Wales.—New premises for the Nortb and South Wales Bank have lately been erected by Mr. Samuel Parry, builder, Llanrwst, at the north-west corner of tbe Market-place. Ahove the Bank are arranged suites of offices, and a large public hall, devoted to the nse of the county court, magistrates' meetings, and also for public entertainments. The style of the building is English Domestic Gothic; the materials used were local stone for the walling stones, and Runcorn stone for tbe dressings. Half-timber framiog bas been employed in the upper stories. The architect is Mr. Edmund Kirby, of Liverpool.

Sewer and Closet Ventilation.—The little Cornish town of Padstow furnishes evidence of the value of the ventilation of sewers. Acting on the recommendation of tbe Local Government inspector, the Local Board have, during tbe last eighteen months, ventilated the sewers so as to permit sewage gas to escape into the atmosphere as soon as it is generated, and before it becomes dangerous to the public health. As a result, it is reported that the town has, during the last twelve months, enjoyed complete immunity from zymotic diseases.

Topography.—The Committee of the Topographical Society of London, which has heeu formed for the purpose of collecting and publishing maps, views, and other materials for the history of London, have made arrangements for the holding of the inaugural meeting of the Society on Thursday, the 28th inst., at four o'clock. Tbe Lord Mayor has granted the use of the Long Parlour at the Mansion House, and will preside on the occasion. Cards for the meeting may be obtained from Mr. Henry B. Wheatley, F.S.A., 18, John-street, Adelphi.

Sewer Fatality in Birkenhead.—Ahout nine o'clock on Wednesday morning, a sbocking sewer fatality occurred at Birkenhead. Five men in the employ of the Corporation were overcome by the fumes of sewer-gas while opening a sewer in Cleveland-street. One (named Michael Donnaney) was killed, and great difficulty was experienced in restoring the others.

The New City of London School.—The foundation-stone of the new buildings for this school were laid on Thursday last, the 14th inst., by Mr. J. E. Walford, the chairman of the school committee. Messrs. Davis & Emanuel are the architects of tbe buildings, of which we published a view and plans in our last volume. pp. 602-5.

Builders' Benevolent Institution.—The tbirty-third annual dinner in aid of the funds of this Institution is fixed for Thursday, the 11th prox., when we trust that a large number of the friends of the Institution (which has recently increased tbe amounts of the pensions granted to annuitants) will rally round the president, Mr. Thomas F. Rider.

The Exhibition of Wood-Carving and Kindred Arts, at the Albert Hall, South Kensington (opened last March), has closed, and tbe various objects are being removed. The collection, as we have pointed out, was largely representative, and has been visited and enjoyed by a large number of persons.

Mr. and Mrs. German Reed's Entertainment.—On Wednesday evening, October 20th, a new first part will be produced, entitled "A Turquoise Ring," from the pen of Messrs. W. E. Godfrey and E. W. Craigie; the music supplied by Mr. Lionel Benson. Mr. Corney Grain has also a new musical sketch, "The Haunted Room," which he will give for the first time on the same evening.

TENDERS

For the erection of two shops at Turnham-green, for Mr. O. Davies. Mr. E. Monson, jun., architect:—

French	£1,348	0	0
Tye & Bartlett	1,335	0	0
Childs	1,222	0	0
Brunsden	1,189	0	0
Warr	1,187	0	0
Battley	1,097	0	0
Maton	1,075	0	0
Stone	1,070	0	0
Beach	1,028	0	0
Lyford (accepted)	966	0	0

For alterations to No. 84, Carlisle-street, N.W., for Messrs. Davies & Evans. Mr. E. Monson, jun., architect:—

Millson	£348	0	0
French	298	0	0
Beach	295	0	0
Sawyer	291	0	0
Fernley	285	0	0
Gaun (accepted)	250	0	0

For new cottage, Woking, Surrey, for Mr. Robert East. Mr. Henry Peak, architect:—

Swayne, Guildford	£565	0	0
Wilson, Woking	494	0	0
Shears, Maybury	475	0	0
Harris, Woking	470	0	0
Butt, Woking	444	0	0
Whitburn, Woking (accepted)	409	0	0

For pulling down and rebuilding Nos. 15 and 16, Walbrook, City. Mr. Alexander Peebies, architect:—

Ashby & Horner	£9,083	0	0
Ashby Bros.	8,993	0	0
Brass	8,649	0	0
Morter	8,208	0	0
Ramsey	8,063	0	0
Conder	7,687	0	0
Clarke & Bracey	7,610	0	0
Lawrence	7,498	0	0
Perry & Co. (accepted)	7,222	0	0

For the erection of twenty-one cottages at Ealing, for Mr. W. White, Park-road, Ealing:—

Hegarty	£5,040	0	0
French	4,678	0	0
Flett	4,557	0	0
W. Ladd	4,159	0	0
Coats & Son	4,158	0	0
Pierce	4,095	0	0
Higgs	3,890	0	0
Childs	3,700	0	0
G. White	3,500	0	0
Haines	3,500	0	0
Cox	3,495	0	0
Stone	3,465	0	0
Warr	3,192	0	0
Squelch	3,150	0	0
Burgess & Co.	3,099	0	0
Monk	3,045	0	0
Balaam Bros.	2,998	0	0
Brunsden	2,935	0	0
Richardson	2,850	0	0
Roberts	2,750	0	0
Prescott	2,748	0	0
Lovell	2,618	0	0
Weeks & Rosenberg *	2,500	0	0
Vaughan	2,600	0	0
Bull Bros.	2,597	0	0
F. White	2,462	0	0
J. Ladd	2,200	0	0

* Exclusive of drainage, at 2s. per foot run.

For additions to mansion at Coombe Hurst, Kingston-hill, for Mr. H. F. Clare Vyner. Mr. W. T. Sams, architect. Quantities by Messrs. J. & A. E. Bull:—

Morris	£6,098	0	0
Bywaters	5,800	0	0
Higgs & Hill	5,744	0	0
Arrowsmith	5,692	0	0
Bowden & Dorrell	5,678	0	0
Macey & Sons	5,549	0	0
Knight & Sons, Chertsey (accepted)	5,354	0	0

For re-building Nos. 116 and 117, New Bond-street, and erection of picture-galleries, for Messrs. Gammon & Vaughan. Mr. W. T. Sams, architect. Quantities by Messrs. J. & A. E. Bull:—

Coles, Bros.	£5,393	0	0
Smith & Co.	5,135	0	0
Hall, Beddall, & Co.	4,995	0	0
Higgs & Hill	4,930	0	0
Chappel	4,831	0	0
Downs & Co.	4,740	0	0
Bywaters, London	4,569	0	0

For alterations to bar, &c., at The Cedars, Lavender-hill, Wandsworth-road, for Mr. Fagan, jun. Mr. Henry Roberts, architect:—

Nicholls	£370	0	0
Lathey Bros.	337	0	0
Simpson	319	0	0
Goddart & Co., Mile-end (accepted)	287	0	0

For sundry repairs, &c., at No. 132, High-street, Notting-hill, for Mrs. C. Jack. Mr. W. Nunn, architect:—

Adams	£297	15	0
Mansell	245	0	0
Lamble	237	0	0
Head & Son	188	0	0

For warehouse, Heddon-street, Regent-street, for Mr. W. F. Williams. Mr. Cubitt Nichols, architect. Quantities supplied by Mr. H. Foster:—

Cook & Son	£6,265	0	0
Greenwood	6,247	0	0
Little & Son	5,798	0	0
Nightingale	5,671	0	0
Bywaters	5,576	0	0
Woodward	5,555	0	0
Langmead & Way	5,549	0	0
Conder	5,431	0	0
Hutchingson	5,395	0	0

For erecting offices, &c., No. 25, Bedford-row, for Mr. R. A. Notley. Mr. Frederick C. Notley, architect. Quantities by Mr. W. Barrett:—

Macey & Sons	£4,392	0	0
Hart	4,364	0	0
Hayworth	4,350	0	0
J. & J. Greenwood	4,333	0	0
Axford	4,320	0	0
A. G. Belding	4,283	0	0
Tarrant & Son	4,223	0	0
Patman & Fotheringham	4,194	0	0
Nightingale	4,171	0	0
Langmead & Way	4,150	0	0
Morter	4,043	0	0
Lawrence	3,994	0	0

For pulling down and re-building the Prince Regent public-house, Sidmouth-street, Gray's Inn-road, for Mr. Rosenburg. Mr. A. Latham, architect. Quantities supplied:—

Renouf	£3,593	0	0
Spencer & Co.	2,865	0	0
Sawyer	2,468	0	0
Stephens & Co.	2,389	0	0
Pringle	2,378	0	0
Smith & Son	2,365	0	0
Henye	2,299	0	0
Wheeler	2,295	0	0
Allen	2,230	0	0
Rosen & Co.	2,220	0	0
Beale	2,210	0	0
Gould Bros.	2,139	0	0
Ward	2,130	0	0
Bull Bros	2,097	0	0
Sharman	1,999	0	0
Augood	1,990	0	0
Hutchinson	1,990	0	0
Casey & Co.	1,985	0	0
Williams	1,959	0	0
Wagner	1,899	0	0

For detached house, St. Stephen's-road, Ealing, for Mr. George Penn. Mr. Walter Graves, architect. No quantities:—

Toms	£1,827	0	0
Hook & Oldrey	1,677	0	0
Facer	1,440	0	0
Penny & Co.	1,402	0	0
Bolding	1,370	0	0

For detached-house, Edgehill-road, Ealing, for Mr. Samuel Smith. No quantities:—

Hook & Oldrey	£1,358	0	0
Facer	1,220	0	0
Penny & Co.	1,205	0	0
Toms	1,190	0	0
Bolding	950	0	0

For extension of promenade and works connected therewith, at Barmouth. Mr. Thomas Roberts, engineer:—

Evans & Jones, Dolgelley	£1,895	19	9
Owen, Portmadoo	1,843	0	0
Jones, Barmouth	1,656	0	0
Davies, Portmadoc	1,552	0	0
R. Williams, Harlech	1,534	0	0
Davies, Waenfawr	1,500	0	0
Hughes, Portmadoc	1,475	0	0
Pritchard, Portmadoc	1,349	0	0
Jeffreys, Colwyn Bay	1,138	2	8
G. Williams, Harlech (accepted)	1,113	1	6

Accepted for the erection of parsonage-house and boundary-walls at Allenheads, Northumberland, for the Rev. J. M. Lister. Mr. Edward Shewbrooks, architect.

Excavator, Bricklayer and Mason, Slater and Plasterer's Work.

Charlton, Allendale, Northumberland £917 10 0

Carpenter and Joiner, Plumber, Painter, and Glazier's Work.

Fairlamb, Allendale, Northumberland £667 0 0

Boundary Walls.

Charlton £160 0 0

For erecting two shops and dwelling-houses at Carshalton, Surrey, for Mr. B. Clarke. Mr. R. W. Price, architect. Quantities by Mr. W. H. Barber:—

Tribe	£2,060	0	0
Humphries	2,041	0	0
Smith	1,997	0	0
Wale	1,970	0	0
Hobbs	1,940	0	0
Taylor	1,900	0	0
Richardson	1,900	0	0
Ward	1,892	0	0
Howe & White	1,880	0	0
Steward (accepted)	1,738	0	

For a pair of cottages for Mr. C. G. Hale, Seal, Kent. Mr. Edwin T. Hall, architect:—

Constable, Penshurst	£480	0	0
Julian & Co., Southwark (accepted)	467	0	0

For alterations and repairs at Euston-road, for Mr. F. H. Warr. Mr. Edwin T. Hall, architect:—

G. & T. Riddell,* Newington-butts	£600	0	0

* Accepted.

For pair of cottages, at Biggenwood, Lower Norwood, for Mr. James Epps. Mr. Edwin T. Hall, architect:—

Julian & Co., Southwark (accepted)	£450	0	0

For alterations and additions to Hill Court, Four Elms, Kent, for Mrs. J. H. Barclay. Mr. Edwin T. Hall, architect:—

Punnett & Sons, Tunbridge (accepted)	£657	0	0

For new carriage-sheds, at Hammersmith, for the Metropolitan Railway:—

Hutchinson	£3,027	0	0

For main approach road at the intended Gloucestershire Second County Lunatic Asylum. Messrs. John Giles & Gough, architects. Quantities by Mr. C. H. Goodo:—

Nicholson	£1,696	0	0
Small & Son	1,680	0	0
Meredith	1,613	0	0
King (accepted)	1,418	0	0

For two pairs of cottages at the Gloucestershire Second County Lunatic Asylum:—

King	£1,568	0	0
Jones & Co.	1,395	0	0
Clutterbuck	1,300	0	0
Meredith	1,243	0	0
Coleman (accepted)	1,243	0	0

For the erection and completion of a small Cemetery Chapel for the Redruth Burial Board, Cornwall. Mr. J. Willey, architect:—

Julian & Sons (accepted) £370 0 0

For the re-building and renovating of Feock Wesleyan Chapel, Cornwall. Mr. Silvanus Trevail, architect:—

Julian & Sons (accepted) £250 0 0

For the erection and completion of a new dwelling-house, Penzance, Cornwall, for Mr. C. C. Ross. Messrs. T'Anson & Son, architects:—

Julian & Sons (accepted).

For alterations and renovations of new shop and premises, Hayle, Cornwall, for Messrs. J. H. Trevithick & Sons. Mr. J. D. Tronnson, architect:—

Julian & Sons (accepted) £350 0 0

For residence, near Shide Cross, Isle of Wight. Mr. Thomas Dashwood, architect:—

Jolliffe, Newport	£1,850	0	0
Grant, Newport	1,825	0	0
Plesse, Woolton	1,767	0	0
Jenkins, Newport and Ryde	1,645	0	0
Barton, Ryde (accepted)	1,640	0	0
Dyer, Newport	1,550	0	0

For the construction of roads and sewers upon the Broomwood Park Estate, Clapham Common. Messrs. Hammack & Lambert, surveyors:—

Harriss	£9,960	0	0
R. & C. Neale	9,500	0	0
Cardus	8,990	0	0
Rigby	8,952	0	0
Neal	8,600	0	0
Pound	8,292	0	0
Bloomfield	7,882	0	0

For alterations and additions to the Duke of York Hotel, Regent-road, Salford. Mr T. Stevens, architect:—

Clarke (accepted) £1,200

For re-building the Cock Tavern, Marsh-street, Walthamstow, for Mr. George Archer. Messrs. Hills & Fletcher, architects:—

Johnson, Walthamstow (accepted)... £1,600 0 0

For 12-in. pipe sewer at St. George, near Bristol, for the St. George Sanitary Authority. Mr. W. Dawson, C.E., surveyor:—

Cryer, Hanham	£289	10	0
Beaven, Bedminster	242	5	0
Martin & Thomas, Bristol	183	7	8
Adams, Bristol	170	2	11
Jones, Bristol	168	9	0
Brittian, St. George (accepted)	161	3	9

For the repair and maintenance of about four miles of main roads for the St. George Sanitary Authority, Bristol. Mr. W. Dawson, C.E., surveyor:—

Cryer, Hanham	£1,700	0	0
Grindell, St. George	1,247	0	0
Jones, Bristol (accepted)	955	0	0

For the reconstruction of 780 yards of brick sewer, ft. 6 in. by 3 ft., for the St. George Sanitary Authority, Bristol. Mr. W. Dawson, C.E., surveyor:—

Facey, Manchester	£2,499	8	0!
Hunter, Bristol	1,877	19	0
Mereweather, Bedminster	1,775	7	0
Monks, Fishponds	1,501	10	0
Emery, Bristol	1,422	14	0
Parfitt, Eastville	1,109	16	2
Jones, Bristol	998	0	0
Rumboll, Bristol (too late)	995	7	0
Yelland, Fishponds (accepted)	757	19	0!

For a detached villa-residence, Baldslow-road, Hastings, for Mr. J. Cockburn. Messrs. Cross & Wells, architects:—

Vidler	£4,167	0	0
C. & E. Harman	4,113	0	0
Punnett & Sons	4,083	0	0
Rhodda	3,993	0	0
Austin	3,895	0	0
Hughes	3,858	0	0
Womersley	3,800	0	0
Jones & Co.	3,698	0	0

For additions to mansion and new stabling at the Grove, Chalfont St. Giles's, for Mr. G. H. Salisbury. Mr. W. T. Sams, architect. Quantities by Messrs. J. & A. F. Bull:—

Knight & Sons, Chertsey (accepted) £1,210 0 0

Stable Fittings.

Musgrave, Bond-street (accepted) ... £627 1 6

For works to houses and shops, for Mr. G. H. Tatham, North Kensington. Messrs. Ebbetts & Cobb, architects. No quantities supplied.

Laws £2,040

For four shop-fronts and fittings, and fixings, Nottingbill. Messrs. Ebbetts & Cobb, architects:—

Laws £189 0 0

For repairs and decorations to No. 12, Cornwall-terrace, Regent's Park, for Mr. Charles Burge. Messrs. Ebbetts & Cobb, architects:—

Sanders (accepted) £400 0 0

For further works inside, and also to stables in rear of same premises:—

Sanders (accepted) £233 4 11

TO CORRESPONDENTS.

Road Formation (several letters on this subject have reached us too late for consideration this week).—H. C. S. (send address, that proof may be forwarded. Mislaid).—R. P. (drawing was paid for to artist who made it).—R. K. (report reached us, but was put aside).—F. & C. (should send lists).—T. W. H. (should have sent names and amounts).—B. (ditto).—R. H. (possibly to prevent down-draught when stove is not alight).—J. J. & Sons.—H. P.—H. J. N.—S. W.—G. M.—Dr P.—J. C. S.—R. R.—D.—Dr. B.—A. P.—Major B.—T. D.—I. P. & W.—H. H.—P. H.—J. B.—W. T. W.—J. R. T.—Boxer.—H. I.—H. & F.—W. B.—T. H. B.—A. G. E.—J. N. J. & Son.—W. E. H.—Mrs. F.—C. & W.—E. M. & Son.—R. M. B.—C. M.—C. R.—P. S.—P. P. P.—W. T. S.—E. L. B.—J. H.—J. D. & Son.—J. McG.—F. C. N.—Mr. M.—Messrs. D.—S. R. L.—H. S. C.—T. R.—W. G.—Wood Co.—J. S.—W. B.—H. W. M. (thanks).—F. W. (next week).—S. H. T. (next week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

The Builder.

Vol. XXXIX. No. 1968. Saturday, October 23, 1880.

ILLUSTRATIONS.

CONTENTS.

The Completion of Cologne Cathedral.

ON Friday, October 15, with Emperor's weather slightly threatening, and amidst the joyous clang of bells, the flatter of innumerable flags, and the thunder of cannon, the crowning stone of Cologne Cathedral was laid on the southern tower, at a height of 157 mètres. On the summits of the two spires of Cologne Cathedral rest therefore the loftiest stones that human ingenuity and patience have succeeded in raising in the world.* Sir Christopher Wren, the immortal architect of St. Paul's, who remembered the quaint old cathedral of the English metropolis,—which Hollar has so carefully shown us,—saw the first stone laid of the new building, and lived to see his great conception completely carried out. But six hundred years and more have passed away since the first stone of the Cologne *Dom* was laid with the ceremonial customary on such solemn occasions.

Little can Meister Gerhard, who began, and Meister Johann afterwards, the architects who so long ago planned and devised the edifice,—the glory of which they must, like all creators, have foreseen,—little can they have conceived that it would be for an Emperor William, living at the end of the nineteenth century, to witness and vouch for the completion of their noble conceptions.

Friday's *Te Deum* in the cathedral gained its chief brilliancy from the military element which, as may be imagined, with such a company as was gathered together in Cologne, was of no ordinary nature. The Emperor and his queen, his son, the Crown Prince, and his wife, our own beloved Princess Royal, and their children, the grandchildren of our Queen, added for every Englishman present a further point to a ceremony already of the highest solemnity. We confess that, apart from the interest connected with the completion of the cathedral, the greatest emotion by which, on the whole, we were moved was caused by the sound of our own national anthem, the air of the German Emperor's hymn, "*Heil dir im Siegerskranz*," as we stood within but a few yards of the cathedral itself, and under the fluttering shadow of the English flag, the peculiar significance and poetry of which can be fully understood and felt only when one is far from home.

For a long time past the Cologne folks have been preparing for the solemn moment of the completion of their cathedral,—in reality, for 600 years and more,—but, as is well known, the works have remained during the greater part of that long period sadly stationary; it is only within the present century that any activity had been impressed on the progress of the great design.

At the Wallraff Museum in Cologne, a not ill-executed fresco represents the ceremony of the laying, in 1842, by the reigning Emperor's father, of the first stone of the works which have now completed the cathedral, and there, standing by the late Emperor's side, is well portrayed the Kaiser William, as Crown Prince, as might be seen near him on Friday last *his* son, the popular husband of our own Princess Royal. During those thirty-eight years various ceremonies have marked the progress of the works, till at length the last stone was on the 15th inst. lowered into its final resting-place on the summit, as we have before remarked, of the southern tower. There, as we gazed up, under an architecturally-designed canopy of scaffolding tastefully covered with fir branches, the coping-stone was seen poised, ready at the proper signal to be let slowly down into its destined resting-place.

To solemnise this final act, so long awaited, Cologne was *en fête*, the streets be-garlanded with a traditional beauty that reminded one for all the world of the pictures of the Early Italian Renaissance masters, Crivelli, Mantegna, or Squarcione, and their decorative school; while the flags and heraldic devices which so plentifully adorned the passage of the Emperor showed that the traditions of Hans Burgkmeir and the familiar triumphant procession he designed with his brother artists for the Emperor Maximilian are far from dead in the fatherland of Albert Dürer. The flags and heraldic devices, indeed, added a great beauty to the scene, for whatever may be said of the danger of the picturesque element in architecture, the heralds in their best days did not disdain the aid and even the control of the painter and the architect.

On Thursday,—the day, by the way, erroneously announced by two of our leading journals as the day of the great ceremony,—Cologne was feverishly preparing for the morrow's momentous occasion, but all was ready to receive at nine o'clock next morning the Emperor and the other distinguished guests, a mere enumeration of whose names would read very much like the interesting pages of the now sadly diminished *Almanach de Gotha*.

After a rapid and what is called brilliant drive through the town, service in the Protestant church, and a simple *Te Deum* in the cathedral, the actual ceremony commenced in the great piazza in front of the cathedral, where the remarkable company was assembled. The address read and duly signed by the Emperor was, in the midst of a cantata specially composed for the occasion, hoisted to the summit of the southern spire, eagerly watched in its slow ascent by innumerable opera-glasses, and then laid under the last stone. The speeches that followed were lengthy, from the Emperor and President of the Cathedral Completion Fund Society; indeed, to those out of ear-shot, the delay at this point seemed long. But nothing, in these hasty days, more reconciled the impatient and the thoughtful to the tedium of this portion of the ceremony than the recollection of the six hundred years and more that it had taken to raise the stone to its present position and the events that had occurred in Germany during that time.

Carefully guided by the workmen, who could be spied with difficulty by the opera-glass at their immense height, the massive stone could be seen, at the proper moment, slowly descending; and when at length it was finally settled down, and the pulley and its tackle removed, the Imperial standard was hoisted, as had been announced,—unfortunately, the breeze was too feeble to shake out its folds,—the bells commenced their merry clang, the cannon roared, and Cologne Cathedral was completed. It was, as may be imagined, an anxious moment for the many thousands gathered in the Dom-platz, at every available window, and in many a narrow street throughout the town, when the stone which had so long been watched by thousands of upturned eyes began to quiver; but the moment of excitement was a short one, and soon the crowd dispersed. The Emperor and the other guests returned to the railway station in the royal carriages (none of which would have been a credit to Long Acre, though they had been sent from Berlin), and the whole party were invited to the palace at Brühl.

In Cologne itself the rejoicings were continued longer, Saturday being marked by an historical procession such as the Germans know so well how to get up. But the chief ceremony was over, and many hundreds who had travelled far to be present on the occasion of the completion of the cathedral hurried home, the picture of the still scaffold-hidden spires and the crowded streets of the resting-place of the relics of the three famous kings never to be effaced from their minds.

WE have availed ourselves of the skill of German artists to place before our readers views of the finished cathedral from several points, the west front, the east end, and a more general view from the south-east. The engraving includes, too, records of the aspect presented by the structure in the year 1500, when the works came to a standstill, and in 1878 when the spires were being fast proceeded with. It shows, too, the Emperor Bell and the ancient and still magnificent Shrine of the Three Kings who came from the East with presents to the infant Saviour.* In an early number we shall give a few details of the architecture on an enlarged scale. Some erroneous statements have been printed touching the discovery of the original design of the architect, and we may as well tell what we believe to be the correct story. The designs for the principal front, which, it seems,

* The spire of Rouen Cathedral is 151 mètres high; the Nicholas Church, in Hamburg, 144; St. Peter's, Rome, 138; the Pyramids of Cheops, 137; St. Paul's, 111; and Notre Dame, Paris, 68.

* See p. 500.

were formerly kept, one with the archives of the cathedral, and the other in the Masons' lodge, were lost when the French occupied the city in 1794. In 1814, one of the drawings, namely, that which represents the north tower, was accidentally discovered in a corn-loft at Darmstadt by a decorative painter who was about to occupy the loft as a studio. Being drawn on parchment, it had been used for many years as the bottom of a sort of tray in which to dry beans; but with the exception of the marks left by the nails which fastened it to the wooden rim, and a fracture in the lower part of it, was little injured. It fortunately came into the possession of Dr. Möller, the distinguished architect, of Darmstadt, who published a facsimile of it in 1818, and from whose lips we had the story. At the time of the discovery of this drawing, M. Willemin was publishing his work "Monumenta Français inédits," and Dr. Möller was struck by the analogy which appeared between the style of a large window represented in the twelfth number of that work, and that of the details of the tower at Cologne. He mentioned the circumstance to M. Boisserée, who was then occupied on his large work on the Cathedral of Cologne; inquiries were made of M. Willemin, and it was learnt that the window in question formed part of a very large drawing of a church on parchment, and then in the possession of M. Imbart, an architect in Paris, who had obtained it from M. Fourcroy. M. Fourcroy, it seems, had found it in Belgium. M. Boisserée contrived to purchase the drawing, and it was at once recognised as representing a part of the façade of Cologne Cathedral.* It was afterwards sold to the King of Prussia, and his Majesty presented it to the city of Cologne. United with the drawing discovered at Darmstadt, it represents the whole of the principal front. The size of the drawings together is about 6 ft. 6 in. wide and 13 ft. long.

This statement the Director of this journal published in very early days after a pleasant visit to Darmstadt, and at the time when the King of Prussia was giving an impetus to the movement in favour of the completion of the cathedral.† At that time, as we wrote, the choir, with its side aisles and chapel, was the only part of the cathedral which was complete, the towers and nave remaining in an unfinished state,—a splendid promise only, an outline of a magnificent intention, which yet remained to be filled up and made perfect. Fired by the successful restoration of the ancient works, and anxious to realise the original idea in all its integrity and unity, the inhabitants of Cologne determined on continuing the works vigorously. On the 16th of February, 1842, a society was organised for that purpose, and the day was set apart for religious intercession and rejoicings. The enthusiasm displayed on this occasion was extraordinary; a procession of more than 5,000 persons took part in the ceremonies of the day. Protestants and Roman Catholics, Liberals and Conservatives, joined on one common ground, and outvied each other in generous efforts to ensure the completion of the monument.

The outburst of feeling on the part of the inhabitants of Cologne was responded to, not merely throughout Germany, but in the neighbouring countries. Branch societies were formed for the purpose; literary men and artists associated to publish magazines, the profits of which were to be devoted to the cathedral; a committee to receive subscriptions was organised in France, and another in Rome. The King of Prussia made himself responsible for 8,000*l.* per annum, and further suggested that each of his provinces should defray the cost of one of the flying buttresses. The King of Bavaria was not behindhand in the good work. In Germany all classes of society, all professions, all faiths, spontaneously united in favour of the work, not merely, as M. César Daly wrote at the time, under the influence of a lively interest in the welfare of the arts and for their sublime creations, or even from a sentiment of piety, but from a new-born feeling of the re-establishment of moral unity in Germany, and a desire to retrieve its ancient grandeur. Piety, art, and patriotism,—love of God, love of the beautiful, love of country,—united in favour of the completion of a building in which modern Germany gives her hand to the Germany of the Middle Ages, across three centuries of discord.

Cologne has just now celebrated the glorious result of these well-conceived and well-continued efforts.

* It is supposed that the drawing had been carried from Cologne about the middle of the fifteenth century, to serve as a model for some of the numerous churches which were then built in the Low Countries.

† "On the Present State of Cologne Cathedral, and its Proposed Completion." By Geo. Godwin, jun.—*Civil Engineer and Architect's Journal*, vol. v., p. 201.

ART AT THE SOCIAL SCIENCE CONGRESS.

The address of the President of the Art Section, which we have been enabled to give in this and our last number, is one of the best addresses which have been delivered since that section was inaugurated. It dealt with art from a "social" point of view, and was broad in its views, without being vague or unpractical. The only point in regard to which we may call Professor Richmond a trifle unpractical is in reference to that much-vexed and much misunderstood question of architectural restoration. He adopts the general views of the Society for the Preservation of Ancient Buildings, lauding the "enthusiasm and courage" with which its views have been urged, and the carrying out of its main objects entered upon; an enthusiasm and courage certainly remarkable, inasmuch as they have not unfrequently been exercised in equal disregard of accuracy as to the statement of facts or courtesy in the manner of making such statements. Artists are naturally very strongly on the side of artistic sentiment in these matters (though not more so than ourselves, and many other architects); but like painters and sculptors in general, Mr. Richmond has no accurate perception of the practical effect which his proposed mode of dealing with buildings would have. He wishes that one-tenth of the money spent in restoration had been expended in such structural repairs as "adding a buttress to a weak wall or tower, or by strong oak timbers, unplaned, where the roof was weak." We should really like Mr. Richmond to see in reality, as we can pretty clearly see in our mind's eye, what some of our cathedrals and churches would look like if they had been subjected, since the first period when their state of decay began to be recognised, to a regimen such as this. The spectacle would possibly open the eyes of some of the fanatical anti-restorationists a good deal as to what their recommendations really amount to. In fact, an able and well-known architect did offer us a very clever and amusing drawing of the results of the treatment recommended by the Society on a supposed old church, and we only declined it, not from any want of sympathy with it, but because those among our readers who did not know how exceedingly unpractical were the demands of the Society might have misunderstood it, and have supposed that the *Builder*, which has always been against any destruction of an old building when it can possibly be avoided, had changed its tactics and principles.

Enough of that, however, for the present. One or two other points in Professor Richmond's address we should like to take the opportunity of supplementing and supporting. Nothing could be more true or more practical than the suggestions as to the importance (as urged, too, in these pages) of bringing good specimens of art before the notice of the children in our primary schools, by the aid of photography. And we are glad to notice that Professor Richmond does not confine this recommendation to exhibiting reproductions of pictures only; he wishes to have photographs of good architectural decoration, carving, ironwork, &c., brought before the eyes of our young and learning population. This might be of the greatest value. The mere early habit of looking at good work is an immense training to the eye and taste, even without a word being spoken about it. What we constantly see has more silent influence on our ways of feeling and thinking about art than many persons would readily believe; without even knowing anything about principles or schools, the man or child (even) who is in the habit of seeing high-class design becomes insensibly tutored by its spirit, and feels intuitively the difference between that and vulgar or inferior design. In the case of those who are to be artisans, especially in connexion with building, how valuable it would be, not only to themselves, but to the architect, for them to have an early habitude of seeing good work and understanding that it was good. As it is, you may find an excellent workman in stone or wood, or iron, who will execute with equal conscientiousness, as far as is in him, a design which is thoughtful or refined, or one which is vulgar and unmeaning; and no attempt to explain the essential difference between them will reach his comprehension, which has never been prepared for such considerations. No doubt, the case will be still bettered if we can secure that some good general training as to the meaning and the principles of art could be given by our Board School teachers; this, however, would be much more difficult to attain, as there will probably be the threefold labour of first persuading the authorities that there is any good in art-teaching at all; secondly, deciding what is to be taught; and, thirdly (and, perhaps, most difficult of all), finding any persons applying for Board School masterships who would have the requisite knowledge of the subject or judgment in treating it. But even without this, the mere turning loose, as it were, representations of good art in our schools would have a beneficial effect on the mental training of the pupils.

Another point on which we are very glad to see Professor Richmond taking up the cudgels is in regard to the abominable and all-pervading vulgarity of our illustrated street-posters. These are a standing and, in large towns, a nearly universal influence in degrading public taste, and putting vulgarity (and sometimes indecency) on a pedestal for the public gaze. One or two instances in which able artists were induced to design things of this kind where the figure was introduced, attracted so much attention that we have wondered that the idea of seeking for higher artistic aid in such things was not recognised as one that might pay commercially. Not only does the present style of wall-pictures vulgarise the taste of the public, but even where comparatively harmless in this respect, it familiarises the eye with bad drawing and misrepresentation. Recently, for example, the Metropolitan District Railway Company have endeavoured to call special attention to the fact that they have opened a direct railway to Putney Bridge, by hanging up in all the stations a map of London and the suburbs, upon which is engraved a huge ill-drawn black hand, pointing with a fore-finger abnormally long to the situation of the new station. Nothing could be more hideous than the appearance of this sprawling black claw, rather than hand, on the paper; whereas an outline of a hand truthfully represented would be a beautiful thing, and would answer the practical purpose just as well. We have gazed on this portentous hand frequently, with the feeling that in no country where there was any public knowledge of, or feeling for, art, could such a thing have been put forth on the walls,—such a libel on

> "Flesh and bone and nerve that make
> The poorest, coarsest human hand
> An object worthy to be scann'd
> A whole life long for their sole sake."*

There surely might very well be an official oversight over what is painted on our walls, to ensure that it shall come up to a certain standard; but here, again, the difficulty will be to persuade any among our rulers that such a subject is a *dignus vindice nodus*. The vulgarity of these posters appears perhaps more flagrantly odious when we come across one, as one sometimes does, stuck on a gate-post or on an old barn far out in the country, to be seen from the turnpike road, and we are suddenly recalled from the innocence and freshness of nature to what may truly be called, in Ben Jonson's words, "the adulteries of art." If artists were employed to draw these, the sight of an advertisement in a country spot would be rather pleasing than otherwise, recalling to us amid the charms of nature, the equal, though widely different, charms of art and culture. The assistance of competent artists in such matters would not be financially so difficult to procure as might be supposed, for the artists are convinced of the vulgarising effect of the present style of advertising pictures, and there is chivalry enough in the artist world to induce many, probably, to think more of the good they would be doing than of the remuneration to be gained in the first instance. And if it became established in public opinion that a higher style of art for advertisements was the right thing, the artists would reap benefit from the movement in the end, even if they were to sacrifice themselves a little, commercially, in initiating it.

The question of "the nude," as it is called, came up again at the Congress, chiefly *apropos* of a paper by Dr. Phené, in which the author laid unnecessary stress on the vicious use of the figure which had been made in some periods of

* Browning.

art, or we might rather say of the corruption of art, and it was argued that nude statuary and classical subjects were out of place in modern countries. This we entirely dissent from, as our readers would expect. In regard to subject, although it is quite true that we do not want to have the well-worn types of Greek Venuses and Apollos and nymphs reproduced to us (the rock on which Gibson wrecked himself), it is true that sculpture remains still, as much as ever, the finest medium for representing ideal thoughts in a plastic form, and that idealising means getting rid of the conventional. On this point we beg to quote the judgment we heard one day from a very young lady, a dear little girl of seven or eight, greatly interested in her small way about the Academy pictures, and who betrayed especial admiration of Mr. Poynter's "Visit to Æsculapius." An older relative was inclined to check her admiration of it, as a picture not entirely "proper" for little girls to look at, but she answered, "Oh, but you know, when you see a picture like that, you must *think*." The child had evidently got into her small mind the notion that this was ideal art, and not to be considered in a more realistic way, though she could only express it in that vague manner. It is a pity that some of the older children who range round our picture-galleries, and profess to have their sensibilities shocked by the nude pictures, cannot have it got into their heads that when they look at some pictures "they must think." Professor Richmond, it is true, in his reply on the discussion of Dr. Phené's paper, very rightly drew a contrast between the healthy and the unhealthy nude picture, speaking strongly in regard to the character and feeling of some French paintings of the class, more strongly and explicitly, in fact, than we generally hear a painter speak. In the course of the discussion, Mr. Rathbone said that the conflict which was raised in Liverpool in regard to Tadema's "Venus" a year or two ago had led to an advance in perception on the part of the public, as they had three nude figures in the present exhibition, of which no one complained. We always considered, as we before said, that Mr. Tadema's picture was a bad one to base a controversy on the subject on, because it is open to the objection of being too much of a mere artist's study, certainly not an ideal picture, or one before which "we must think." Still, the fact mentioned by Mr. Rathbone illustrates what we have often said, that the public must become habituated to the free display of the figure in art, and that the more they are so the less they will have any feeling of impropriety about it, and the more they will come to understand its unequalled beauty and its value as a means of the highest expression in art. As in many other cases, propriety in this is mainly a matter of habit or convention. At all events, people who do not innately feel how much nobler a thing is the human figure *per se*, when shown in a fine and healthy state of development, than when treated as a mere clothes-peg on which to hang a mass of often unhealthy, cramping, and ill-designed garments, had better let art alone altogether.

THE PAINTINGS IN THE GREAT ROOM OF THE SOCIETY OF ARTS.

The paintings by James Barry, R.A., which for close on 100 years have adorned the upper portion of the walls of the Society of Arts' Great Room in John-street, Adelphi, have just been carefully and successfully cleaned of the film of dirt which has latterly obscured much of the drawing and colour of these large works. Their refreshed appearance will be hailed with pleasure by the admirers of Barry's style of art. It opens up a new life, as it were, for the works, and affords a favourable opportunity for new studies to be made of these hitherto almost obliterated paintings.

Whilst for rich glow of colour, although there are unquestionably some bright and luminous passages, one might not propose to draw a comparison between these works and some of the great paintings in the Ducal Palace, at Venice, and whilst for composition and draughtsmanship one would not, either, propose to put them into the lists with the Sistine Chapel frescoes, they are nevertheless important as works of art, and, at the time at which they were done, when an affectation of Classicism pervaded a large section of the productions in fine art and literature, they were probably as able expressions of a curious bent of imagination, as any that then evolved themselves in colours on canvas.

From his early days Barry seems to have shown a predilection for Classical mythology, the influence of which was inherited in these times from the painters of the Renaissance. He painted a signboard for his father's public-house, with a figure of Neptune, and, much later, after his visit to Italy, where he became still more strongly imbued with Classic idealism, he, like many others of his contemporaries, dressed passing events in the guise of antique episodes. For instance, his "Death of General Wolfe at the Battle of Quebec," was a Classic composition of nude figures. In a spirit counter to such mannerism, as its opponents held it, Benjamin West treated the same subject realistically, and, when criticised for so doing, he maintained that the battle of Quebec took place in a locality of which the Greeks and Romans never heard, and that in 1759 there were no warriors clad in Grecian and Roman costumes. This blow at Classical affectation served to foster the feeling for realism, and was not without influence even upon Sir Joshua Reynolds.

We might glance at the difference between the classicism of fine art under the presidency of Sir Joshua Reynolds, and that under the presidency of Sir Frederick Leighton, were it not that the question is a large one, and would require more space for discussion than is at our disposal. At the same time, we may, for the sake of illustrating our allusion to this question in a cogent way, recall to our readers' remembrance Mr. Poynter's painting of "Nausicaa," which was exhibited at the Royal Academy in 1879. In this we had Mrs. Langtry's face appearing upon the shoulders of a Grecian maiden playing tennis with Nausicaa; but this adaptation of a modern face to an ancient costume does not savour of the solecism and anachronism perceptible by probably every one who looks at Barry's Alfred the Great leaning upon the shoulder of William Penn, who is showing his code of equal laws to Lycurgus; or at Sir Francis Drake and Captain Cook as Tritons swimming attendance upon Father Thames.

When James Barry generously offered to paint the walls of the Society of Arts' Great Hall, the opinions of Montesquieu and Winckelman were working an effect in teaching people to observe their own particular capabilities and capacities. Thus it was said that English people were devoid of imagination, taste, and sensibility; that they failed in works in which genius was necessary. These and other assertions, which might now be held to have become obsolete,—if they were ever more than ambiguous and loose,—seem to have stung men like Barry to the quick; and Barry, almost foremost in the movement of refuting them, wrote and painted to disprove the unpleasant dicta of the foreign philosophers and critics. In a letter to the Dilettanti Society, published some time after the completion of his Society of Arts pictures, he stated that his intention had been of endeavouring to effect a union between the Grecian style and character of design and "all those lesser accomplishments which the moderns have so happily achieved."

Before briefly describing these pictures, we may mention some circumstances which led to their production. In 1776 the Society of Arts, in possession of its new house in John-street, Adelphi, offered the loan of its premises for the exhibition of paintings to the members of the then young and growing Royal Academy, upon the consideration that the members should decorate the walls of the Great Hall. These terms of lease, however, the Royal Academy, under the presidency of Sir Joshua Reynolds, rejected. In the following year, "James Barry, who had signed the refusal, volunteered to decorate the room without any remuneration." The "Handbook of London" says that when he made his offer he had but sixteen shillings in his pocket. The Society of Arts accepted it, and supplied him with the necessary materials during the six or seven years which he appears to have taken to paint his pictures. He was allowed to make what money he could out of the admission fees paid by the public who came in to see his work, and the Society also made him a present of 200*l*. When he died, his remains lay in state in the great room of the Society.

His series of paintings consists of six large panels, entirely filling the upper half of the walls of the room. At each end of the room are a pair of large square paintings, the two long sides being devoted each to a single composition. The subjects of the four square paintings at the ends are,—"Orpheus," "A Grecian Harvest Home," "The Thames," and "The Society of Arts." The "Victors at Olympia" are portrayed upon the length of wall opposite the entrance to the hall, and facing this is a composition of equal size, entitled "Elysium, or the State of Final Retribution." The text upon which this great pictorial sermon is preached is "That the attainment of happiness, individual as well as public, depends upon the development, proper cultivation, and perfection of the human faculties, physical and moral, which are so well calculated to lead human nature to its true rank, and the glorious designation assigned for it by Providence."

In the "Orpheus" picture, which is the first of the series to be examined by those who desire to follow Barry's development of his subject, is depicted the god, singing divine poems; his right hand stretched towards the sky, and his left hand holding the traditional lyre. Beyond him is a wild and mountainous district, and upon the slopes may be detected a woman milking a goat. Her two children sit near the entrance of their rustic habitation, above which is lurking a lion ready to pounce upon them. Further in the distance are two horses, one of which is being attacked by a tiger. In the foreground are groups of figures of a barbaric type, in various attitudes of attention, as they listen to Orpheus's music. The motive of this picture is said to be one which may show the benefits accruing to mankind from religion and poetry, and the necessity of a pure civilisation in lieu of barbarism. Between the "Orpheus" and the "Grecian Harvest Home" is an upright panel of H.M. the Queen and several of the royal children, painted by J. C. Horsley, R.A. It completely disassociates itself from Barry's paintings, though it conduces to the decorative unity of the room. The "Grecian Harvest Home" is, of the whole series, perhaps the merriest and brightest. Young men and women are dancing to the tune of pipes and tabor round two terminal figures of Sylvanus and Pan. The landscape is that of a rich agricultural country. The harvest is being carried; a marriage procession is wending its way from a temple. With the view of emphasising the season of the year, and to add to the brilliancy of the picture, Ceres, Bacchus, Pan, and others are benignantly smiling upon the scene from the clouds, whilst a peacock,—"Juno's bird with eye-spotted train,"—is perched upon the shed on the right of the composition. We now come to the long triumphal train of the "Victors at Olympia." Suitable to the shape of his long stretch of canvas, Barry has adopted for this subject a sort of frieze treatment. The Olympian games are terminated; and the prize-winners are defiling before the judges, from whom, and in the presence of a concourse of spectators, they receive their olive wreaths. At the head of the procession almost, is a group of two athletic figures, bearing on their shoulders their aged father,—"Diagoras of Rhodes," "who having in his youth been celebrated for his victories in the games, has in his advanced age the felicity of enjoying the fruits of the virtuous education he had given to his sons amidst the acclamations of the people of Greece," some of whom are strewing flowers around the old man's head, while one of his friends is grasping his right hand, and supposed to be making the celebrated speech recorded on the occasion,—"Now, Diagoras, die, for thou canst not be made a god." The Earl of Chatham's portrait, robed as Pericles, in conversation with Cymon and others, is near the athletic group. Behind comes a spirited horse-racer, who is preceding a chariot, drawn by four horses. In the distance rises the temple of Jupiter Olympus. To the left foreground is a sitting figure of Barry himself in the character of Tymanthes, holding a picture of the Cyclops and Satyrs. Figure-drawing and rendering of spirited action are artistic features of this painting. Turning, now, to the adjacent end of the room, and above the rostrum of the president of the Society of Arts, we have Mr. Cope's full-length panel of H.R.H. the late Prince Consort in his robes of the Garter, a painting corresponding in size to that of Her Majesty the Queen. On the left of Mr. Cope's upright panel is another four of the Barry series, "The Thames." The most striking object in this is probably the huge and unwieldy construction, supported by Tritons, which is said to be a "Naval pillar, mausoleum, observatory, and lighthouse." In front of it, to the left, is Father Thames in a marine car, surrounded by sea-gods, typical

of Europe, Asia, Africa, and America. In the immediate vicinity of the car appear the heads of Sir Francis Drake, Sir Walter Raleigh, Sebastian Cabot, and Captain Cook, placed on the shoulders of Tritons. Sailing-ships and some slight coast scenery are indicated in the background. Among the sea-nymphs, introduced as a tribute, apparently, to music, whose claims as an art or a science are neglected in the great Elysium painting, the portrait of Dr. Burney, Henry Purcell, and Dr. Arne, not to name other famous English musicians, have no place with the various eminent men whose portraits Barry has included in his series. Considering the stir which Handel was making in the musical world, especially with his performances at the Foundling Hospital and Vauxhall Gardens, about Barry's time, it is a matter of surprise that music should have been so scantily treated by Barry, unless, indeed, he was deprived of sympathy with this sister art. The painting on the right of the Prince Consort's portrait represents the Society of Arts. Here is an assemblage of distinguished persons whose names are connected with the early history of the Society, from the founder (sitting in the left corner), Mr. Wm. Shipley, to Lord Romney, the then president of the Society. A farmer is displaying specimens of grain to the president, Mr. Montagne; a philanthropic lady of distinction is showing off the work of a young woman; and the Duke of Northumberland, and the Earl of Radnor,—the son of the Society's first president,—are examining some drawings by young students who figure in this group. Many portraits of eminent members and vice-presidents of the Society are to be found here. Amongst them is that of Dr. Johnson, who appears between the Duchess of Rutland and the Duchess of Devonshire. The accessories of the picture consist chiefly of portions of well-known public buildings in London,—like Somerset House and St. Paul's Cathedral. A picture and a statue are introduced to show the Society's connexion with the fine arts. We now come to the sixth and last painting of the series. It is that of the "Elysium," which, as we have said before, is the companion in size to the "Victors at Olympia." The Elysium here depicted requires, for the enhancement of its glories, that a gloomy, garish Hades, inhabited by vices who are being whirled towards a fiery gulf, shall occupy an important position on the right of the canvas. A striking figure, forming a sort of link between the Elysium and Hades, is a great female archangel, with immense arm and hand outstretched over a corner of the Hades. A little above her is a figure of a seated guard in contemplation. The main portion of the great canvas is filled with a crowded series of distinguished men,—poets, philosophers, potentates, legislators, artists, architects, &c.,—those in the foreground forming picturesque groups in varied attitudes. Much of the composition partakes of that convenient conventionality of arranging rows of heads which has been adopted almost as much by early Christian mosaicists and formal fresco-painters as by the great Tintoretto himself in his gigantic work of the "Day of Judgment," in the great Council Chamber at Venice. At the same time, there are many less uninteresting and formal portions in the "Elysium," and some good figure studies. Without a key-sketch, visitors will be somewhat puzzled to find out all the celebrities who, represented by Barry as having "attained the glorious designation assigned for them by Providence," are here congregated together in more than social amity. A former critic of this picture, some thirty years ago, said of this "Elysium" scene that the artist had "with wonderful sagacity, and without any of those anachronisms which tarnish the lustre of other very celebrated performances, brought together those great and good men of all ages and nations who have acted as cultivators and benefactors of mankind." In a composition like this, based upon purely imaginative conceptions, anachronisms, so far as human nature understands the word, are evidently unavoidable, and it can only be in the hands of a great master to so control the impulses of imagination that by dignity of treatment, or some such means, ridiculous effects which, as a rule, are the result of anachronisms, may be avoided. Thus, with much deference to the genius of Barry, it is within comprehension that an observance of simplicity and even uniformity of costume might conduce to the realisation of a more solemn ideal than that which is expressed in broad-brimmed Quaker hats, snuff-coloured suits, togas, and chlamys, Imperial Roman armour, and Saxon fur-trimmed cloaks, a quaint *mélange* of all known costumes. At the same time, one cannot shut one's eyes to the difficulty of making popularly intelligible who is Homer, who Shakspeare, who is Phidias, who Inigo Jones, or Sir Christopher Wren, without using the distinguishing marks which the costumes of their different periods offer.

It is interesting to note that the condition of the paintings is fairly good. The pigments used by Barry do not seem to have been mixed with deleterious vehicles, and excepting for high lights, are not massed up into thick impasto. There are consequently few, if any, cracks. This condition has, no doubt, favoured the cleaning operations, which have been of a very simple character, skilfully carried out under the superintendence of Mr. F. W. Andrew, of the Art Department of the South Kensington Museum.

AN ÆSTHETIC INSURRECTION IN INDIA.

From the more observant of Anglo-Indian residents and students there has been not infrequently a lamentation over the injury done to the indigenous art of the great peninsula by the importation of British arts and manufactures, and the consequent perversion of the native Hindoo taste in the effort to produce or imitate European art. In the matter of architecture, earliest of all and the most persistently, we have in our own columns expressed regret in regard to the prevalence of bad Renaissance in modern Hindu palaces and other buildings, displacing the native style of the country. Others have brought home to us similar reflections in reference to the decorative art of the Hindus, and, if we remember rightly, in reviewing a little while since Dr. Birdwood's guide to the Indian collection at South Kensington, we called attention to his remarks on this topic. It is to this gentleman that we owe the intelligence that the Hindu mind is itself awaking to a perception of this false æsthetic situation, and that something like "revival-hymns" in praise of indigenous art are being systematically sung in the market-places in the towns of western India. In a communication which appeared in the *Times* of the 14th, Dr. Birdwood gave some remarks as to the general nature of the movement, and a translation of one of these revival odes is subjoined. He affirms that the district in which this movement has arisen is one which has advanced immensely in material prosperity of late under our rule, but in spite of this there are people there who are "not happy." Their unhappiness has found vent in ballads (*kirtans* is the original word) which are sung by itinerant minstrels who profess to be indifferent to gain, even to refuse money for their songs, and to be anxious only to disseminate principles. As you strolled into the market of such a town as Indapur, for instance, on a Sunday afternoon, the chief attraction would be not so much the shops as the hustling crowd of sightseers and purchasers, which "is sure to be thickest round those shops in which are piled up from floor to roof the rolls of many-coloured Manchester goods. It is in the midst of such an eager huckstering concourse, gathered from all the country-side around, that these industrial ballad-singers are wont to appear. A space is cleared around them, and after a little tuning up of their banjos and hurdy-gurdies, they at once begin their song." The translation of the song (one of them) was then given entire in the *Times*, and a very curious and significant composition it is.

It commences, like all Hindoo compositions, with invocations to various gods of the immense Hindoo hierarchy, to "the auspicious Saraswati, who is fair and fragrant as the sweet white flowers of the jasmine," "to the elephant-headed god whose vehicle is a mouse," &c.; and then follows an enumeration of the fourteen sciences, viz.:—Divine knowledge, chemistry, music, the Vedas, astronomy, grammar, archery, swimming and navigation, logic, the art of love, knowledge of the horse, riding, courage, and palmistry. But, after another invocation to the "one-toothed god," comes the sad declaration that "the fourteen sciences have disappeared." The real gist of this sweeping and rather alarming statement seems to be that the native artists are deteriorating in the practice of their art, and that machine-made work is taking the place of handwork. Once an Indian shawl was unequalled in other countries, once a pair of waist-cloths were sent packed in a mango-stone; but there is no one who can make such work now. "Remember who our ancestors were, and be vigilant." "Necklaces, bracelets, rings for the fingers, and earrings set with gems, beautiful earrings for the women, of diamonds and double drops of pearls, all have been lost. Women now adorn themselves with gilt ornaments. Imitation jewelry has been introduced; real things have disappeared, and false ones are used for show." European learning is condemned, and the study of it by natives. "Some have become B.A.s, and some have become M.A.s, but have no money" (a state of things not quite unknown in some Western countries), the significance of the remark lying in the idea that evidently pervades the whole composition, that loss of the real wealth of India has resulted from this decline in her native manufactures; though at the same time the most prominent and foremost complaint is that art has been deteriorated. There is no denial made of the excellence of our manufactures from some points of view. The people who came from England "filled the country with beautiful-looking and charming articles, and had songs sung in their praise. This is attributable to the skill of these people. Glass came first. It was a great shock to caste. Now there are not five persons left who do not buy it. The high-standing metal candelabra have disappeared, and 'wál-shets'" [wall-shades,—this seems to be the English name Indianised] "have taken their place. Their hanging globes have brought about a general pollution of the four castes. Brass hanging lamps have disappeared, and glass chandeliers have increased. Oil has passed into the background, and kerosene oil has come forward. The wicks have been blown out, and candles which make people sick are lighted."

This and some other remarks belong rather to the prejudices of a *laudator temporis acti* pure and simple than an artistic reformer. But some of the succeeding remarks have more direct point:—"Articles which only seem bright, but which are in reality as deceptive as fire-flies, are freely purchased. Their nails and sickles, and bright scales, their knives, scissors, and spoons are good only in appearance, but they are not durable, and are made for sale only, like the *palgunika*" (ladies of a certain description, we believe). Is this a true bill? English cutlery may be presumed to be still worth something when it is good; is all the rubbish sent out to India, or are our minstrels only speaking out of the lips of general discontent? Wearing apparel has been subjected to the same unhappy innovations. "Broadcloth has displaced the thick cashmeros, as also the thin *alwans* [a sort of cotton cloth]. Their sheetings appear cheap, but they are not so beautiful as flannel, so warm, so soft. Their imitation waist-cloths have borders, which are dyed with imported powders [aniline dyes]. The borders appear, but their colour is false and transient. You have a great liking for these things, and use them, and reject the indigenous cloth. You at this moment seek after Horrocks's long-cloth." The solemn tone of this last accusation is very impressive, and no doubt "Horrocks" will have felt it. "You have been enticed by the show of their skill. Even if their goods are delivered packed up, you blindly receive them." It is, however, satisfactory to find this statement followed by a testimony in favour at least of our moral character, that "although they know this, they do not abandon honesty," and that some of our stuffs are very good in their way. But in other respects, our innovations in the matters of utensils and dress are to be protested against. "Porcelain dishes have entered our houses and filled our brazen dishes with fear." This seems to reverse the proverb about the clay pot and the brass pots. "You ought to purchase country shoes, but you think it a pleasure to buy their boots and pumps, with their appurtenances, blacking and brushes. You have a great desire to have their umbrellas, walking-sticks, Guernsey frocks, neck comforters, waistcoats with green and red buttons" [where on earth do these last come from?], "caps, gloves, and stockings, double coats, watches, and chains. These you purchase with great delight, and you pour out the crucible of wealth to fill up the holes in the houses of foreigners."

After some further description of the variety of Western-made utensils of different kinds which have supplemented the Indian brass-work, there is an exhortation to the hearers to love their country, to cherish pride, and to promote the arts, with the addition that this latter course is the way to acquire wealth; and the song coincides with the expressed conviction that,

although there was much to complain of in the doings of the resident Government officials, if their sufferings become known to the Queen, "who is our mother," all will be speedily set right.

There is a good deal in the matter and manner of this curious production which, we confess, would lead us to the conclusion that it is not a spontaneous outbreak of popular feeling so much as a deliberately-conceived protest on the part of a section of people who are discontented under our rule. At the same time the feeling that an inferior art has taken the place of the art of the country is obvious and in some passages apparently sincere and strongly felt. If asked what is to be done in such a case, by those who regret the corruption of the purity and richness of Indian art for the sake of a sham Europeanism, all we can say is that we do not believe anything can be done. It is a natural result of the invasion of a land by a foreign race, that the native race are influenced by the arts and manufactures of their invaders. It always has been so more or less; one nation cannot mingle with another without a great deal of mutual imitation and interchange of fashion in arts and manufactures taking place. However superior we may know the native art to be, ours is new to them; and to a large proportion of them, no doubt, new styles of design and new accomplishments in manufacture are more interesting than the style which has been handed down to them from their own ancestors. It is impossible, we imagine, to take any definite steps to counteract this: we may regret it, and we do regret it, but it is almost a law of Nature, and we can really do nothing definite in opposition to it.

The neglect of indigenous art in favour of that introduced by Europeans is, of course, not peculiar to India; we have just the same thing in Japan, where the most curious interchange of tastes has been going on, our people having imbibed a love for Japanese art, while the Japanese themselves are becoming Anglicised in their tastes. All this is only part of a general movement which must go on increasingly as the constantly increasing facilities for travel bring together into close intercourse peoples who were formerly precluded from any real knowledge of each other. The world is becoming, in fact, Europeanised, and will become more and more so, and one necessary consequence of this is that native arts, which formerly were marked by a distinct style and taste, will lose their special character, and blend with the art of the European world, though not without influencing it very decidedly in the process. The unconscious and spontaneous character of national arts will give place to the self-conscious art of cultured societies. At present the loss is very obvious, but we need not think that therefore no good result even to art can ultimately arrive. As long as we, in mere caprices of fashion, adopt the style and productions of the art-work of the Eastern countries with which we come in contact, and as long as they take up with our art merely as a novelty that attracts them, the result must be unpropitious to a true artistic temper of mind on either side. But we have gained much, and may gain more, from a closer acquaintance with Eastern art; and in the end Eastern peoples whom we come in contact with may gain from the European mind a power of analysis and criticism which will bear new fruit in its turn. We may regret the loss of the marked varieties of national arts, but we cannot prevent their assimilation; and a "revival movement" such as that we have had described to us, even if absolutely sincere, can do nothing permanently to avert the process. What we must hope for is that the West will catch the influence of the rich fancy and the harmony of colour of Eastern work, and that the people of the East may learn from Western thought and culture how to carry their artistic impulse into new forms, based on choice and not merely on traditional usage.

Epworth.—The Church Needlework Society of Epworth has presented, as one of the results of its labours, a small stained-glass window for the east end of the south aisle, to fill the place of the old window which has been taken away to make way for the new one. The window, which is of one light, was put in the day before the harvest thanksgiving. The subject is "The Good Shepherd." The window has been executed by Mr. W. H. Constable, of Cambridge, and the fixing of it was done by Mr. F. Grant, stonemason, of Epworth.

FROM THE BANKS OF THE SEINE.

Rarely has public opinion, which may, by the way, be said scarcely to exist in France, such as we understand it, raised its voice so unanimously as it has within the last few weeks against what has variously been named, among other titles, the "Infections of Paris," the "Odours of Paris," or, more simply, the "Drains." For some time past it is undeniable that in certain parts of the capital the drains have been giving forth odours such as are calculated to alarm not only the timid, but the properly cautious. On this point all are agreed. As to what cause to attribute the dangerous odours and what remedy is necessary there is much discussion, which has extended not alone through the columns of the daily journals, but, after passing through the municipal council, has been continued in the august precincts of the Institute. The complaints as to the existence of the odours and the inconvenience caused received only too terrible support when, a few days since, a fatal accident in the drains, and in which several workmen lost their lives, asphixiated by the foul air, excited a wide-felt attention. The inquiry as to the exact reasons for the existence of the bad gas that caused the death of the men is at present pending; but the public have almost made up their minds regarding the cause. The drains in Paris are intended for the street dirt and comparatively clean water. It would appear, however, that they are too often used as receptacles for the household refuse and fœcal matters, for the removal of which there exist several systems, all in daily use, in Paris. As happens in every great city, the drainage question is far from being in a satisfactory condition, and much as the municipality expend on the provision and maintenance of the drains throughout Paris, at this moment whole streets are pulled up, and neighbourhoods until now unsupplied, are having a system of drainage laid down. By the nature of the construction of the drain and its numerous mouths in the street, should the slightest action of fermentation commence, the gases escape directly into the air,—and this is the cause of the recent complaints. A sufficiency of water, some urge, is necessary to well sluice the drains. Plentiful as seems the supply, so far, it would appear to be inefficacious; more water is wanted,—and in what large town is not more water wanted? With the proper quantity of water, argue many, the foulest deposits may be prevented from infecting the air. There remains only the question of the eventual outlet of all the refuse, which here in Paris, as in every great city, is no small matter. Already a large quantity is profitably utilised on the great plain of Gennevilliers, but the site is insufficient; and the recent proposal to utilise for this purpose a portion of the forest of St. Germain roused thunders of opposition. The objectors to the flushing system very warmly condemn, on hygienic grounds, the apparently cleanly method of sluicing the drains, into which everything shall have been allowed to flow. Others urge the efficacy of a comparatively recent innovation on the primitive "fosse,"—which often remained, and still remains, unemptied for a year or more,—the so-called *système diviseur*, by which the fœcal matters are roughly separated from the liquid, being retained on a sort of strainer, contained in a zinc cylinder (*tinette*), removed from time to time. But this system,—though a decided improvement on the older and pestilential mode,—is not perfect. There remains, therefore, to be applied some method by which no solids can enter the drains, as it is proved by the chemists that the mere liquids are harmless. The solid matters thus collected, and properly treated, may be made to serve excellently for agricultural purposes. Till this system is satisfactorily and universally applied, the drainage will continue to trouble and punish alike the worthy and unworthy residents of Paris. These are questions of sanitation that cannot be carelessly put aside,—they demand, not alone in Paris, but in every great city, immediate and searching attention, which can scarcely be more profitably applied than to such points as these.

An important branch of Parisian commerce has been for some time past suffering from a serious strike. The cabinet-makers of the busy and crowded Faubourg St. Antoine have demanded higher wages. The origin of the movement may be traced back much further than is apparent to the ontside observer. Indeed, as long ago as July last, symptoms of disaffection were noticeable. The *ébénisterie* trade being a very large, important, and exceedingly respectable one,—Paris is its head-quarters,—the serious nature of the lock-out may be understood. In other parts of the country the Paris lock-out has incited discontent. The three principal points of the men's demands bear on the reduction of the day's work to ten hours, though on this head no great stress is laid, as the arrangements regarding time are matters to be settled between the employer and his men; the second point bears on the increase of the hour's pay to 80 centimes,—nearly 8d. In this case the masters have seriously urged on the men to remember that the chief source of profit to the trade lies more in the manufacture of ordinary everyday furniture than in that of artistic productions; such is always the case in businesses of this sort. Wedgwood, it will be remembered, recouped himself for his costly outlays only by the sale of his purely serviceable wares, which are to be found to this day in common use in many parts of the Continent. The third point of the programme of the workmen's delegates claims for piecework a rearrangement of the tariffs, based on the price adopted for the hour; this of course depends on the second point. After due deliberation, the masters' delegates made known their replies to the men. The question of the hour's work was agreed to; 75 centimes was the pay accorded, subject to proper revision; the delegates further promised to those men who would agree to these terms that the workshops would open on the morrow. To this, the men's delegates replied that they had no power to accept the diminution of the price of the hour's work, and so the settlement was put off. If the crisis is prolonged, many millions of francs will be lost to the country, for in strikes of this nature masters and men suffer alike. New relations are opened, new inlets to foreign enterprise, which will with difficulty be closed again. In one of their many resolutions, the masters admitted that "it was notorious that business with foreign parts and with the provinces was following a downward slope"; the competitors most dreaded, it would appear, are Belgium, Germany, and the United States.

In a chronicle from the banks of the Seine it would be, indeed, unjust to pass over without mention the death of Jules Jacquemart, an artist whose name and works have long been familiar in England. Carried off at the early age of forty-two, Jacquemart has by his industry made for himself an enviable reputation as an etcher, who may be said to have been the first in modern days to throw an artistic charm into his technical representations of articles of domestic decoration. His numerous illustrations to the work of his father on the "History of Porcelain" are familiar to the artistic world. His works, which have appeared from time to time in the pages of the *Gazette des Beaux Arts*, reprodnctions of famous pictures, &c., have long been remarked as specimens of etching, but which are, however, not invariably as good as his representations of armour, china, and furniture.

Since we have mentioned the death of poor Jacquemart, it would be unjust not to devote a few lines to a notice of the death of Jules Labarte, whose name is familiar to many in his profession. Jules Labarte, unlike Jacquemart, died at an advanced age, for he was in his eighty-fourth year. His name will always be connected with the superb illustrated work on the "History of the Industrial Arts in the Middle Ages and the Renaissance," and which long since received the honour of an English translation. Another of his works, the "History of Enamel Painting in Antiquity and in the Middle Ages," is still an esteemed handbook with collectors, while to the professional reader and archæologist, the "Imperial Palace of Constantinople and its Approaches, such as they existed in the Tenth Century," is a work of more than usual interest. M. Labarte succeeded, now some nine years since, as perhaps will be remembered, M. Texier, as travelling archæologist. He had long been a free member of the French Academy.

Mural Painting.—Mr. Philip H. Newman has just completed, on the south wall of the chancel of St. Peter's Church, Belsize Park, a painting representing Our Lord healing the Sick, size 15 ft. by 8 ft. It is a spirit fresco after the method recommended by Mr. Gambier Parry, and adopted by Sir Frederick Leighton in his lunette recently finished at South Kensington.

ON THE RELATION OF ART TO SOCIAL SCIENCE.*

I have said that the reproductions in photography should include other examples than pictorial art, for though examples from that ancient and modern form of art are necessary to the beginning of cultivation, not only on account of their innate beauty of design and form, but also on account of the beautiful ideas by which they have been stimulated, with which they are connected, others of a more directly practical nature should be added. And for this reason: among those,—in fact, most of those who are being educated by our Board Schools,—there are children who may become members of trades in which taste and a faculty acquired for design will be of great service. So photographs of beautiful ironwork, such as that beaten by the Flemings and Dutch, will be invaluable as training the taste of the child who may become a blacksmith. Again, the future cabinet-maker may have his imagination stimulated and his admiration kindled by examples of Italian or Dutch marqueterie. He who by-and-by is to carve the capitals of future churches, and,—who knows?—perhaps to design them as well, will not be the worse off for having had in childhood his attention drawn to casts from some carvings of the front of Wells Cathedral or other examples in the art of which he is to become so important an exponent. Nor is it impossible, but highly probable, that artistic natures dormant from want of calling out, or from want of opportunities of seeing beautiful art, may be awakened into a desire to design by a stimulus exciting a desire to emulate the beauty of the art they are permitted to see, and concerning which they may receive valuable instruction. Although I have ventured to lay some stress on the practical advantages of learning to draw, it is not so much upon this that it appears necessary to appeal, for I believe that at present, in the Board Schools, children can learn to draw, although upon a routine as yet not satisfactory. Yet the question arising for our consideration is really whether the scholars would not be wholly benefited, improved, and for their lifetime refined, by being accustomed in early childhood, and, during its impressionable educational period, to have before their eyes art, in some of its foremost, poetic, and practical phases constantly. And whether, being thus trained and accustomed to see beautiful works, the taste and workmanship of the coming generation would not be elevated, its labourers more refined, and the need for better art become a part of its natural existence. Farther, whether such refinement begotten of art would not act upon morals, reduce drunkenness and crime, having sown the seed of perceptions in a beautiful direction, in a class sadly needing them, and if directed in practice, benefit the career afterwards chosen or forced by circumstances upon the individual scholar. It seems to me here at this Social Science Congress that we meet rather to suggest and discuss possibilities, than to draw up any definite and possible Governmental schemes by which our ideas might be carried out, and that we must leave it for others versed in political or other economy to tell us how far the rates would stand the pressure upon their funds of an outlay needful to carry out our suggestions. But this much may be stated, that if it were proved that by an increased interest given to artistic cultivation, if more insistance were made by the Government upon it, and it became generally recognised that our lower classes are capable of æsthetic culture, and that such culture would tend to the progress rather than to the decline and fall of our nation, our country would not be slow to expend a portion of such money (as is now spent upon a 100-ton gun, to be shortly superseded by a further improvement) upon the taste and moral advancement of its people. The real point of difficulty is to convince the general mass of men, Governmental or other bodies, that the æsthetic soul is worth saving at all, or that art and taste are of any value whatever, excepting as a pastime for the rich, or a *dilettante* diversion for the lazy. On the other hand, there is a set of, as some think, madmen, who imagine that the influence of art has drawn nations from barbarity; that the Christian religion has found it a fair handmaid in her teachings; that the lower classes of all countries have emotions worth educating; and that these lower classes are more than beasts of burden,—beings whose welfare, happiness, and taste we who have experienced the advantages of culture are bound to assist and foster.

It will very justly be asked, Who are there, if such a scheme as is here suggested he thought practical, whose power in teaching would be sufficient to carry it out with success? The answer to this question is not simple. The Government Schools of Design are constantly educating men as art-teachers; these are sent from the South Kensington Museum to take in charge local Art Schools. Where those have been educated others can be educated; the supply will come when there is a demand generally. But great care would have to be taken that those who are to teach and guide the tastes of the Board scholar should not only he qualified to do so in the practice of drawing, designing, or carving, but that they should be men enthusiastic about their educational work; capable, too, of giving clear lectures on art, in precept and practice, to children, and, while they instruct, to amuse and excite their young minds. Beyond these, teachers being now in an age of much voluntary work, much self-sacrifice on the part of the upper and educated classes, no doubt many willing persons could and would be found willing to give up a small portion of their time, now and then, to lecture to their poorer little brethren, and to give to them some of the result of that art-education which circumstances have allowed them to be possessors of. Time will not allow me to go farther into this side of our question; slightly, indeed, only, and rapidly, have I been able to touch upon it, but the suggestions I have made may be modified or augmented by others, if any are found to take interest in them. There are other questions which I am anxious to touch upon now. It was asked in the earlier part of my address what agencies are at work in our great cities which are acting against the artistic development and good taste of the poorer class?

Now there is one which will at once appeal to us all. The great competition existing in our age, the anxiety for prominence, the desire to out-Blondin Blondin, to fall farther than Zazel, to expose the last result of African conquests to view, makes advertisement into a possible art. What a means this system of large advertising pictures might be made, if rightly used, for the education of taste among the lower classes! What a blot and abuse it is in our streets as at present used! It is difficult to find words strong enough to declaim against the miles of walls which are covered with vulgar and revolting placards. And now the Brobdingnagian dimensions they assume are positively alarming in their gigantic hideousness. We have an inspector of plays, an inspector who is bound to see that no public morals are injured by what is produced upon the public stage. Why should we not have an inspector of moral tastes for our still more public streets? It will, perhaps, be said that this would be interfering with the liberty of the subject; that you could not exercise such a right without injury to it. But you have an inspector of architecture, you are obliged to build to a certain symmetry with other houses, the frontage of your house must be in accordance with frontages of your neighbour's house; and furthermore, alas! for the beauty of our streets, the houses must look as much as possible as though they were turned out of the same mould. Well, we will admit that this supervision is a failure, and that the laws under which it acts are detrimental to beauty, invention, and variety. But it need scarcely be thought that such transient works as advertisements would be injured in the subject of their taste by an artistic overseer who would have the public good taste at his heart. I say transient advertisements: this in a sense they are, but in another sense they are the very reverse, for their bad and vile art is lowering to the taste of the very class we are most anxious to elevate, and must leave behind it an indelible injury the reverse of transient. If those who advertise would get the advice of good artists,—and there are among our best designers those who would gladly assist in such a worthy cause,—not only would they profit by the attraction well-designed advertisements would have, but also they would, instead of doing a public harm, as they are now doing by using a powerful weapon in an ostentatious and vulgar way, be public benefactors by disseminating good art in the most public manner possible. We all know the admirable work done by Mr. Walter Crane, in his "Baby's Opera," and by Mr. Caldecott in his illustrations to John Gilpin, and other excellent designs. Taking these two artists, whose facility and taste especially fit them both for designing where rapidity of invention and execution, humour and pathos, are such necessities, let us imagine what a difference there would be on the hoarding boards, omnibus interiors, and railway stations, if the works here were executed under the supervision of such excellent designers. Where at present our eyes are disgusted, our sense of all refinement insulted, we should,—and what is still more important, the workmen and labourers would,—find something worth looking at, something which, instead of lowering, would elevate taste. All the freedom so boasted,—freedom of the press, British rights, cant about liberty,—has had such a swing, and still has such sway, that it may be said to be licence, not liberty; the world has been so busy making itself rich, running headlong after every facility for doing so, has got us into such a state of anarchy, carelessness, and total disregard for matters of taste, that we must look round now and see whether the reaction now setting in against mere utilitarianism cannot be pushed further, and whether the ordinary human being has not, after all, something in his nature well worth cultivating besides his greed for success in money-making.

It must appear strange that any one should dare to mention "the freedom of the press" in a derogatory tone, for its advantages are enormous; but while they must be admitted to be so, certain evils touching upon such freedom cannot be denied. By these evils I mean the low taste of such papers, to give an instance, as the *Police News*, bearing a sheet of odious woodcuts, representing, with the worst possible taste, the last ghastly murder, arson, or wife-beating. It is no exaggeration to say that this art, if art it can be called at all, is doing incalculable mischief both to morals and taste; nor will any one fail to observe, if he take the pains to do so, how knots of children of tenderest years collect round, and with tragic and pathetic curiosity, are rapt in contemplation of these horrid pictures of the basest crimes. When we think what a seed of taste and demoralisation is sown by the fact of children taking into their minds, almost with their mother's milk, impressions so utterly at variance with every noble instinct or healthy desire, so contrary to the pure nature of childhood, we can hardly help feeling ashamed and aghast at a Legislature which, while it is indeed rich in Poor Laws, while it is in earnest, too, concerning the bodily wants of its lowest class, permits such a social scandal to taste and morals to exercise itself upon the childhood of the rising generation of its poor but most sensitive class.

Yet another influence is at work, and this not only upon the morals and tastes, but on the health of our citizens. Of course, to those who do not believe in beauty and morals acting one upon the other, who consider that man's mind is not influenced through his body, who imagine that it is idle and lost time to consider the cultivation of a love of beauty, all that I have said, and what I still have to say, will appear fanciful, Utopian, unnecessary,—in fact, harmful. But those who agree with us, who love beauty and art, and believe in their distinctly moral influences, must see that the absence of light and clear atmosphere, the almost total obscuring of the sun during eight months out of the twelve, cannot but have the most depressing effect upon a class whose conditions of poverty and overcrowding are sufficiently accentuated already.

Were it absolutely necessary, were it indispensable to the comfort of all, that our cities should be covered with a thick pall of smoke, we might be willing to bear with it; but when we know that this is not the case, that such a state of things need not exist, it is exasperating to find that there is such a want of desire among men for the blessings of a clear, clean, bright, healthy atmosphere; that there are very few who regard with any regret that the sun and sky are denied them, being so used to the denial of them; that these shrug their shoulders with some scorn, and even pity, that there should be those who are so weak as to love beauty while they can have money, or that the outward appearance of nature should affect them while their pockets are full. A few days since there was an article in the *Daily Telegraph*, sensible in what it said, namely,—that it was to be lamented that while scientific men were so busy occupying themselves over inventions such as telephones, telephotes, photophones, and other

* By Professor W. B. Richmond, M.A. (see p. 467, *ante*).

fantastical inventions, clever and wonderful, useful too, perhaps, they should not turn their attention to something easy and practical,—having proved their abilities to overcome apparent impossibilities,—which would restore us a clear atmosphere.

As our cities become larger,—and they do and must become larger,—this evil of smoke destroying the surface of stonework must increase, rendering sculpture out of doors almost an absurdity; causing such risk to all kinds of mural decoration that it scarcely seems worth while to attempt it. Embroideries, tapestries, all delicate workmanship suffer,—in fact, are ruined unless protected by glass. The beautiful objects collected by art-lovers during the spare hours from business cannot be made use of as they should be; embroidered curtains from India, or Japan, or Persia, of delicate colour and exquisite work which would perish under the hand of a cleaner, cannot adorn the windows or walls of our rooms; they must be hermetically sealed, put away, or they are ruined. It is really very little use talking about art until this condition is changed, and very little good expecting that we as English, or you as Scotch, people, care about the subject of art, or believe with any sincerity in its usefulness, until we are all determined, each one of us, to believe that beauty is better than ugliness, that it is more important than fashion or wealth, that a clear sky is better than a black pall, and that that noble self-respect belonging to man is far more likely to increase and flourish, under cleanliness and brightness than under dirtiness and dulness. Art has never flourished, and never will flourish, under depressing or degrading circumstances. She is not the sister of dulness, dirt, and darkness; she is the sister of cheerfulness, brightness, and light. She belongs to happy conditions of life, to a contented and thrifty people; she will not go where she is not wanted; squalor and degradation she shrinks from, but she should be the property of the poor as well as of the rich.

The question immediately connected with this Art Section I have not touched upon; the question immediately touching upon my own art I have already lectured upon. Those relating to music and the dramatic art, although I consider them of the greatest importance, I preferred to leave in the hands of such masters in these arts who are here more qualified to deal with them than I should be. Still, though it is not my intention to dwell upon either subject under the pretence of doing it justice, I may permit myself, if you will permit me, to say a few words concerning these arts as refining agents, upon a popular and generally social scale. The growing love for music in the United Kingdom is enormous. Even in the memory still fresh of those younger than myself, London contained but few concert-rooms, and in these but a limited range of music was given; the seats, too, were of such expense that but few, excepting well-to-do people, could afford to avail themselves of them. Now there are many concert-rooms, and continual concerts going on, where the very best music can be heard at a reasonable rate. For one shilling now, instead of three shillings formerly, the works of the greatest composers can be heard. The result of this has been that a far larger circle of people now is interested in the greatest music, and there has arisen a chaster and stronger taste for severe and classical music than heretofore. Good music is no longer called heavy and dull, as the custom of constantly hearing it has caused people to appreciate its sound and lasting merits above the mere passing pleasure,—purely sensuous,—of music having nothing to touch the human heart or intellect in it. By grand music we are lifted out of the every-day burdens of life; we are transported by it to another land, as it were; we are elevated, refreshed, strengthened by it as by a tonic, and encouraged by its recreative powers to go about our labours with renewed cheerfulness and energy. Cheaper and cheaper may our concerts become, so that the whole of our brethren may be able to profit by them.

The efforts made in the direction of dramatic art have been successful in many directions. Would, however, that the public taste had declined in its love for horrors. Would that the theatres were found to draw better for "Romeo and Juliet" than for the "Ticket-of-Leave Man." Let us wish Mr. Irving well, whose sense of the importance of his art as a public benefactor and factor for the product of intellectual enjoyment and taste, has made him, with manly consistency, adhere to his Shakspeare.

If, gentlemen, aught has fallen from my lips of too strong language; if anything said here has wounded the sensibilities of any one, I hope it may be forgiven. It has been my endeavour to place before you, in as strong a light as lay in my power within the limits of my time, that art, to exist, must be national; that the poor should possess it with the rich; that there should be a chance for all to drink of its refreshing streams; and that unless a nation is in pursuit of the beautiful, it can scarcely be said to have arrived at the extreme power of civilisation.

IN THE ART DEPARTMENT: SOCIAL SCIENCE ASSOCIATION.

THE NUDE IN ART.

On the 12th inst. Dr. Phené read a paper "On the Humanising and Refining Effects of Art." He remarked that though popular impression generally gave supremacy to pure Greek art, and considered its effect on Rome and its inhabitants as unique, yet that schools as important, in both painting and sculpture, existed in Asia Minor prior to the great advance in Greek art, and that, indeed, they were the source whence Greek art was taught, and whence it drew its knowledge and refinement. The Ionians, themselves Greek in descent, were, from their geographical position, thrown into contact with the most highly cultivated countries in the world, —Assyrians, Egyptians, and Persians,—and with their natural Greek refinement of feeling, and subtle and delicate perception of the beautiful, not only designed the most exquisitely pure order of architecture, but, as proved by the great wealth attained by their painters, and the enormous sums paid for paintings, must have been masters of that art also, which could not have been otherwise than of the highest order, as the painters had to compete with the most perfect sculptors, to whom anatomy and symmetry were elementary studies. When the wealth and art of Asia were poured into Rome, her inartistic people, untutored, and unable to discern the delicacy of an art which, through the human form and features, endeavoured to represent the mind, saw only the outlines of nude but beautiful beings, which inflamed their imaginations and aroused their passions. And when, added to this, Asia's subtle mysteries were introduced among them,—equally ignorant of higher conceptions concealed under symbolic forms and ceremonies,—they received them in their externals only, which they exaggerated, and at once converted into a source of evil, beneath which ancient Rome fell hopelessly, and from which moral degradation she never recovered. From facts of history the writer deduced, first, the powerful effect of art as a refiner and educator of the mind, if judiciously used; secondly, that the misuse was as dangerous as the proper use was beneficial, and the consequent injury to any nation or community from the introduction of open exhibitions to the eyes of the ignorant, and even of those wanting simply in art education, where those exhibitions permitted the general appearance of undraped statuary or paintings. Art, as a mentor, he said, might and should refine and elevate, and for this, multitudinous examples of the more graceful and endearing acts of life were at command,—life as it was to-day amongst ourselves, known to and fully capable of being appreciated even by the inartistic of every civilised people. The leaders of public taste should use their influence, not only to exclude subjects likely to excite prurient feelings from the higher art-galleries, as was for the most part carefully done, but to prevent general exhibitions of the human form at places of amusement and resort for those who, as a rule, knew nothing of art, and who saw in them only the human figure. Without in any way depreciating the beauty and value of classic sculpture, he submitted that, as we had no sympathy with the divinities of Greece, and the intention of these sculptors being now of no importance, except to the scholar and the connoisseur, they should be restricted to art schools as much as anatomical studies were to schools of surgery. There had, he thought, been a marked decrease in modesty since the extensive exhibition of such objects at the great places of public amusement within the last twenty years.

Mr. M. C. Rendall, Leith, thought that there was a certain amount of confusion in the paper. Dr. Phené spoke of the luxury and immorality of Rome; but they should consider their own immorality if they were to speak of immorality at all. It might be a question whether modern Christianity had done for art what ancient Christianity did for it. The Church of Rome had done more for art than the Protestant Church had done, and although he did not wish to commend the Church of Rome, he must say he thought Christianity generally might do an immense deal more for art than it had done.

Mr. Herdman, R.S.A., as a practical artist, was greatly interested with the paper, and the discussion which had followed. Such a discussion was good for professional artists, because it made them think of the importance of the work in which they were engaged, and the responsibility attaching to them in carrying on that work. It was also good for society to be reminded that the great subject of art was something more than a mere pastime,—something to give a few moments' delight.

Mr. Rathbone, Liverpool, believed there was nothing in art so beautiful as the human form; and if the human form were more generally treated, he believed morality would not suffer, but be very much improved. Even our health and methods of dress might be improved, for we did not want to see the abomination of women making themselves into wasps, or by means of high-heeled boots throwing the whole body out of gear; nor did we want to see ladies, who were so very charming by nature, make themselves hideous by art. The superstition about the undraped in art was completely divorced from any pruriency until these abominable Asiatics came in. It was of the greatest importance, both for morality and health, that we got rid of this idea about the undraped human form. Two or three years ago there was exhibited in Liverpool a picture, by Alma Tadema, which had been hung in the Academy without attracting any notice. The whole town was in arms; but, this year, instead of having one young lady in a nude form, they had three, and not the slightest notice was taken of them, because the people had been told that it was the right thing. In his opinion, there ought to be specimens of the nude human form in every museum throughout the country.

The President (Professor Richmond) said the subject was an extremely delicate one; but one, he thought, that must receive attention. Dr. Phené said he thought the ancient subjects were unfitted for modern art. He disagreed with that statement. He thought they were eminently fitted, especially subjects taken from the Greek poets, not only inasmuch as, by choosing these subjects, the painter might show his exquisite taste in form, but also because most of these subjects were of a highly moral and extremely beautiful character. If they took the whole of the Iliad of Homer, as Mr. Gladstone once observed to him, they could not find a line of impurity in it from beginning to end; and if they took the Odyssey, what perfection of taste and elevation of sentiment pervaded the work. Surely, that being the case, such ideas as were there suggested could find a place upon the canvas of modern painters. If the world was of such a prurient nature that it could not stand at the side of the nude, he was sorry for it. To treat the nude, he was free to admit, entirely depended upon the purity of the individual treating it. Where the mind of the painter was defiled, his art would be defiled. Where his mind was pure, no one would see in his art impurity, excepting those narrow-minded people who went about the world like roaring lions, seeking whom they might devour. Much damage had, it appeared to him, been done in modern times by French art, and the treatment which the nude had received in that country. In Greek art, as Dr. Phené had said, you never saw a trace of anything that the most morally-trained person could take exception to; but he was bound to say that, although he had been familiar with the nude form from his childhood, he could not go into the Paris *Salon* and look at their interpretation of the nude form without blushing. That, he must say, he had never seen in an English exhibition. The nude was always treated by us with dignity. He was quite of Mr. Rathbone's opinion, that our ladies would do well if they did not lace so tightly and wear such high-heeled boots.

WHAT SHOULD BE DONE FOR SCULPTURE.

Mr. Boyes read a paper by Mr. Hamilton P. M'Carthy, offering suggestions for the promotion of sculptural art. The writer endeavoured to show that, art having become influenced by the caprices of passing fashion, painting failed to fulfil its higher functions in historic and figure

subjects; and the older, grander, and more important art of sculpture was utterly neglected. He therefore suggested that copies of the best examples of ancient and modern statuary should be placed in our public parks and gardens, which would not only raise our cities in dignity and attractiveness, but would familiarise the masses with the highest standard of taste and the truest type of beauty and proportion. He further suggested the desirability of the appointment of a Minister of Fine Arts, or other responsible Government authority, empowered to prevent the incongruities in architecture which frequently disfigured our cities. Also, that Government should be petitioned to allocate an annual subsidy for the special encouragement of the sculptor's art, which would doubtless lead to its receiving more general patronage from public corporations, rich mercantile bodies, and the general public. Mr. MacCarthy extolled the citizens of Edinburgh for their public spirit and appreciation of their beautiful city shown in the erection of so many fine public buildings and monuments, putting to shame the metropolis and other richer cities, and hoped that, by the addition of fine ideal statuary, it would become a veritable modern Athens. He also took occasion to announce an important discovery made by a gentleman of a new material for use in sculpture and architecture, which, while possessing the whiteness, beauty, and hardness of marble, was impervious to all climatic influence, smoke, or dirt, perpetually retained its colour, and cost considerably less than any existing material.

Dr. Farquharson, M.P., did not see what the object of the paper was at all. It began by saying that sculpture was in a decaying state. That was quite true. It was so expensive that no one could buy it, and in the Royal Academy it was treated with scant ceremony, so that between these drawbacks and the deficiency of material, there was no doubt it was decaying. Another point they must agree to was that sculpture had been made very unpopular by the very depressing examples of the art to be seen in many large towns,—those unfortunate people sitting in arm-chairs, and dressed up in costume they were never intended to wear. He should like to point out to the author of the paper that Edinburgh had carried out what he recommended. The visitors, he thought, must have observed that in Edinburgh there was a very good statue gallery. Many friends would bear him out in saying that the Edinburgh gallery would compare favourably with that of any other town. There was a valuable collection of casts, showing a little of the beauty of ancient sculpture, and Edinburgh might favourably compare its monumental sculpture with that of almost any other city. They could not fail to admire the very spirited sculpture by Sir John Steel as compared with what was to be seen in his (Dr. Farquharson's) native city of Aberdeen. If any one visited Aberdeen he would see a statue of the Prince Consort which, he thought, for sheer degradation and contemptible treatment could not be exceed d in the world.

Mr. Rathbone remarked that there was nothing sadder than to see Greek buildings entirely unfinished in consequence of the want of that sculpture which was a necessary part of them. In his opinion, it would be much better to go in for smaller buildings and finish them properly, than have enormous unfinished edifices.

Mr. Boyes did not like the tone in which the author of the paper spoke about the relationship between architecture and sculpture. He spoke about architecture as if it should be kept in the background for sculpture. That was a tone which had often been adopted by sculptors and painters. Painters often spoke as though the walls of a building should be arranged so as to afford them spaces for decoration. He maintained they should never have any true art without a proper combination of the three, and that sculpture and painting must be subordinate to architecture, and that they would each gain by that subordination.

The President disagreed with the way the paper had been received. He did not think there was anything new in it; but some people were very slow of apprehension, and even truisms constantly required to be stuffed down people's throats. The whole tone of the paper seemed to be that we wanted more sculpture in our towns. That he entirely agreed with; but he disagreed entirely with calling out the old artists of Greece and Rome and the Middle Ages to help us in that. It would, he thought, be a great mistake to put up casts of ancient art in our public parks and buildings. It would be rather an insult to contemporary art. If we wanted to encourarge art, we must employ artists; and if we wanted to give sculptors a chance to show what they could do, we must give them commissions. He should recommend the city of Edinburgh to employ sculptors. There were plenty of them, no doubt. He did not think that architecture should be supreme, but that the painter, the sculptor, and the architect should work together. It would, he thought, be of great advantage to the architect, when a great building was to be erected, if he would call in the painter and the sculptor. Certainly that was done in Athens.

IN THE HEALTH DEPARTMENT: SANITARY CONGRESS.

On the 12th inst. Dr. Stevenson MacAdam read a paper on the

VENTILATION OF SEWERS AND DRAINS.

The efficiency of the sewerage system of any town, he said, depended upon two main factors—(1) The facility of run or fall for the transmission of the sewerage; and (2) the ready means for admitting of the escape of foul or sewage gases. In the older systems of drainage the latter factor was scarcely thought of, because the common built drains were not tight, and allowed of the escape of gases between the stones. In the more modern systems, however, with brick conduits and glazed pipes, the sewers were practically impervious to gas. The more thorough sealing of the sewers and drains had led to the sewage gases being driven back into our dwelling-houses, causing disease and death. The quantity of sewage gas thus sent into houses fluctuated from hour to hour during the day, as the sewerage increased and decreased in volume, rendering the air-space less, and especially during the influx of warm water, which expanded the gases, and still more so during rainy weather, when the whole of the sewage gas was liable to be forced from the sewers. A mile of medium-sized ordinary town sewer contained about 12,000 cubic feet of air space, and more or less of this large volume of air, contaminated with sewage gas, was liable to be discharged through the house-service drains. This arrangement had led to the saying that town sewers were retorts generating sewage gas, which was laid on to our houses in a manner similar to ordinary coal-gas mains with their branch house-service pipes. The first precaution to be taken was to cut off the house-service drains from the main sewer by thorough trapping, and to ventilate the house-drain by level ground ventilators where practicable, or by pipes; and further, to carry the separate closet-pipes to the open air. The main sewers themselves should then be thoroughly ventilated. For the letting off of compressed gases, the so-called ventilation might be accomplished by shafts or by open street gratings; but the shafts will not insure the through aëration of the sewers, which ought to form the main feature in the efficient ventilation of the sewers. The open street gratings thoroughly served three conditions which were essential:—(1) They admitted of the ready escape of gas; (2) they admitted of abundance of air passing through the sewer to dilute the gas before escaping; and (3) they admitted of so thorough an aëration of the main sewers that any foul matter there would tend to be oxidised or burnt up rather than to enter into ordinary putrefaction.

The Rev. Mr. Graham, Newhaven, read a second paper by Mr. John Coley Bromfield, sanitary engineer, bearing upon the same subject. The paper was entitled, "Wholesome houses under the Banner system of ventilation of sewers," and was written to prove the successful working of that system in several large houses in London. The object of the system was to ensure a constant current of air, which should carry the foul air and gases from the ingress pipe of the sewer to the outside of the top of the house.

In the discussion which took place on the two papers, general approval was expressed of the importance of the subject with which they dealt. The systems of sewer ventilation which they advocated did not meet with the same general acceptance. Whilst several speakers, including Dr. Aubrey Husband, Dr. Elliot, Carlisle, and Bailie Fergus, Portobello, warmly approved of ventilating gratings level with the street, others, including Mr. Brodie, Mr. Tait, the Rev. Mr. Graham, and Dr. Littlejohn, expressed an opposing opinion. The idea of shaft ventilation received a more general, but not an altogether unanimous, support. Ultimately,

Dr. Littlejohn moved,—

"That it be a recommendation to the Council of the Association that the Local Government Boards of England and Scotland be requested to cause an impartial inquiry to be made into the system of open-air ventilation as practised in England and Scotland."

Mr. Stevenson Macadam seconded the motion.

Mr. H. H. Collins pointed out that in England they were fairly well satisfied with the open-air system, and that, if it was wished that a practical result should follow the resolution, the inquiry should be confined to the Board of Supervision in Scotland, who might get proof of English experience if that were desired. He moved, as an amendment, that the words in the motion, "Local Government Boards of England and Scotland," should be replaced by "the Board of Supervision of Scotland."

After some discussion, it was agreed to accept Mr. Collins's alteration of the original resolution, which was, with this amendment, unanimously adopted.

TREE-PLANTING IN TOWNS, AND TOWN FOGS.

Dr. Phené, F.S.A., read a paper on "The Sanitary Results of Planting Trees in Towns." Among the beneficial results which he claimed for tree-planting in towns was that it attained, or at any rate much aided, just that which was effected by the use of green or blue glasses in strengthening and sustaining the power of sight. Again, the chemical properties of trees gave them important standing on sanitary ground, irrespective of ornament or the pleasure they produced. He pointed out that all the nations of Western Europe used trees, for both their pleasure and health-giving properties.

Dr. Littlejohn read a paper by Dr. Alfred Carpenter, Croydon, on "The Causes of the Fogs which now belong to large Towns: a Proposal for their Prevention." Referring to a recent London fog, he said he had traced its cause to kitchen-fires alone; and he had found that the air contained unconsumed carbon in great quantity, and sulphurous acid, which acted injuriously on the respiratory organs. For the removal of the evil, he urged upon local authorities the duty of insisting upon the provision of self-cleansing sewers, and that the air should be purified from unconsumed carbon and sulphurous acid by the use of gas-stoves and fires for cooking purposes. Pea-soup fogs would, he said, become a thing of the past if,—(1) a tax should be put upon grates not so constructed as so consume their own smoke; (2) a tax should be put upon landlords for chimney-stalks; (3) local authorities should acquire the gas-works, and make every ratepayer a part shareholder, paying the cost-price only of the gas consumed; and (4) the law as to smoky chimneys, &c., should be enforced against all offenders.

In the discussion which took place on the two foregoing papers, approval was expressed of the objects of both; but doubt was indicated as to the suitability to all localities and circumstances in our towns of tree-planting; and also as to the feasibility, with coal-gas at its present price, of at all largely replacing coal-fires with gas-stoves and fires for cooking.

DECORATIVE SUGGESTIONS FROM NATURAL FORMS.—No. 3.

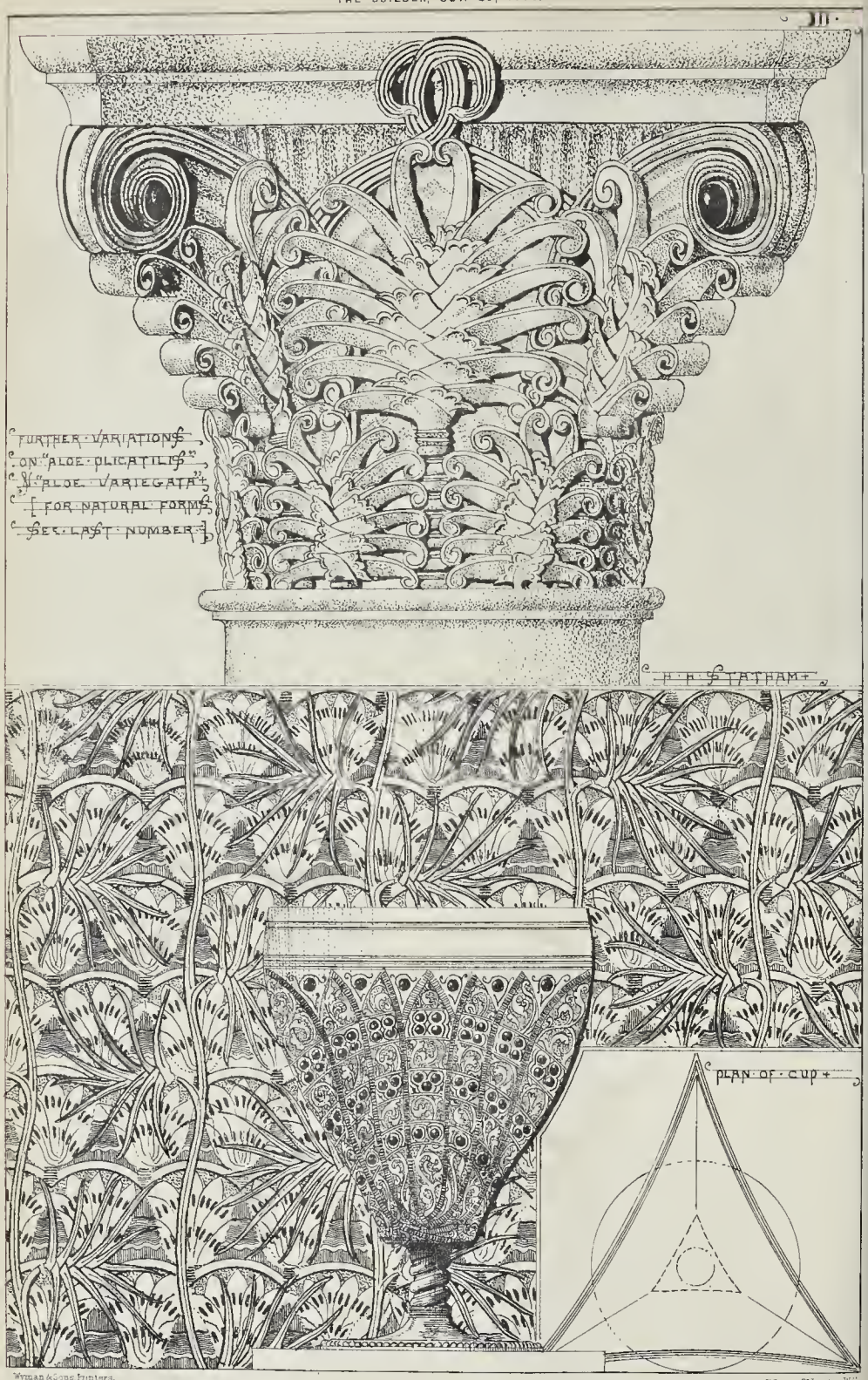
We give some further suggestions derived from the same two species of aloe figured in our last. *Aloe plicatilis* is more highly conventionalised and applied to a capital of Classic type. *Aloe variegata* is taken as the suggestion for a chased and jewelled silver cup,—the variegated patches of colour, and their arrangement in the original plant, being conventionally imitated by the setting of the stones in the artificial leaflets, and the triangular plan of the original plant furnishes the plan of the cup. The two plants are combined in a wall-paper, or a wall-diaper, which forms the background.

Trinity College, London.—The winter course of special lectures for the session 1880-81 will be delivered on the third Thursday evening of each month from October to March, commencing with,—October 21, Mr. William Spottiswoode, "Polarised Light." November 18, Dr. Francis Hueffer, "Musical Criticism." December 16, Professor Leone Levi, "Change for a Sovereign." January 20, 1881, Dr. B. W. Richardson, "Breath and Breathing."

COLOGNE CATHEDRAL, AS COMPLETED, 1880: WITH

ISCENCES OF ITS ASPECT AT PREVIOUS PERIODS.

[See page 191, *ante*.



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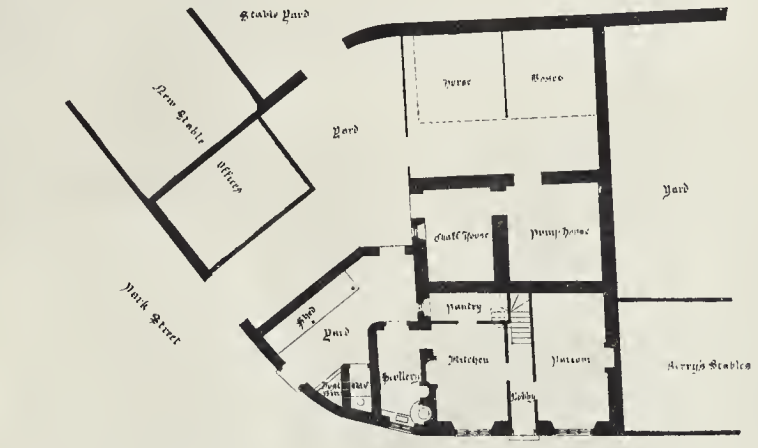
DECORATIVE SUGGESTIONS FROM NATURAL FORMS. — No. 3.

74 Queen St London W.C.

Sketch of Residence - Cecily Hill - Cirencester.



Whiteman & Hall's Photo-Litho, 46 High Holborn.
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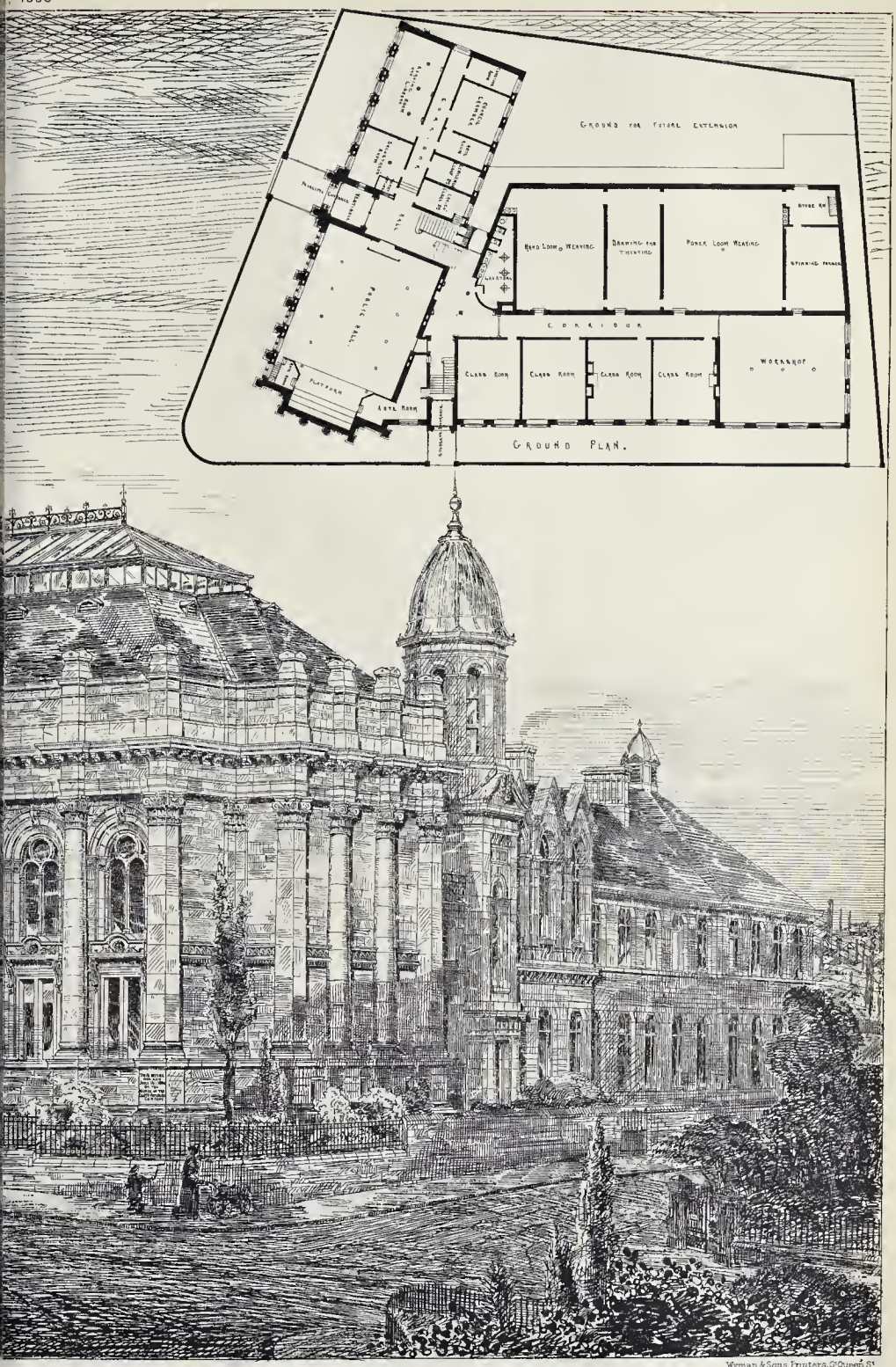
THE BRADFORD TECHNICAL SCH



ISRS. HOPE & JARDINE, ARCHITECTS.

Wyman & Sons, Printers, 9 Queen St.

BRADFORD NEW TECHNICAL SCHOOL.

For some few years the trade upon which Bradford, in Yorkshire, relies for its prosperity has been greatly depressed, and amongst the causes was the change of fashion which set in in the manufacture of dress fabrics, and that change came about without the manufacturers taking sufficient cognisance of it, until it was seen that many of the orders which were formerly executed in England were being bestowed upon foreign houses. The advantage which had been gained was freely admitted, and it was at the same time seen that the technical schools in France and Germany, in which the student was not only taught the principle of aiming at perfection in everything he undertook, but also the spirit of beauty and taste in every article he executed, had played no small part in the revolution that had taken place. English manufacturers, and especially Bradford manufacturers and merchants, recognised the imperative necessity that if the position of England as a manufacturing nation was to be maintained, it could only be done by imparting to the workpeople the technical knowledge which the French and German artisan employed and utilised with such deterrent effect upon English manufactures. Improved machinery was of very little benefit unless there was a corresponding improvement in the theoretical and practical knowledge of the workman, and it was seen that the latter could only be thoroughly and properly brought about by the erection of a technical institution, where the art of designing and weaving could be properly studied. Hence the determination to erect the Bradford Technical School.

As early as 1877 a "School of Weaving" was established in the Bradford Mechanics' Institute. Money was raised by an appeal to the town, Mr. J. Ashenhurst was appointed Instructor, and some good work was done in the right direction. In order to ensure the success of the undertaking, the Clothworkers' Company promised an annual subscription of 100*l*., and to establish at the same time two scholarships of the annual value of 25*l*. each, tenable at the Yorkshire College. In order, too, that the benefits and privileges of the new institution might be more usefully extended and enjoyed, Mr. Jacob Behrens presented two free scholarships, open respectively to boys attending the Board Schools and the classes of the Mechanics' Institute, the praiseworthy object of the donor being to enable deserving lads to devote themselves to the study of science and art as applied to industry, and thus not only adding to their own material welfare, but benefiting the community at large. Opening under such favourable auspices it was not perhaps surprising that the school should become popular, and the committee very soon experienced a difficulty in dealing with the large number of students who presented themselves for admission. The total number who joined the school during the opening session was 340. It was now felt that some earnest endeavours must be made to erect a permanent school, which should not only be sufficiently spacious, but should be at the same time an important addition to the building of a town justly honoured for its handsome public buildings. An appeal to the Clothworkers' Company resulted in a promise of a conditional building grant of 2,000*l*. in lieu of the annual subscription of 100*l*., and at a public meeting held in the Mayor's parlour at the Town Hall in October, 1878, the proposal to erect a permanent home for the Technical School was taken up with such warmth that subscriptions amounting to 11,000*l*. for the furtherance of the object were announced at the meeting. Some considerable information was obtained respecting the working of the technical institutions of the Continent, and this having been considered, and some additional subscriptions having been obtained, raising the total sums promised to 17,000*l*., a scheme was propounded for the erection of a school which should be thoroughly organised, well equipped, and replete with all the appliances necessary for the study of science and art as applied to manufacture. An excellent site, both pleasant and central, was obtained at the junction of Great Horton-road and Carlton-terrace. The site covers nearly an acre of ground, but some portions of the ground having been quarried in an irregular manner some fifty or sixty years ago, some considerable difficulty was at first experienced in obtaining a good and sure foundation. Excavations in some places had to be made to a depth of six or seven yards, whilst in others only to a depth of a single yard, but ultimately a good foundation upon rock was secured. In response to the invitation of the council of the Technical School, some sixteen architects sent in competitive designs for the erection of a building at an estimated cost of 12,000*l*. Most of the designs were of good character, and the result of the competition was that Messrs. Hope & Jardine, of Bradford, obtained the first premium, Messrs. F. & T. Healey taking the second, and Messrs. Hargreaves & Bailey the third. Since the adoption of the premier design several additions and alterations have been made, and the total cost of the building will now rather exceed 13,000*l*. The plans show that the principal features of the building, as seen from Horton-road, will be a tower rising in the principal front to a height of 120 ft., and an imposing general elevation, the front being relieved by fourteen Corinthian columns. The principal entrance will be in the centre of the Great Horton-road front, and it will divide the building into two parts. The Great Horton-road frontage will be 152 ft. with a height of 50 ft., whilst the Carlton-place frontage will extend to 217 ft. The left side of the entrance will be devoted to what may be termed the management department, and here will be located the subscribers' reading-room and library (38 ft. by 19 ft.), council chamber (19 ft. by 19 ft.), secretary's rooms, curator's room, and the necessary cloak-rooms. On the right-hand side will be the large lecture-hall, 68 ft. long, 46 ft. wide, and 32 ft. high, having a gallery round three sides, and capable of accommodating 800 persons. The hall will be divided into nave and aisles by two rows of pillars connected longitudinally by semicircular arches which, owing to the hall having a span of 46 ft., will be necessary for the support of the rooms above for the art-classes. The ceiling of the hall will be panelled, and surrounded with a bold cornice. The ground-floor of that part of the building which will front Carlton-place will be devoted more especially to the practical work of the school. It will contain a room 45 ft. by 32 ft. 6 in., to be devoted to the teaching of handloom weaving; another, 45 ft. by 44 ft. 6 in., to be devoted to powerloom weaving; a third, for teaching spinning; four class-rooms, each 23 ft. 6 in. by 30 ft. together with a storeroom and a large workshop 46 ft. by 40 ft. In the same part of the building will be a large lavatory, and a separate entrance will be provided for the use of the students, so that the work of the school may be carried on without interfering in any way with those using the public hall or the rooms in the management department. On the first floor, over the class-rooms and workshop, will be a smaller lecture-hall, seated in raised stages, to be used for science-lectures, &c., together with a chemical laboratory, with demonstrator's room adjoining, and a large room, 46 ft. 6 in. by 40 ft., in which dyeing will be practically taught. This part of the building may be reached either by means of the principal staircase, or by one which is provided near the students' entrance. The first floor of that part of the building which fronts Great Horton-road will be reached by means of a handsome stone staircase, which will lead up from the principal entrance-hall. One-half of the first floor will be taken up by the gallery of the large public hall, and the other half, over the management department, by a large room 50 ft. by 46 ft., which is intended to be used as an industrial museum, and which will have galleries around all sides. To this room there will be separate entrances on its area and gallery floor, and a separate staircase will connect the galleries with the floor below. On the second-floor level over the large lecture-hall will be rooms in which classes for the study of mechanical drawing, &c., will be taught. The Horton-road front of the building, the tower, and the end of the lecture-hall fronting Carlton-place, will be built of oleansed ashlar, and the remainder of cut wallstone. The building, when finished, will probably be the largest and most complete building devoted entirely to technical education in this country, and the desire of the council is that it shall be as handsome as it is hoped it will be useful. The building is being erected under the superintendence of Messrs. Hope & Jardine, Mr. Ashner Rhodes being clerk of the works. The contractors for the various works are as follow:—Mason, Mr. E. Atkinson; joiners, Messrs. Deacon & Whittaker, Shipley; plumber, Mr. S. Ryder; plasterers, Messrs. C. Howroyd & Sons; slater, Mr. J. Smithies, Great Horton; and iron-founders, Messrs. Taylor & Parsons.

We must congratulate Bradford on the course that has been pursued, and we anticipate excellent results. We have but one suggestion to make. We observe that rooms are provided for the teaching of "mechanical drawing": it is to be hoped that free-hand drawing will not be neglected, and that in other respects the great importance of the art side of the question will be fully recognised and acted on.

RESIDENCE, CECILY HILL, CIRENCESTER.

The building at the foot of Cecily Hill, Cirencester, formerly used as a brewhouse for the mansion, having fallen into disuse and decay, has been lately pulled down and rebuilt after the style of the Domestic architecture of the fifteenth and sixteenth century, to harmonise with the buildings in this quaint old-fashioned town, noted for Roman relics. The building forms a pleasing finish to a range of stable offices recently erected, and to the buildings at the foot of Cecily Hill, which is the chief approach to one of the finest parks in England. The residence, like the new stables, is built of rubble stone, with Box-ground stone dressings to doors, windows, chimney-heads, &c., and the roofs are covered with slate and lead. The works have been carried out by Messrs. J. B. & E. D. Bridges, of Cirencester, who also executed the works at the mansion-house, stables, &c., under the direction of Mr. John Birch, of John-street, Adelphi.

OBITUARY.

Colonel Ponsonby Cox, R.E., was for some years one of the engineer inspectors of the Local Government Board, and was well known in Lancashire, Yorkshire, and other parts of England. It is about twelve months since he resigned his appointment, and left England for Bombay, with the result as stated in an Indian newspaper. There is something peculiarly melancholy about the death of Colonel Cox, while acting as chairman of the Bombay Port Trust. The appointment he filled was created when the Port Trust was reconstituted, and a considerable amount of criticism was evoked by the way in which a very important and highly-paid office was called into existence by Sir Richard Temple without any reference to the trustees, while the appointment to the office of a military man who had only recently come to India as Military Secretary to the Commander-in-Chief, and who was almost necessarily ignorant of everything appertaining to the trade of this port, gave the new chairman a very unpopular start. The critics, ourselves among the number, were all most agreeably disappointed. On assuming office Colonel Cox exhibited the highest administrative talents. His experience as an engineer officer, his subsequent training as an inspector of the Local Government Board at home, and the energetic manner in which he set to work from the very first, enabled him to master the intricacies of a very important business concern at a very important period of its existence. In a few weeks those who had opposed his appointment most honestly were convinced of its fitness; in a few weeks more they were among his friends and admirers; and in a few weeks more they had to regret his loss. We never remember a case in which prejudices, which had appeared quite legitimate at the time, have been so rapidly lived down, and we doubt if any man who has lived so short a time in Bombay has ever left so many friends behind him. To great natural gifts Colonel Cox added those charms of manner and address which make an official's life as pleasant to others as to himself. His close attention to the wishes of shipowners and merchants has done much to do away with the unpopularity of the Prince's Dock, and his invariable courtesy endeared him to all who had business relations with him; and not least of all to his colleagues on the Port Trust, who had felt themselves slighted by Government when he was first appointed. The Port Trust offices were closed on receipt of the intelligence of Colonel Cox's death, and several members of the Port Trust proved the esteem in which he was held by starting for Poona immediately to attend his funeral. The Local Government Board had no abler inspector;

firm, conciliatory, quick, but gentlemanly. He shortened his inquiries without giving offence, and reported briefly, but to the point. A good man has been sacrificed to climate.

The Marchese Giovanni Pietro Campana, whose excavations among the remains of the cities and cemeteries of Etruria some twenty-five years ago attracted a great deal of attention, and whose museums in his house in the Babuino and his villa near St. John Lateran were among the most interesting sights of Rome, died on the 10th inst., at the age of 72 years.

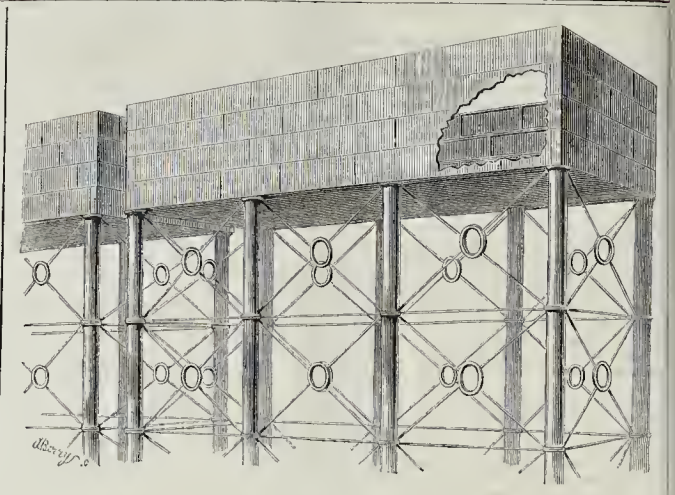
A VISIT TO OLD LONDON.

In accordance with a suggestion made during the late Congress at Devizes, a meeting of country and town members has been organised to visit some of the ancient portions of London, commencing on Monday next, when members and friends are to assemble, by 11.30 a.m., in the cloisters of Westminster Abbey and its precincts. Westminster Hall, the Crypt of St. Stephen's Chapel, and St. Margaret's Church will also be visited. After taking lunch they will go along the Albert Embankment and inspect Lambeth Palace and the Church of St. Mary, Lambeth, afterwards dining together at the Freemasons' Tavern. On Tuesday, the 26th, St. Saviour's, Southwark, will be visited, after which the party will cross London Bridge to the Coal Exchange, and inspect the remains of the Roman villa beneath that building; and then to Guildhall, the City Museum, the Charterhouse, the Church of St. Bartholomew, in Smithfield, and the old Gateway of St. John's Hospital. After luncheon the party will go to Gray's Inn Chapel, the Temple Church, and the Hall of the Middle Temple. On Wednesday the Tower will be inspected, including the Church of St. Peter-ad-Vincula. The remains of Roman London and the Roman Wall, Cripplegate Churchyard, and a fine portion of the old wall in Wood-street, Cheapside; the Churches of St. Helen, Bishopsgate, St. Andrew Undershaft, and St. Catherine Cree, Crosby Hall, and the Church of All Hallows, Barking, will all be visited; also Paul Pindar's House, in Bishopsgate-street, and the Church of the Austin Friars. A visit to the British Museum will be arranged for the next day (Thursday) for those who like to attend. At each place visited, some particulars will be given by some well-known antiquaries, who have promised to attend for the purpose. Tickets may be obtained of Mr. John Reynolds, Redland, Bristol, or of Mr. George Patrick, Drummond Chambers, John-street, Adelphi.

ST. PANCRAS INDUSTRIAL EXHIBITION.

The second St. Pancras Industrial Exhibition was opened on Saturday by Sir Thomas Chambers, Q.C., M.P., at the Tolmers-square Institute, Drummond-street, Hampstead-road. The exhibition contains 544 entries from 350 artisans and others. Sir T. Chambers delivered an address, in which he dwelt upon the awakening in recent years of all classes of the people to the possession of talents and tastes which might be developed into perfection by well-directed industry. Mr. Daniel Grant, M.P., said that those whose whole life was spent in giving polish to the top of a nail or sharpness to its point might compensate themselves for the repression of individualism in their ordinary life by taking up an artistic occupation in their leisure hours. Prizes are to be given for painting (oil, water, and on glass), cabinet-work, wood-carving, fret-cutting, working models, imitation of wood and marbles, turnery, wrought-iron work, art metal-work, &c.

The collection is superior to that of last year. Several specimens of *repoussé* work by A. W. Austin, A. de Caesemaeker, B. Humphreys, and others, are very creditable. One of the first objects that meets the eye of the visitor is an ornamental stand for flowers in wrought-iron (14) by E. A. Mills, made in his overtime; it ought to find a purchaser. W. Aumonier, G. H. Bull, and others, send some good wood-carvings. An ebonised cabinet by J. Flattely is very good of its kind. No. 72, an inlaid cabinet, sent by W. Langdale, carpenter, is a specimen of good work wasted on a bad design. Such absence of knowledge is shown that we have as an inlaid inscription "Britons scorn to *yeald*." Amongst the specimens of painted glass, one panel (94) by Nathaniel Seare, glass-painter's apprentice, gives excellent promise. Another youngster, O. R. Plummer, cabinetmaker's apprentice, sends a carved oak chest of drawers (436), indicative of industry and aptitude, and makes us desire he should get right teaching. The paintings and drawings are mostly very indifferent.



The Crystal Palace Tank.

THE BURSTING OF THE CRYSTAL PALACE TANK.

Sir,—If you can find space to insert a small woodcut from the rough sketch (made after a visit to the spot), which I enclose, I think it is likely to be of interest to many persons who have large water-tanks under their charge, in conjunction with the observations from "Civil Engineer" which appeared in your last number. Fortunately the failure of the tank, which occurred on Thursday, the 30th of September, at half-past one p.m., was unattended by personal injury, although there were some narrow escapes; but the damage to property was considerable, and there are in many places tanks so situated that their failure would be a very serious matter.

The cause of this accident is stated to be the corrosion of one of the tie-rods or stays connecting the flat sides of the tank, but it does not appear quite certain that the couplings or means of attachment were satisfactory either in design or in condition at the time of the failure; and although the outsides of the tanks were always kept in good condition, and well protected by paint, no attention appears to have been paid to the condition of the interior, and to me it appears more than probable that some one or more of the stays having been removed to effect some slight repairs or alterations, or even to clean the tank, had never been properly readjusted. Any information on the exact circumstances of the failure would be, I feel sure, of great value, as the popular accounts which are to be found in the daily papers on such matters are frequently not reliable in their figures, notably as to the height of the tanks from the ground, which, instead of 200 ft., is about 80 ft. Perhaps some one connected with the Palace, or the engineers who designed the work, will confer a benefit on your readers by giving such information as they may feel inclined to furnish through the medium of your columns.

C. E.

Sir,—The rules as to cast-iron water-tanks given in your issue of the 16th by "Civil Engineer," are instructive, but I firmly believe that it is not always owing to the constructors of such tanks that the plates may be ruptured through faulty workmanship. Cast iron is brittle, and when tanks of this material are carried on columns or on walls, with probably sinking foundations, to such may most likely the breakage be due, "stay" the tanks as you like.

I prefer wrought-iron tanks, not too large. If a great mass of water is to be stored, let there be a series of tanks, connected by "double-flanged pieces." I find such tanks less costly to erect; they have a better bearing, and I must say I have never, in my twenty years' experience, heard of one giving way.

Mechanical Engineer.

EDINBURGH.

The Scott Monument.—The Treasurers' Committee of the Edinburgh Town Council have had under consideration a motion by Bailie Hall to have the remaining niches of the Scott Monument filled with statuettes. A committee, of which Sir James Falsbaw was the chairman, some time ago handed over the balance of a fund, it is said, in their hands, amounting to about 160*l.*, to the Town Council, for the purpose of being expended on the monument. There is also a balance of about 1,000*l.* in connexion with the monument fund of the Town Council, and as there are about thirty niches which have not yet been filled, it is proposed to apply these sums in completing the structure as far as they will go. The statuettes proposed are those of characters in the works of "The Wizard of the North" which are not yet represented on the monument. It was agreed by the committee to recommend that the proposal be approved of by the Council.

Ventilation of Water-closets on Common Stairs.—At a meeting of the Edinburgh Town Council on the 28th ult., on a report by the burgh engineer, the Public Health Committee recommended that that official be authorised to call upon the owners on the common stair at No. 6, Gladstone-terrace, to have their water-closets ventilated to the open air. Mr. M'Laoblan asked upon what principle they proceeded in this matter, seeing that the Dean of Guild Court sanctioned plans of houses with water-closets in them, constructed upon the very principle which was condemned by the burgh engineer. (The Dean of Guild.—That is not true.) Mr. M'Lachlan went on to state that he had quite recently seen plans, which had been approved of, which did not provide for the ventilation of the water-closets into the open air. Were they to have this conflict going on between the Dean of Guild Court and the Public Health Committee? It was a serious question, and one deeply affecting the health of the community. The Dean of Guild said he had most distinctly to contradict Mr. M'Lachlan. Since the new Act came into force the Dean of Guild Court had passed no plans where the water-closets were not ventilated into the open air. They had insisted that each water-closet should be ventilated by a 4-in. pipe into the open air. Mr. Gowans said he did not know that the pipe mentioned by the Dean was a proper method of ventilation. If he put a candle to the mouth of one of those pipes he would find that the draught was often downwards and not upwards. That was only what might be anticipated if the interior of the house was hotter than the outer atmosphere. After

further discussion, the recommendation was adopted.

The North Bridge.—The east footpath of the North Bridge is now being relaid with Limmer Rock asphalt. The work is being done by Mr. William Briggs, the agent for the asphalte in Scotland, under the direction of his Edinburgh manager, Mr. Adam Loch.

WESTMINSTER NEW VESTRY HALL.

A committee of the Vestry of the united parishes of St. Margaret and St. John held a meeting on Tuesday, to confer with the authors of the first premiated design, Messrs. Lee & Smith, of Queen Victoria-street. The sum which the Vestry had decided not to exceed was 15,000*l.*, but Mr. Barry (the referee) had reported that the buildings would cost 22,092*l.*, carried out according to Messrs. Lee & Smith's design. In answer to various questions put by the members of the committee, Messrs. Lee & Smith admitted that, in order to give the whole of the accommodation required for 15,000*l.* the interior must be finished in the plainest and barest manner; but they had no doubt tenders would be obtained for the works finished in every way in a satisfactory manner, at such a price as would approximate the total cost of the buildings to 20,000*l.* After further discussion, it was resolved to report the result of the interview to the Vestry, and to recommend that Messrs. Lee & Smith be employed as the architects of the new buildings. It was also resolved to send on the approved design and plans to the Local Government Board for consideration.

YORK MINSTER.

The restoration of the south transept of York Minster, now just completed, was commenced nine years ago. The *York Herald* says that the work embraced the repairs necessary to the interior of the transept, and whilst this was going on the transept was separated from other portions of the minster by the erection of two partitions of timber and stoothing covered with a coating of plaster. The clearstory walls were found to be in a very unsafe condition, which was attributed to imperfect construction originally. In their rebuilding a different mode has been adopted. They are formed of solid masonry, laid in with Portland cement, and thus united the two constitute a firm and compact mass. The walls are also tied by wrought-iron rods running through each of them from the south front to the lantern tower, the effect of which is to keep the walls properly fixed and immovable. Additional strength, too, is imparted by the use of several transverse iron cramps. When the west clearstory wall was removed one of the triforium arches was found to have sustained some injury at an anterior period, the joints having given way several inches. The defect was remedied as far as possible, and greater strength and stability were imparted. The arches composing the different bays of the transept were rebuilt in a more vertical form. Most of the shafts were renewed, as were also the various Purbeck marble shafts, and the quantity of this marble which was thus brought into requisition may be judged of from the fact that upwards of 1,180 lineal feet of shafting, varying in diameter from 4½ in. to 7½ in., were used in the transept. The interior of the central roof was strengthened by the addition of extra braces and trusses, and the west aisle roof was raised to its original pitch. The groined ceilings of the two aisles of the transept were denuded of the plaster, which opened out to view the original stonework, and thus those unique examples of the quadripartite, quinquepartite, and sexpartite vaulting were exhibited with pleasing effect. The date of the main roof of the transept is the thirteenth century, and the style of decoration adopted was an exact reproduction of the original mode of embellishment. The foliage of the bosses was gilded, and the background was picked out in vermilion. The vaulted ceiling in its renovated beauty presents a striking appearance. During the progress of the restoration, it will be remembered the celebrated dial-clock above the south doorway was taken down, and the mechanism of it was placed in the clock-chamber of the western tower. The space thus vacated was occupied internally by a string of small arcades, with Purbeck marble shafts of the same description as those which existed before the clock was obtained in 1750. On the completion of the interior restoration of the south transept, in the latter part of 1874, a series of inaugural services were held in the minster, which drew together immense congregations, and a large amount was thus realised to enable the work of exterior restoration to proceed. The south front throughout presented externally a shattered appearance, the effects of weather and time having told very perceptibly on the walls and on the prominent features of the architecture. The figure of the old fiddler on the pinnacle surmounting the southern gable was removed some time ago, and recently a cross was erected in place of it. When the fiddler was taken down traces of a cross that had previously terminated the apex of the transept were discovered, which showed that the erection of the present one was in keeping with the original style. The carving of the south front is generally admired, and the clever execution here, as in the artistic work of a similar kind throughout the south transept, redounds to the credit and ability of the artist, Mr. Milburn. The great work of restoration having now been completed, the southern front of the cathedral, which has been hoarded in for the past nine years, will again be opened out to public view.

OLD STONE PULPITS IN ENGLAND.

A large number of the examples in the following list were kindly forwarded to me by Mr. A. W. Morant, F.S.A. I have noted others, and the whole may be acceptable, as I am not aware of a similar list. Those marked with (D) are engraved in Dollman's "Examples of Ancient Pulpits existing in England," 4to., 1849, 30 plates :—

Bedfordshire.—St. Paul's Church, Bedford.
Cheshire.—Nantwich, at junction of north transept and chancel.
„ *c.* 1270.—Chester. St. Werburga Abbey, refectory (D).
Cornwall.—Egloshayle.
Cambridgeshire.—Newton Nottage.
Devonshire. — Harberton; Chittlehampton; Paignton.
„ *c.* 1530.—North Molton (D).
„ *c.* 1500.—Totnes (D).
„ Sonth Wooton; Dartmouth, St. Saviour's.
Dorsetshire.—*c.* 1450.—Frampton (D).
Gloucestershire.—*c.* 1460.—North Cerney (D). Cold Ashton; Pitcombe; Staunton All Saints.
„ *c.* 1520.—Winchcombe (D). Lechlade; Ellestow; Northleach, SS. Peter and Paul Church; Gloucester Cathedral.
„ *c.* 1450.—Cirencester, St. John (D).
Hampshire.—1260.—Beaulieu Abbey, refectory.
Isle of Wight.—Shorwell.
Hereford.—Cannon Peon.
Oxfordshire.—1400. — Oxford, St. Peter's Church.
„ 1480.—Oxford, Magdalen College, external.
„ *c.* 1370.—Coombe.
Shropshire.—*c.* 1320.—Shrewsbury Abbey (D).
Somersetshire. — Bristol Cathedral, near a pillar on north side of nave.
„ *c.* 1500.—Glastonbury, St. Benedict (D)
„ *c.* 1500.—Cheddar (D).
„ *c.* 1480.—Banwell (D).
„ *c.* 1500.—Nailsea (D). Kew Stoke; Stogumber; Wrington.
„ 1547.—Wells Cathedral, nave.
Staffordshire.—*c.* 1480.—Wolverhampton Collegiate Church, near one of the south pillars of the nave (D).
Sussex.—Arundel; Clymping.
Yorkshire. — Ripon Cathedral; Beverley Minster.
Warwickshire.—*c.* 1470.—Coventry, Trinity Church.
Worcestershire.—Worcester Cathedral. Pl. 42 and 43, vol. ii. of Pugin's "Specimens of Gothic Architecture."

I am not aware that there is any old stone pulpit in Scotland; and only one apparently in Ireland,—namely, in the cloisters at Sligo Cathedral. Wales affords one,—namely, in the refectory at Tintern Abbey, Monmouthshire.

Wyatt Papworth.

DRINKING-WATER AND ENTERIC FEVER AT LLANDUDNO.

A family staying at Llandudno for a few days during the month of September, three of whom were water-drinkers, found some of their party very unwell shortly after returning home. A medical man was at once called in, and pronounced it to be a severe attack of enteric fever. After suffering for many days, two of the family are out of danger, but the third still remains in a precarious condition. It is worthy of note that only the water-drinkers of the family were attacked, the others escaping entirely.

It is not known if the source of supply was a well or the waterworks, or whether the mischief may have arisen from the overflow of the cistern being connected with the soil-pipe; but that the fever was due to the drinking of water (polluted water) whilst at Llandudno there is no doubt. And it would be well for the Llandudno Sanitary Authority to investigate the matter without delay, lest a more general and dangerous outbreak drive visitors from their town.

SALE OF ILFORD GAOL.

Under the Prisons Act of the late Home Secretary, several of the disused prisons in different parts of the country are from time to time being publicly sold and converted to other uses, and last week the Ilford Prison was offered for sale at the Auction Mart by Messrs. Beadel & Co. It was described as situated on the borders of the town of Ilford, comprising a substantial pile of buildings, with a large area of garden-ground, presenting an eligible frontage to the main Essex road, the site altogether containing three acres, and forming a good site for the erection of villa residences. It was stated that the existing erections, which comprised the governor's house, chapel, court-house, cells, offices, and outbuildings, were all in a very substantial condition. The biddings started at 1,000*l.*, and quickly went up, by advances of 1,000*l.*, to 3,000*l.*, on which the auctioneer stated that he was then at liberty to say that it was an entirely open sale, and in the hands of the company for what it would fetch. The property was then bid up to 3,800*l.*, at which sum it was sold to Mr. George Blizzard, of Ladbroke-road, Notting-hill.

WORKMEN'S EDUCATION.

Sir,—"A fair field and no favour," as Mr. W. Cave Thomas has justly said, is what we workmen require, and depend upon it when we obtain that there will be but little reason to complain of an absence of "the spirit of emulation" among us. But while employers maintain a demand for ignorant and inferior workmen, and it is to men's interest to be such, we may be sure the supply will not fail. When, however, our ablest and most intelligent men, instead of our biggest fools (as is now too often the case), are selected to occupy positions of responsibility, as foremen or managers; when we have foremen who can do something more than drive,—men who can, when necessary, instruct and direct those under them,—then shall we have a better class of workmen than at present, and the best men will then by preference be retained, as the jealous fear for their own position, now so prominent a feature in some of our present foremen, will then be a thing of the past; neither will it then be found necessary to resort to abuse and invectives as a cloak for ignorance and incapacity, an expedient now in great favour with many foremen.

When the existing premium is taken off ignorance, and we have a "fair field without favour" granted us, then will merit, asserting its rights, meet with the recognition it deserves, and we shall have both good foremen and good workmen. But at present, to our shame, men are not allowed to know, or even to think; their hands only are hired upon the understanding that they leave their brains at home.

The special training that "E. G." advocates is already within the reach of all workmen, for the various technical and science and art classes now established in all parts of the country ably supplement the practical lessons of the day by the theoretical instruction they impart of an evening. The value of these classes, however, seldom meets with the appreciation, or even recognition, of employers, although they are the parties principally benefited by them.

The students, who usually pursue their studies under great difficulties, meet with scant encouragement, and often with serious opposition; their aspirations are nipped in the bud, their hopes disappointed. Is it then to be wondered at that apathetic indifference is the ultimate result? E. W.

THE SCULPTURE FOR BLACKFRIARS BRIDGE.

Sir,—I see the "Bridge House Committee" have issued an advertisement, which appears in the *Builder*. As far as I can judge and can learn, for of course I have inquired where I could among sculptors, the matter put forward in this crude way will meet with no response at all,—at least, from any of those whom it is desirable to interest.

It is not for a looker-on to move further if sculptors remain quiescent.

The Committee have simply shirked the whole question, and a magnificent opportunity runs the risk of being wrecked. Z.

MARGINS OF SAFETY.

Sir,—Some time back (June 12th) I called the attention of your readers to the unsatisfactory nature of our knowledge of dealing with ironwork; but, important as the subject is, no further information was elicited.

The draughtsman has a similar difficulty in regard to margins of safety. The greater the number of "authorities" he consults, the greater is his difficulty in arriving at a conclusion. For example, the weight of a crowd of men closely packed is given as 120 lb. per foot super. by Hurst, as 84 lb. per foot by Young, as 102·6 lb. by Campin. The weight of a man being a variable quantity, each of the foregoing may be correct, but is the same "margin" to be always allowed?

The factor of safety is given as one-sixth to one-tenth of their strength for cast-iron columns by Hurst, as one-fourth by Molesworth, and by Humber as one-third to one-fifth for metal structures generally; Fenwick gives one-fourth to one-eighth. I believe the custom of giving a margin up to nine-tenths of the breaking-weight is most general in this case.

The factor of safety for wrought-iron structures is given by several authorities as one-third load and two-thirds margin, but one-fourth to one-fifth load is more like the general custom.

According to Young, brickwork in cement can safely bear three tons per foot super., and Hurst gives it as one-fifth of thirty tons. In buildings, such piers often have to stand (and do so) eight to ten tons; but I am not advocating the advisability of loading to such an extent.

The quality of the materials supplied must always affect the question of "margins of safety," especially as this is to the draughtsman an uncertain element. Let him also guard against the usual and pernicious custom of "roughly guessing" and "lumping" loads on structures.

I believe the most satisfactory results are to be arrived at only by considering every element of load in detail, omitting nothing, and only giving a sufficient margin of safety to counteract "those powers of nature that are subject to no calculation." A. Harland.

ROAD FORMATION.

Sir,—In an article on "Road Formation and Street Pavements" in your issue of October 9th, by a "Civil Engineer," your correspondent gives what in his opinion is the best method of laying wood pavement. In this case, as in many other articles on practical subjects, there is considerable room for divergence of opinion. I am not a civil engineer, and do not intend to refute the assertions made in the article by any theoretical problems, but by the actual experience of the systems of wood pavement laid in London during the present year.

The table accompanying the article I will not discuss in detail, but simply refer to one item, which is the statement under the heading "Estimated Life" of wood pavement, which is stated by the author to be for the Asphaltic Wood Pavement Company's paving, from twelve to fifteen years. Now, Sir, I think this statement will astonish the strongest advocates of wood pavement, for no engineer or contractor will (considering the traffic on the principal London thoroughfares) expect to do less than entirely renew the wooden surface at least once in the course of fifteen years, and in some cases this amount of renewal will not be sufficient.

My object in writing at the present time is to dissent from the assertion by your correspondent that, "the best system is when the wooden blocks are laid on a bed of tarred felt, jointed with a bed of close felt (close jointed). A thin layer of asphalte over the concrete may take the place of the bed of felt, but both will be better." I maintain that wood pavement has received a fair trial in London, and no doubt the various bodies interested have made themselves thoroughly conversant with the various systems, and the result of their careful inquiries and experiments must prove what the great majority of them think the best pavement. Now, the work of the present year is what I submit should show this opinion. Note the result: there has been laid in London of the system or systems recommended by your correspondent about 10,000 square yards; this quantity includes both systems, although none of it was laid with the combination; whereas, of the pavement generally adopted there has been laid over 20,000 square yards, the whole being laid with the wood directly on the concrete foundation, proving that in the minds of most people there is no necessity for the costly and fanciful bedding of felt or asphalte recommended by a "Civil Engineer." Fact.

MATERIALS FOR ROADS.

Sir,—In reply to the inquiry of "One Interested," I venture to supply some information upon this important and interesting subject.

Having had tested by Mr. Kirkaldy some 1½-in. cubes of Guernsey granite and Quenast porphyry from Belgium,—the latter largely used in the street paving of Paris and other Continental cities,—I am in a position to give you the result. Thus:—

Guernsey crushed at 14,015 lb. per sq. inch.
Quenast " 24,460 " "

Now, without committing myself to the statement that therefore Quenast stone is superior to Guernsey in the ratio of 12 to 7, I may safely venture to assert, upon this evidence alone, that Quenast must be a very superior material for macadam roads.

I can, however, speak from a somewhat extended experience of its value as a road metal, having, during the last four years, used it largely in some of the principal thoroughfares of the metropolis, and am satisfied that it is, if not the best, certainly one of the best yet introduced.

I venture to say this much in its behalf as it is a newly-introduced material, and therefore is not as widely known as it ought to be.

Surveyor.

GIVE, AS WELL AS TAKE.

Sir,—We are most of us, more or less,—more, I may say, than less, if we look at things fairly and philosophically,—fortunate, and those are happy, too, as well as fortunate, who give a helping hand, when opportunity serves, to a failing or a fallen brother. Hence I am tempted, without a word of apology, to quote the following extract from a letter I have just received from my good friend, Mr. Edward Ashworth, of Exeter. Here it is:—

". . . . If ever there was a case needing charity it is that of poor Strachan. When I worked as his assistant at Hong Kong, in 1844-45, he had a large house of his own, had servants, and an excellent professional practice amongst the merchants there, although I used scarcely say specifications were not carried out in China to the letter as they are here. Afterwards he carried out some large gasworks at Shanghae, then went home, as men will do, to get married. Coming out again, he found his absence had injured his connexion, and that his practice was, to a great extent, gone. Then his wife's health failed, and he returned to England. Gradually his resources ebbed away, and a family coming on in the meanwhile, he went hopelessly down in the world.

In 1875 I recognised an advertisement of his soliciting architects' and surveyors' work; but the lack of any response to this and other such applications, as well as continued ill-luck in every way, preyed upon his spirits terribly. I heard no more of him until the beginning of this year, when he wrote asking me to give him a testimonial, and fill up the necessary papers preparatory to applying for some allowance from Sir John Soane's legacy fund for distressed architects or their widows. I did this, making, as I thought, a good case out; but, alas! he got nothing, the applicants were so numerous. He has six children, and is now much too ill and infirm to take any employment, even if he could get it. Mr. Strachan is an Edinburgh man by birth, and I can warmly testify to the constant opportunities I had of witnessing his untiring industry and good moral conduct when we were both residing at Hong Kong."

Thousands of eyes, in every part of the world, will read these lines; and, I hope, many hearts will respond thereto, and send a trifle to you, Mr. Editor, for the poor fellow's benefit. Harry Hems.

HOUSE-DRAINAGE AND SEWAGE WORKS AS A SPECIALTY.

"In exposition of the ignorance which is prevalent there [*i.e.*, in the United States] as well as here, he [Mr. G. E. Waring] states, for example, that the particular idea of the size of a drain required to receive the drainage of a house, or of a number of houses, is strangely in error."

Sir,—The above extract from the *Builder* of September 25th, is, in part, the utterance of, and the rest is sanctioned by, an eminent sanitarian. The report from Boston on the common defects of drainage, and the introductory remarks by Mr. Chadwick, show up so well the scamping way of doing work (or not doing it), and covering it up, that I feel a bit sorry to break a lance with such good intentions.

But the assertion and recommendation of small-bore drains in preference to larger ones needs limitation. Readers must not fondly imagine that that is the panacea for all evils. The theory that a pipe-drain, being full of liquid, cannot contain gases at the same time, is very well in type or in a drawing, but in practice there are difficulties.

This theory of small drains is by no means a new one. Some six years ago, I saw in the *Scientific American* that a 4-in. pipe would do so much, under such and such conditions, and having some drainage in hand at the time for a client who wished to be economical, we resolved to make the experiment. The length of drain was 161 ft., the fall in its whole length 14 in., and it had to carry the sewage from two pan closets, discharging itself into a 9-in. pipe drain. It worked beautifully for about a month, and then, in consequence of frequent stoppages, we finally lifted the 4-inch pipes, and laid 6-in. ones, which gave no trouble whatever. Now the question comes, how is it that a 6-in. pipe worked so well? Because there was space for the sewage and space for the fur.

When furring takes place in a pipe, we know it must diminish the bore, and then what happens? Why a little silting up here, or some half-floating substance there, adheres to the fur, and lo! the embryo stoppage.

Any plumber knows what furring means, from lavatories and especially from dish-washing places; unfortunately householders get too often acquainted with it too. It is a pity the practical men, the men who do the work, do not join in such discussions as these, as it would undoubtedly contribute to the elucidation of much which is at present very little understood in the office of the so-called professional. When we come to practically look upon a sewer or a drain as an elongated cesspool, then we shall be face to face with our foe. But when we succeed in, as Mr. Chadwick says, the grand desideratum—getting the sewage out of the sewers and drains before it is twenty-four hours old, then yes! then we may rejoice and say the sanitary millennium has come, so far as drainage goes, any way.

Practical Sanitarian.

CHURCH-BUILDING NEWS.

Walsall.—Walsall parish church was reopened on the 21st ult., after extensive alterations and re-decoration. Formerly the nave was filled with high-backed pews of antique make, fronted by a huge structure in three stages, combining pulpit, reading-desk, and clerk's desk. These have been removed; the chancel arch has been cleared of the organ and gallery; the arch has been widened and rebuilt, and the gable above raised and pierced with two lights. The eastern wall is filled with a memorial window to Sister Dora; in the side walls (of the chancel) instead of the old windows are new ones in the style of the fourteenth century, with stone mullions and cathedral glass, being exact copies of an original window which was found blocked up by the organ. A roof of oak occupies the place of the whitewashed ceiling, and the floor is laid with encaustic tiles; whilst two ancient doorways, leading into the crypt, and a canopied sedilia, which were discovered during the progress of the works, have been restored with scrupulous fidelity to the original work. The old oak stalls are retained in the chancel, new ones being added, and the organ is located within an archway to the north, the old vestry having been enlarged and transformed into vestries for the clergy and choristers. The organ has undergone complete restoration, modernisation, and enlargement, at the hands of Messrs. Bishop & Son, London. The "Sister Dora" window has the spaces between the tracery of the upper portion filled with representations of the four Archangels, the twelve Apostles bearing a scroll inscribed with the Apostles' Creed, the Agnus Dei, and other sacred symbols. The five lights in the lower part are filled with ten designs, the centre one in the upper row being a figure of Christ, and those to the right and left figures of the Virgin and St. John; whilst the other seven contain representations of the seven corporal works of mercy,—giving water to the thirsty, feeding the hungry, clothing the naked, receiving the stranger, visiting the sick and the prisoner, and comforting the mourner. This window is from the works of Messrs. Bullison & Grylls, Newman-street, London, and cost upwards of 300*l*. The alterations and restorations have cost 5,000*l*. The architect is Mr. Ewan Christian, of London, and the builder was Mr. Thomas Williams, of Harrington-square, London.

Ashley.—On the 29th ult. the Bishop of Chester consecrated the new church of St. Elizabeth, at Ashley. The new church, which is in the Gothic style, has (according to the *Manchester Courier*) been erected from the designs of the Hon. Wilbraham Egerton, M.P., and together with the site, is the gift of Lord Egerton, of Tatton Park. With the exception of the helfry, which is of Runcorn stone, the building is of brick and terra cotta. The font is of Dumfries stone, with Connemara marble columns, and the symbols of the Evangelists are carved in the alabaster panels. The reredos is in five panels of Dumfries stone with green marble columns. It is intended to fill the recesses with a cross and floral patterns in mosaics, manufactured by Salviati, of Venice. The contractor for the fabric is Mr. H. Ormson, of Bowdon, and the internal fittings are by Messrs. Jones & Willis. The peal of five bells, with chiming apparatus, has been put up by Mr.

Taylor, of Loughborough. The edifice has been erected at the cost of over 3,000*l.*, and is constructed to accommodate about 250 persons, all the seats being free.

Poplar.—On the 29th ult. the new Church of All Hallows, East India Docks, was consecrated by the Bishop of Bedford. Towards the outlay necessary for the erection of the church, &c., estimated at 14,700*l.*, 2,000*l.* were received from the Bishop of London's Fund, and the sum of 9,000*l.*, derived from the proceeds of the sale of site of All Hallows, Bread-street, City, was placed at the disposal of the committee. From the latter church, in which Milton was baptised, several pieces of furniture were transferred; also the communion vessels, which were in silver gilt; the organ, which has been repaired and improved; the pulpit, some old panels, and two bells. The accommodation consists of 900 20 in. seats. The edifice is in the Early English style, 111 ft. long by 63 ft. broad, and 51 ft. from the floor to the centre of the roof (inside measurement). It has two entrances, one from the East India-road and another from Atholstreet. The architect is Mr. Ewan Christian, and Mr. George Shaw was the contractor.

Waenfawr, Carnarvon.—The new church here, dedicated to St. John, was consecrated by the Bishop of Bangor on the 28th ult. The building, which is in the Early English style, has been erected from a design by Mr. Henry Kennedy, architect, Bangor. The site is the gift of the late Mr. Christopher Holman, of Glyn Afon. It is estimated that the cost will be about 2,250*l.*

Wigton.—At a meeting of the parishioners on the 23rd ult., it was resolved to apply for a faculty to re-seat Wigton Church, and to carry out other works, under the direction of Mr. Ferguson, architect, Carlisle, at an estimated cost of 700*l.* The faculty was decreed on the 13th inst. by the Carlisle Consistory Court.

Hallonghton.—Hallonghton Church was re-opened, after restoration, on the 29th ult. The new roof, which has been raised, is of the same design as the one it has replaced, and is of carved oak. The screen, dating from the early part of the fifteenth century, has been restored, and two stained-glass windows have been added at the east end of the chancel, the gift of the Rev. J. Barrow (Southwell), whose father was for sixty years the incumbent of the parish. A carved oak pulpit occupies the site of the old one, and the old seats have been replaced by low-backed pews of pitch-pine. Accommodation is now provided for about eighty persons. The work has been carried out by Messrs. Clipsham & Son, of Norwell, under the supervision of Mr. Ewan Christian, architect to the Ecclesiastical Commissioners.

Books.

The Index to our Railway System, and on Leading Lines: a Comprehensive Analysis of Railway Property. Fourth Number. By W. Fleming. London: E. Wilson. 1880.

Mr. Fleming has reached the fourth number of his painstaking and useful Index. He does not congratulate railway shareholders on the result of the movement of the year. We must make due allowance for the spirit of disappointment, not to say of irritation, which it is but natural that those railway economists who, during the past four or five years, have endeavoured to ascertain the real profits and losses of the English railways, should feel at the hindrances thrown in their way. The Parliamentary returns, whether purposely or not, are so framed that the clue to the whole question,—the statement of the work separately done in each of the three main departments of railway transport,—is sedulously concealed. The managers of the companies are deaf to every appeal for information on this cardinal point. The Board of Trade, which a year or two ago admitted the extreme importance of obtaining such detailed information as to the working of the railways of the United Kingdom as is given in France, in Austria, in Germany, in India, in America, and, most carefully of all, in New South Wales, seems now to have abandoned the hope of giving real value to the Parliamentary returns. It is due to this persistent concealment, which must be more injurious to the shareholders than to any one else, joined to the complexion of some of those statements which it is impossible to conceal, that analysts like Mr. Fleming are driven to form inferences which it is possible that a fuller statement of accounts would overthrow.

Meantime, public gratitude is due to those who perseveringly endeavour to throw the light of scientific investigation on the subject. In regarding the palpable fact of the constant increase in capital cost of our railways, Mr. Fleming takes views of the increase of dividend at the cost of capital which we should be glad to see disproved. One thing is certain, and that is, that if untrue, they are capable of disproof. And so long as those who have the proofs in their hands remain silent, they cannot blame those who draw an adverse inference from this silence.

Without attempting to discuss any details that may prove dry to the general reader, we will give one example of the mode in which figures may be so dealt with as to afford contradictory results, in the absence of a proper debtor and creditor account. Mr. Fleming states (p. 45) that since 1874 the increase in the number of locomotives and vehicles owned by the railway companies has been double the increase in the length of line and earnings. He infers that a sum of 3,780,000*l.* has been improperly expended on plant; and that by means of the saving thus effected in repairs, a proportionate sum has been paid out of capital by way of dividend.

When we observe that every locomotive on an average earned 4,934*l.* in 1874, and only 4,508*l.* in 1879, this looks like a confirmation of Mr. Fleming's charge. Going back a little, we find that in 1877 every locomotive earned on the average 4,750*l.*, and in 1878 4,661*l.*, or 89*l.* less. But if we inquire what work was done to obtain these earnings, we find that the mileage of trains drawn by an engine was actually identical in 1877 and in 1878, and within seventy-nine miles, or less than two days' work, of the same, in 1879, the respective mileages being 17,223 17,223, and 17,144 miles run. In 1874 the mileage ran per engine was 17,418 miles.

If we look at the locomotive as the bread-winner of the companies, and endeavour to form an idea of their respective economy of management by their employment of their engines, we are struck with extraordinary differences. On the Metropolitan Railway, in 1879, every locomotive on the average ran 24,000 miles, while on the adjoining Metropolitan District line each engine ran more than 33,000 miles. Yet every Metropolitan engine earned a gross sum of above 12,500*l.*, while each Metropolitan District engine earned a little under 11,000*l.* The former line paid 37 per cent. of gross revenue for working expenses; the latter 42 per cent. These differences are probably mainly due to the fact that the density of the population, or of the course of traffic, on the former line is such as to fill the carriages fuller than on the latter, although the two lines are really integral parts of the same system. These lines are exceptional. But we may compare the London and South-Western, as relates to engine earnings, with the London and North-Western. On the former line each engine ran above 23,000 miles, and earned 6,114*l.* in the year. On the latter each engine ran 14,600 miles, and earned 4,138*l.* during the same period. And yet the working cost of the London and South-Western line was 57 per cent. of revenue against only 52 per cent. on the London and North-Western. But again, on the other hand, the gross traffic of the London and North-Western was 5,298*l.* per mile of line, while that of the London and South-Western was only 3,324*l.* It is evident that there are in these two cases so many elements of comparison, that it is quite impossible to tell how far any one may affect any of the others, without the possession of the cardinal information of the cost of conveying, on each line, a definite weight for a definite distance. The capital of the London and South-Western Railway had a gross earning power of 12·05 per cent. in 1874, which had fallen to 11·76 per cent. in 1878. The capital of the London and North-Western had a gross earning power of 12·18 per cent. in 1874, which fell to 11·55 per cent. in 1878. The net earnings in the latter year were respectively 4·90 and 4·80. But this covered a nominal increase of capital in the latter case. There can be little doubt that the detailed accounts of these two lines would afford valuable information as to the most economical form of locomotive power. But the partial facts which are afforded form only a hopeless puzzle, in the absence of the one controlling fact of the mechanical work actually done in each case.

Thus it is evident that the London and North-Western line is worked, on the whole, ten per cent. cheaper than the London and South-Western. It is, however, probable that the difference is mainly due to the great volume of traffic over which the fixed expenses are distributed. The London and North-Western is the sixth, the London and South-Western the twelfth, in the order of traffic of the English lines. Taking the cost of locomotive power alone, the proportion borne to receipts does not very materially differ in the two lines. But the question remains whether a much greater economy might not have been effected on the Northern line had the locomotive power been conducted on the principles adopted on the Southern. On the other hand has to be urged the economy of giving to engines, as to horses, a certain interval of rest. The results of a difference of more than a third in the average annual mileage performed by two sets of engines are enough to clear up this, among other, vexed questions. But with the accounts before the public it is not possible even for the expert to give the information which it is so important to secure.

We give the above as an instance of the way in which it is possible to attach much value to such work as that of Mr. Fleming, without implicitly accepting all his conclusions. But the very fact that conclusions of such magnitude should be in doubt is a fresh proof of the desirability of that clear statement of work done, and cost incurred, which is demanded by the railway economist. Of the value of the statistical analysis and tabulations contained in the Index, no two opinions can be formed. This is not the first time that we have expressed our own.

VARIORUM.

The current number of *St. James's Magazine* includes a paper by Mr. H. Reid, C.E., entitled, "Hand-made Homes." This is the ending of it:—"People will prefer to live in good houses when they have guarantees that they are so, and therefore bad houses will be empty, and if unoccupied, and no tenant to be found, they must become all but worthless. They cannot be taken down by the man who built them, for the freeholder has them fastened and rooted to his title, and therefore they must eventually revert to him; but he will, again, be puzzled how to dispose of them. Landlords in the agricultural direction have farms thrown on their hands which they have not the sense or means of cultivating, and so it has been for years with house-owners. The time will, and must, come speedily, when it will be impossible for the most expert speculating builder to throw into the human dwellings any of the rubbish now so frequently used, for our authorities will have awakened to a sense of their duty and position, and make it compulsory on all concerned to test the materials to be used in all buildings, of whatever kind. It is unnecessary for us to say that our remarks apply only to the worst class of houses, which the present generation have seen reared in their midst, for we are happy to be able to admit that there are many good and true houses, where any one may live in comfort. The builders of these houses reap their due reward, for not only are such a class of dwellings readily occupied, but when offered for sale the character of their builders, and their well-earned reputation for good and substantial work, insures a fair and remunerative price, even under the disadvantage of a forced sale."——The *Leisure Hour* says, justly, of Edinburgh,—"Probably there is no spot on the face of the earth of which so much has been well said and well sung. The novelists, like Scott and Galt and the Wilsons, not to mention a number of other and many inferior names, have set the social manners of the people, the scenery, and the historical incidents in such a pleasing light; the poets, like Scott again, Burns, Fergusson, and Ramsay, have made every variety of beauty familiar to all readers by their verse. No other spot has been honoured by such a crowd of artists and engravers, illustrating and realising the charm of scenery, the romantic structure of old buildings, or the curiosities of old manners. And then the archæologists and historians of Edinburgh and Scotland, like Burton, Rogers, Pitcairn, Chambers, have explored every cranny where a fact or a forgotten incident might be supposed to lie. Edinburgh is a place of which not only its citizens, but all England and all English colonies, may well be proud."——A new feature has been introduced in *Engineering*, in the shape of an "Illustrated Patent Record." This will be of much service in many ways to inventors, patentees, and others.——A European

edition of *Harper's Magazine* is projected, to be published by Messrs. Sampson Low & Co., London. This periodical, whose name is a household word in America, where it circulates 140,000 copies, has been the means, in its sixty volumes, of introducing to the American public many of the leading novels of Bulwer, Dickens, Thackeray, and George Eliot, and other English writers. It is understood that Mr. Thomas Hardy is engaged upon a new novel, to be illustrated by Mr. Du Maurier, of *Punch*, which will accordingly appear exclusively in *Harper's*. The illustrations are, in fact, a chief feature of this monthly, which, in its 160 pages, gives commonly from 70 to 100 wood-engravings.—— A selection from the miscellaneous scientific papers of the late Professor W. J. Macquorn Rankine is about to be published by Messrs. Charles Griffin & Company. It will include an introductory memoir of the author by Mr. P. G. Tait, M.A., and be edited by Mr. W. J. Millar, C.E.

Miscellanea.

The late Mr. T. H. Wyatt, Architect.—The *Citizen* states that probate of the will of Mr. Thomas Henry Wyatt, late of 77, Great Russell-street, Bloomsbury, architect, who died on the 5th of August last, was granted on the 6th ult. to Messrs. Matthew Wyatt and Thomas Henry Wyatt, the only sons, the executors, the personal estate being sworn under 30,000*l*. The testator bequeaths the goodwill of his business, the lease of his offices, and all his architectural drawings and books, to his son Matthew; to his daughter, Constance, in addition to other provision, 6,000*l*. for life; at her death such sum is to go among his son Thomas Henry's children; and there are many other bequests to his children and others. He also bequeaths to the Architects' Benevolent Institution, the Incorporated Society, the Middlesex Hospital, and the Royal Institute of British Architects, 100*l*. each; and upon the death of the daughter of his old friend, George Moore, a certain trust fund of 500*l*. is to be paid either to the treasurer of the R.I.B.A. or to the Artists' Benevolent Institution. One-third of the income of the residue of his property is to be paid to his daughter-in-law, Mrs. Charlotte Wyatt, and the other two-thirds to his son Thomas Henry (and on the latter's death to his wife, Mrs. Julia Wyatt); ultimately the said residue is to be divided between his grandchildren, the children of his said sons.

Examination of Candidates for District Surveyorships.—At the meeting of the Metropolitan Board of Works on the 15th inst., on the recommendation of the Building Act Committee, it was resolved that the Royal Institute of British Architects, in reply to their letter as to the examination of candidates for certificates of competency to perform the duties of a district surveyor in London, be informed that the Board concur in the views of the Institute as to the desirability of making the examination of an improved character, and see no objection to the proposed imposing of a moderate fee upon each candidate.

Roman Villa at Brading, Isle of Wight. With reference to certain complaints Mr. Cornelius Nicholson says,—"A contract was signed a week ago for the complete roofing of all the mosaic floors, and the framework of the roof is now in course of erection. As to the dyke between Lady Oglander's land and Mr. Munn's farm, negotiations are now on foot for having this removed; and, for the future, it is our intention to make only one charge of 6*d*. to visitors. On the question of expenses, I feel certain that this great undertaking cannot be effectually completed unless the public assist us with the ways and means. We are already heavily and personally pledged."

Stained Glass seems steadily to be taking higher ground in Scotland. Two national historical windows have recently been undertaken by Ballantine,—the one illustrative of the Regent Murray's life, for the Murray aisle in St. Giles's; the other of single figures from the "Fair Maid of Perth" for the Town-hall in that city, of which we recently gave a plan and view.

Gipsy Hill.—Extensive additions to the schools and public hall, Gipsy Hill, have just been completed by Messrs. Bowyer & Son, of Upper Norwood, builders. The cost of the new buildings was defrayed by Mr. James Sidebottom. The architect was Mr. Ernest Turner, of Regent-street.

Homes for Aged Mariners, Liverpool.—On the 16th inst. the foundation-stone of the central block of the Homes of Aged Mariners, near Egremont, was laid by Mrs. William Cliff. The site for the erection of the principal block stands upon a promontory, so to speak, on the coast line from Egremont to New Brighton. The area of the park, which is being laid out by Mr. W. H. Tyerman, is about 5 acres in extent, and is to bear the name of the Roger Lyon Jones Park. Mr. William Cliff, of Liverpool, has undertaken to defray, to the extent of 5,000*l*., the cost of an erection to accommodate fifty aged mariners of the Mercantile Marine; but, finding that it was desirable to make the central block of sufficient capacity to accommodate for social purposes those living in detached residences, and to provide enlarged reading, smoking, and other entertaining rooms, the original scheme was gradually expanded, and included the addition of a large central tower, 120 ft. high, which will accommodate a clock and bells, visible from a long range by sea and land, and Mr. Cliff has undertaken to pay the necessary additional cost. The contractor for the works is Mr. Richard Beckett, of Hertford, the amount of the contract being about 10,000*l*. Mr. Edward Roberts is the clerk of the works, and the architect is Mr. D. Walker, of Liverpool. The scheme proposed is (1) a home, with entire maintenance, for friendless single aged mariners; (2) cottage homes in the same park (with or without pension) for aged mariners who have wives or other relatives to care for them; and (3) out-pensions and relief for aged mariners and widows who cannot leave their friends.

Society of Medical Officers of Health.—The inaugural address in connexion with this society was delivered by the president, Dr. Bristowe, F.R.C.P. Lond., at 1, Adam-street, Adelphi. After some introductory remarks, the president observed that the public, especially its poorer portion, habitually disregarded precautions which were not, and some of which could not be, compelled by law, but without which the efforts of sanitary authorities became practically useless, and it was most desirable to leaven the public mind with the practical truths of sanitary science. He was certain that damp rooms tended to cause inflammation and affections of that character, and that the removal of dampness from houses was likely to improve the health of inmates in that respect. After discussing the relation of medical officers of health to the vestries and district boards which employed them, or, rather, he might say, of sanitary officers to the bodies with whom they co-operated, and to the population for whom they acted, he affirmed, in conclusion, that the position which a medical officer of health might hold in his district depended mainly upon himself. It was not the law which he administered which gave him the chief power for good, but the moral influence which he might acquire, and he need not look for conspicuous examples of the truth of his assertion.

Board Schools, West Bromwich.—The new Board schools at the Lyng, West Bromwich, have been opened by Mr. Daniel Howard, vice-chairman of the School Board. The schools are planned in three departments,—for boys, girls, and infants,—and to accommodate 826 children. They are erected in a Domestic Gothic style, the walls being constructed of red brick, the elevations relieved by stone dressings and bands of blue brick. The schools were erected by Messrs. Jones & Son, of Sedgley, the amount of the contract being 3,960*l*., and that, with the cost of site and other contingencies, brings the cost to less than 6*l*. 12*s*. per head. The schools were erected under the supervision of the architect, Mr. E. J. Etwell, of West Bromwich, whose designs were selected by the Board in competition.

Tramways for South Shields.—On the 13th inst., at a special meeting of the South Shields Town Council, it was resolved to apply for a Provisional Order from the Board of Trade sanctioning the construction of certain lines of tramway within the Borough. The Borough Surveyor (Mr. M. Hall) presented a report on the subject, stating that the total length of tramways proposed to be constructed is (including double lines and passing points) upwards of seven miles. He estimated the cost of the lines at not less than 4,500*l*. per mile, or about 33,000*l*. for the whole. In connexion with the execution of the works it is proposed to widen and extend some of the thoroughfares and to improve their gradients.

New Battersea Bridge.—At the last meeting of the Chelsea Vestry, it was resolved, on the motion of Mr. Davidge, "That this Vestry, having been informed that the Metropolitan Board of Works intend applying in the next Session of Parliament to rebuild Battersea Bridge, are of opinion that any suggestions to destroy an ancient thoroughfare by removing it to another site are strongly to be deprecated, especially as a large sum of money has already been expended by the Metropolitan Board of Works and this Vestry in opening up direct communication to it from South Kensington and the Fulham-road, and they respectfully urge on the Metropolitan Board of Works that in the preparation of plans the present position may be maintained."

Wiltshire Archæological Association.—The annual meeting of this Association was held on the 13th inst., at Devizes. In consequence of the recent visit of the British Archæological Association, no excursion was made to any place or object of interest. The Rev. C. W. Hony presided. The committee in their report stated that the success of the society had in no degree diminished, the membership having reached the number of 392, being a slight increase on last year. The event of the visit of the British Archæological Association was dwelt upon at length. The museum continued to hold its reputation as one of the best collections of antiquities in the provinces. Lord E. Fitzmaurice, M.P., was re-elected president of the Association for the ensuing year, with Mr. W. H. Butcher as hon. secretary, and Mr. H. Cunnington and the Rev. H. A. Olivier has hon. curators of the museum. All the other officers were re-elected without exception.

Technology.—A prospectus from University College, London, just now issued, with special reference to applied science and technology, shows that very complete arrangements are made for giving to students wishing to devote themselves to engineering, architecture, applied chemistry in any of its branches, or any other manufacturing or commercial pursuit, a systematic training in the application of scientific principles to industrial purposes. As in all other departments of the college, there is in it an unrestricted admission of students, without previous examination, to any class or classes they may select. The prospectus may be obtained from the Secretary, at the college.

Desecration.—At the Bucks Quarter Sessions, Aylesbury, on the 18th inst., before Mr. Cripps, Q.C., a man named Warren, and four other men, were charged with stealing lead from coffins in a vault in Cold Brayfield Church. Warren was contractor for restoring the church. The evidence showed that early on the morning of the 10th of July, with the other prisoners, he opened a vault in the chancel, sawed the ends of six coffins, wrenched the leaden shells from other portions, and strewed the human remains among quicklime. Warren was sentenced to twelve months' imprisonment; the others were acquitted.

A new Clock has just been erected in the central tower of the General Hospital at Swansea. It shows time on three large illuminated dials, strikes the hours, and chimes the quarters. It is fitted with all the latest improvements, and has automatic apparatus for turning the gas up and down. It is the first chiming clock in the town. Mr. John Smith, Midland Clock Works, Derby, has carried out the work.

Wakefield Town-hall.—On Monday last the new Town-hall at Wakefield was opened. It has been built in the Renaissance style from designs by Mr. Collcutt, of London, and, including police premises adjoining, has cost about 80,000*l*. The foundation-stone was laid in October, 1877, by Alderman Gill, the mayor. The building comprises a council-chamber, borough court, mayor's room, and banqueting-room, with offices for all the corporate officials.

A Lucrative Appointment.—According to the *Cornishman* for last week, a clerk of the works being wanted for Kelynack School, St. Just, Mr. Francis Gibson has been appointed to that post, and his salary for the work there and *in the town* is to be 25*s*. a week.

The Severn Tunnel.—Operations at the Severn Tunnel works, suspended in consequence of the inflow of water filling the horings and shafts twelve months ago, have been resumed. The new pumps reduced the water 18 ft. in twenty-five minutes.

Ipswich New Corn Exchange.—The corner-stone of this new building was to be laid this Friday (the 22nd), with Masonic ceremonies.

Extinguishing Fire.—Some experiments have been tried in Oil-street, Liverpool, with the "Rapid" fire-extinguisher, Mr. Gibbs representing Messrs. Jarvie & Miller, the inventors. A pile of old tar-barrel staves, and other inflammable materials, was raised and set fire to. When the flames had got sufficient hold, Mr. Gibbs directed the hose of his machine upon the burning mass, and in less than half a minute there was nothing but smoke to be seen. The whole fire was completely extinguished. The engine is charged with water, bicarbonate of soda, and sulphuric acid. The acid is put in last, in a bottle with a glass ball working like that of a soda-water bottle. When the engine is on its end the ingredients do not mix, but once on its side the gases amalgamate, and the pressure is directed to the fire.

The Late Edward Blore.—A handsome monument, executed in marble and granite, by Mr. Forsyth, has just been placed over the remains of this well-known member of the profession, in Highgate Cemetery. It bears the following inscription:—"In memory of Edward Blore, Esq., Architect, D.C.L., F.R.S., F.S.A., born in the parish of All Saints, Derby, September 16th, 1787. Died at 4, Manchester-square, London, September 4th, 1879." "Also of Sarah Ann his wife, who died August 4th, 1867, aged 69."

The Gladatone Bridge, Rhyl.—This bridge, constructed over the London and North-Western Railway Company's land near the railway station, and connecting the hitherto severed portions of the town with each other, has been completed. It has been constructed from designs prepared by Mr. B. Nelson, architect, Llandudno. The stonework was let to Messrs. Braddock & Mathews, of Southport, and the wrought-iron girders to Capt. S. Woodall, of Dudley. The total cost was about 10,000*l.*

Messrs. Bunnett & Co. (Limited) have received instructions from the Master of the Household to replace the existing lift at the Royal Laundry, Richmond, with one of their patent lifts. Messrs. Bunnett & Co. have also just completed fitting their steel shutters to the strong-room at the offices of the Crown Agents of the Colonies, Whitehall, for H.M. Board of Works.

St. Michael's Church, Cornhill.—The income of this church is estimated at 3,000*l.* a year. The prodigality of the expenditure may be estimated from the statement that, in order to give the organist complete control over the choir, electric communication has been made from his seat on one side of the church to the organ on the other.—*The Electrician.*

Alexandra Palace Exhibition.—Francis J. Bancroft, a junior in the highway surveyor's office, St. Mary's, Islington, has been awarded a silver medal by the Alexandra Palace Exhibition Committee for his drawings of timber and iron roof construction, suspension-bridge, road-construction, and ornamental ironwork.

The Works of the late William Daniels. Mr. William Tirebuck, of Leeds, in a letter to a Liverpool paper, says that there are in Liverpool sufficient of the works of the late William Daniels to form a fairly representative collection, and he suggests an exhibition of them.

Wood Paving.—We understand that Mr. H. Allnutt, of the *Estates Gazette*, Fetter-lane, will shortly publish a pamphlet descriptive of laying wood pavement on Kensington high road, a distance of three-quarters of a mile, costing about 11,000*l.*

Architectural Association.—The President and Council have issued cards for their usual *conversazione*, to be held on Friday, the 29th of October.

TENDERS

For roads and sewers on the Oak Lodge Estate, Edgware-road, the property of the United Land Company, Limited, including Aberdeen granite kerb:—

Watts	£5,910 5 0
Pizzey	4,545 0 0
Keable	4,474 0 0
Boyer	4,392 13 0
Cooke & Co.	4,310 0 0
Bell	4,282 0 0
Crockett	4,268 0 0
Nowell & Robson	4,226 0 0
Thompson & Son	4,149 0 0
Meara	3,610 0 0
Killingback (accepted)	3,598 0 0

For restoration and enlargement of Little Market House, High Wycombe, Bucks. Mr. Arthur Vernon, architect:—

Woodbridge	£640 0 0
Lacey	559 9 0
Taylor & Grist (accepted)	520 0 0

For alterations at the Magpie, Battersea Park-road. Mr. H. J. Nawton, architect:—

Blenkarn	£205 0 0
Beale	196 0 0
Walkley	178 0 0
Lamble	157 0 0
Taylor, Brixton-road (accepted)	143 0 0

For the erection of schools in the Avondale-road, Peckham. Mr. H. G. Brace, architect. Quantities not supplied:—

Terry	£1,729 0 0
Hoare & Son	1,398 0 0
Hoskin	1,299 0 0
Keen	1,144 0 0
Watson & Dennett, Dulwich*	1,097 15 0

* Accepted.

For proposed alterations and additions to Exeter Hall, Strand, exclusive of large hall. Mr. Alfred R. Pite, architect. Quantities supplied by Mr. Joseph Rockwood:—

Kirk & Randall	£12,983 0 0
Conder	12,695 0 0
Brass	12,485 0 0
Chappell	12,353 0 0
Booth & Sons	11,980 0 0
Patman & Fotheringham	11,845 0 0
Braid & Co.	11,800 0 0
Nightingale	11,699 0 0
Hobson	11,470 0 0
Higgs & Hill	11,129 0 0

For the erection of a house on the Starts-hill estate, Orpington, for Mr. J. L. Lovibond. Mr. G. St. Pierre Harris, architect:—

Taylor & Son (accepted)	£950 0 0

For new tavern, Maidenhead, Berks. Mr. Arthur Vernon architect:—

Silver & Son	£1,449 0 0
Woodbridge	1,383 0 0
Loosley	1,370 0 0
Hunt (accepted)	1,195 0 0

For additions and alterations to house and stables, "Cuckman's," St. Stephen's, near St. Alban's. Mr. James N. King-Church, architect. No quantities supplied:—

	House.	Stables.	Total.
Rayment & Son, Hertford	425	257	682
Battley, London	337	327*	664
G. & J. Waterman, Watford	378	220	598
Miskin, St. Alban's (accepted)	349	227	576

* Afterwards corrected to £227.

For the erection and completion of new house and stables at Knighton, near Leicester, including foundations and bricks, for Mr. G. H. Ellis. Mr. Edward Burgess, architect. Quantities by Mr. W. Thornicroft:—

Myor	£6,500 0 0

For the erection and completion of new Board Schools in Hazel-street, Leicester, for the Leicester School Board. Mr. Edward Burgess, architect. Quantities by Mr. W. Thornicroft:—

Kirk & Randall	£8,560 0 0
Bland & Son	7,739 0 0
T. & H. Herbert	7,697 0 0
Hutchinson & Son	7,659 0 0
Clark & Garrett	7,019 0 0
Kellett	6,959 0 0

For the erection of a house, shop, and warehouse, Gold-street, Northampton. Mr. S. J. Newman, architect. Quantities supplied by Messrs. R. L. Curtis & Sons:—

		Shutters and Blinds.
Roberts	£1,884	£52 15 0
Dunkley	1,868	59 0 0
Cosford	1,792	55 10 0
Martin	1,700	48 0 0
Ireson	1,685	45 0 0
Smith, Bros.	1,649	42 10 0
Watkin (accepted)	1,423	55 0 0

For the erection of a villa residence and stabling at Cliftonville, Northampton, for Mr. W. Coulson. Mr. S. J. Newman, architect. Quantities supplied by Messrs. Curtis & Sons:—

Edey & Wade	£2,989 0 0
Cosford	2,953 0 0
Bassford	2,851 0 0
Barlow	2,786 0 0
Smith, Bros.	2,657 0 0
Woodford	2,630 0 0
Ireson	2,629 0 0
Emery	2,600 0 0
Taylor & Grist	2,570 0 0
Green, Bros.	2,470 0 0
Heap (accepted)	2,449 0 0

For new church at Falmodeston, Norfolk. Mr. W. Smith, architect:—

Bust, Norwich	£2,430 10 0
Brown, Lynn	2,099 0 0
Hubbard, Dereham	2,052 10 0
Chapman, Hanworth	2,053 0 0
Cornish & Gaymer, North Walsham*	1,994 0 0

* Accepted.

For the erection of new Presbytery-house, Palace-street, Westminster. Mr. J. F. Bentley, architect:—

Stephanson	£1,782 0 0
Nightingale	1,781 0 0
Lawrence	1,721 0 0
Clements	1,719 0 0
Stimpson & Co.	1,688 0 0
Adamson & Son	1,682 0 0

For new road and sewers at Clifton Wood, Bristol, for Mr. Joseph Bartlett. Mr. Herbert J. Jones, surveyor:—

Humphreys	£535 0 0
Yalland	447 0 0
Johnson	424 12 0
Cowlin & Son	395 0 0
Merseweather	390 0 0
Krauss	389 0 0

For the construction of tramways (Barker's patent) at West Derby, Liverpool. Mr. Edward H. Allies, C.E., engineer. Per mile of single line 8 ft. wide, with concrete foundation and paving complete:—

Catterall & Co.	£5,704 0 0
Kidal & Arnison	5,500 0 0
Dawson	5,490 0 0
Holme & King	5,250 13 4
Walkden & Co.	5,236 0 0
Monsley & Sons	5,133 6 8
R. Worthington,	5,104 0 0
Fawkes, Bros.	4,876 13 4
P. Smith	4,726 0 0
Rendall	4,796 0 0
Bell	4,796 0 0
Barker	4,774 0 0
G. Smith, & Co.	4,583 6 8
Lewin & Co.	4,561 6 8
Pitt	4,528 6 8
W. & J. Worthington (accepted)	4,224 0 0

For re-building No. 1, Monument-yard, City, for Mr. R Davis. Mr. Wm. Smith, architect. Quantities supplied by Mr. E. J. Pain:—

Sailer	£6,118 0 0
Durnford & Langham	5,247 0 0
King & Son	5,217 0 0
Harper	5,031 0 0
Crabb	4,913 0 0
Burman	4,771 0 0
Steele, Bros	4,686 0 0
Shurmur	4,265 0 0
Apley	4,195 0 0
Larke & Son	4,190 0 0
Mattock, Bros.	4,121 0 0

For girls Middle Class School, Chenies-street. Messrs. Davies & Emannel, architects. Quantities by Mr. Fredk. Downing:—

Cubitt & Co.	£7,994 0 0
Holland & Hannen	7,937 0 0
Lucas, Bros.	7,910 0 0
Trollope & Sons	7,743 0 0

For the erection of new school at Highgate-hill, for the London School Board. Mr. E. R. Robson, architect:—

Wood	£9,166 0 0
Staines & Son	8,638 0 0
Roberts	8,558 0 0
Higgs & Hill	8,490 0 0
Boyce	8,295 0 0
Stimpson & Co.	8,263 0 0
Pritchard	8,182 0 0
Shepherd	8,181 0 0
Scrivener & Co.	8,022 0 0
Grover	7,938 0 0
Wall, Bros.	7,875 0 0

For new Board schools in Flockton-street, Bermondsey, for the London School Board. Mr. E. R. Robson, architect:—

Booth & Son	£10,970 0 0
Jerrard	9,169 0 0
Higgs & Hill	9,140 0 0
Thompson	9,063 0 0
Shepherd	8,984 0 0
Nightingala	8,981 0 0
Tongue	8,983 0 0
Grover	8,934 0 0
Atherton & Latta	8,900 0 0
Brass	8,896 0 0
Stimpson & Co.	8,773 0 0
Kirk & Randall	8,741 0 0

For the enlargement of Board-schools at London Fields, Hackney, for the London School Board. Mr. E. R. Robson, architect:—

Staines & Son	£4,279 0 0
Wood & Son	4,203 0 0
Pritchard	4,123 0 0
Brass	4,085 0 0
Williams & Son	3,944 0 0
Higgs & Hill	3,898 0 0
Boyce	3,880 0 0
Grover	3,872 0 0
Shepherd	3,813 0 0
Seargent	3,763 0 0
Kirk & Randall	3,734 0 0
Stimpson & Co. (accepted)	3,718 0 0

For pair of villa residances in Norwich-road, Stratford. Mr. J. Moore Smith, architect:—

Gentry	£2,905 0 0
Heiser	2,854 0 0
Waterman	2,775 0 0
Webb	2,749 0 0
Martin	2,539 0 0
North, Bros.	2,487 0 0
England & Thompson	2,372 0 0
Crisp & Tomlin	2,223 0 0
Cheffins (accepted)	2,159 0 0

For new infirmary, Mile-end Old Town. Mr. J. M. Knight, architect:—

Lemaine	£40,570 0 0!
Julian	38,500 0 0
Vernon & Ewings	38,481 0 0
Boyce	37,935 0 0
Crockett	36,200 0 0
Wood	35,963 0 0
Nightingale	35,980 0 0
Howell & Son	35,500 0 0
Everitt	35,500 0 0
Hearle & Son	35,350 0 0
Bangs & Co.	35,318 0 0
Devlin	35,282 0 0
Simpson & Son	35,250 0 0
Higgs & Hill	35,144 0 0
Merritt & Ashby	34,985 0 0
Braid & Co.	34,480 0 0
Drake	34,100 0 0
Little	33,847 0 0
Angood	33,980 0 0
Perry & Co.	33,495 0 0
Johnson	32,890 0 0
Shurmur	31,980 0 0
Croaker	31,484 0 0
Judd	31,400 0 0!

For pulling down and re-erection of premises in Queen's road, Brighton, for Messrs. J. Fieldus, Son, & Co. Mr. J. Lainson, architect. No quantities:—

Howard (accepted)	£7,845 17 8

For the erection of new wing to the Portsmouth Grammar School. Messrs. Davis & Emanuel, architects. Quantities supplied by Mr. H. P. Foster:—

Hide, Bros., & Cook	£1,360	0	0
Ward	1,350	0	0
Cooper	1,330	0	0
Croad	1,341	0	0
Barbidge	1,309	0	0
W. B. & C. Light	1,300	0	0
H. & W. Evans	1,230	0	0
Lewis	1,284	0	0

For new Mission House, Sanford-lane, High-street, Stoke Newington, for Rev. C. J. Robinson. Messrs. Allen & Burbridge, architects:—

Hunt	£1,115	0	0
Shurmur	1,062	0	0
Lawrance	1,023	0	0

For erection of All Souls' Mission House, Overbury-street, Clapton-park. Mr. Francis T. Dollman, architect:—

Perry & Co.	£2,559	0	0
Boyce	2,529	0	0
Dove, Bros.	2,475	0	0
Onthwaite & Son	2,470	0	0
Shurmur	2,443	0	0
Lawrance	2,434	0	0
Hunt	2,381	0	0

For soup-kitchen and boundary-wall, All Souls', Clapton-park. Mr. Francis T. Dollman, architect:—

Perry & Co.	£333	0	0
Boyce	263	0	0
Onthwaite	260	0	0
Dove, Bros.	245	0	0
Shurmur	243	0	0
Lawrance	241	0	0
Hunt	238	0	0

For the erection of a residence for Captain Armstrong, R.E., at Westcombe-park, Blackheath. Messrs. J. & J. S. Edmeaton, architects. Quantities by Mr. North:—

	House.	Stokery.
Boyce & Co.	£3,943	£70
G. Grimwood & Sons	2,930	60
Lucas	2,893	68
Kirk & Randall	2,778	75
Smith	2,518	59
Grover	2,488	64
Gould & Brand	2,429	55

For the Western extension sewerage works at Bournemouth, for the Bournemouth Commissioners. Quantities supplied. Mr. G. R. Andrews, surveyor:—

Stoneware Pipe Sewers.

Saunders & White, Bournemouth	£1,801	3	0
Sharland, Wimborne	1,046	11	0
Etheridge & Co., Manchester	8 9	3	0
Hoare, Bros. & Walden, Bournemouth	748	19	0
Bell, Wood-green, London, N.	680	0	0
Pontifex & Wood, Shoe-lane, E.C.	678	5	0
Leyland, London	583	10	0
Meats, Bros., Nottingham*	550	0	0

* Accepted.

Cast-iron Outfall Pipe Sewer.

Bell, Wood-green, London, N.	£2,580	0	0
Etheridge & Co., Manchester	2,290	0	0
Pontifex & Wood, Shoe-lane, E.C.	1,480	0	0
Leyland, London	1,348	0	0
Howell, Poole	1,145	0	0
Hoare, Bros., & Walden, Bournemouth	936	0	0
Meats, Bros., Nottingham*	760	0	0

*Accepted.

For road kerbing and guttering at Bournemouth, for the Bournemouth Commissioners. Quantities supplied. Mr. G. R. Andrews, surveyor:—

Saunders & White, Bournemouth	£2,216	8	9
Leyland, London	2,066	15	6
Pond, Wimborne	2,010	0	3
Meats, Bros., Nottingham	1,988	6	4
Knight, Wenstead-park	1,968	0	0
Gibson, Exeter	1,948	8	0
Free, High Wycombe, Bucks	1,851	11	8½
Rutty, Bromley-by-Bow (accepted)	1,766	5	0
Hoare, Bros., & Walden, Bournemouth	1,670	4	5

For surface-drainage for the Queen's-road and the Cambridge-road, Bournemouth, for the Bournemouth Commissioners. Quantities supplied. Mr. G. R. Andrews, Surveyor:—

Saunders & White, Bournemouth	£211	0	10
Pond, Wimborne (accepted)	195	0	2
Hoare, Bros., & Walden, Bournemouth	117	6	4

For new dairy premises, St. Peter's Park, Paddington, for Messrs. Welford & Son. Mr. Edward Vigars, architect. Quantities supplied:—

	Dairy Block.	Stables and Dwellings Block.	Foreman's Dwelling and Private Stable.
Phillips & Son	£6,310	£7,099	£859
Rider & Son	6,166	6,666	766
Col's & Son	5,970	6,600	770
Roberts Bros.	5,711	6,389	763
Downs & Co.	5,975	6,120	750
Bangs & Co.	5,582	6,212	788
Williams & Son	5,620	6,290	757
Stephenson	5,444	6,224	724
Thomas & Butland	5,579	5,896	713
Deacon & Co.	5,297	5,865	721
Bowles	4,957	5,954	705
Martin & Wells	4 954	5,581	693
Hook & Oldrey	4,700	5,640	660

Cottages at Ealing.—Messrs. Tye & Bartlett's tender, amounting to £2,772, was omitted from the list of tenders for cottages at Ealing in our last.

TO CORRESPONDENTS.

T. L. D. (address of office will be found under "Notice to Correspondents")—Floor-cloth Tile Co. (his material would not serve for the case in question).—Inquirer (because of their contents)—E. I. O. (thanks; not quite in our direction).—J. M. (the best organ is the *Builder*. The question asked cannot be answered categorically. Remedies have been constantly discussed in these pages)—J. N. K. C.—S.—G. H.—P. H. N.—J. M.—H. S.—H. M. M.—J. J. A.—R. S.—W. S.—S. & Co.—A. R.—B. & Co—H. F. F.—G. S. A.—W. M—J. M. S.—M. & H.—H. & C.—H. A. S. & L.—S.—W. T. W.—A. V.—A. R. F.—W. & R.—J. P. S—W. H. S.—A. M.—S. L. M. & Co.—S. T.—M. O. T.—H. T. T.—G. P. S.—S. H. T.—C. C.—C. G. & Co.—D. W.—Messrs. C.—W. S.—J. D. H.—G H.—O. S. & Son.—J. F.—H. J. J.—S. C. M.—H. H.—J. T. G—M. B. (received).—S. T. G. (next week).—M. & C. (next week).—Will Watch (next week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

The Builder.

VOL. XXXIX. No. 1969. SATURDAY, OCTOBER 30, 1880.

ILLUSTRATIONS.

CONTENTS.

A Sanitary Aspect of Construction.

ODERN investigation and experience in regard to the best conditions for healthiness in hospitals have proved that in regard to such buildings at least it is not only important to consider how completely satisfactory ventilation and drainage are to be provided for, but how precaution is to be taken against the retention of impure matter in the very materials themselves of the building. It is not only a question of how the building is constructed, but of what it is constructed;

d one conclusion at least has been unaniusly arrived at,—that smooth, impervious, d washable materials are the most likely answer the desired end. And along with e conclusion is one which almost necesrily accompanies it,—that all receptacles d corners where matter may be collected and difficult to dislodge are almost certainly of injurious tendency. The medical part of the timony is unanimous on this point.

All dwellings are not hospitals; but it may worth consideration whether some of the nciples which are regarded as *de rigueur* in e case of hospitals ought not to be to a certain ent acted upon in regard to all buildings for man habitation, as far, at least, as is conkent with convenience, comfort, and a sonable economy in regard to the general s of a habitation.

Every house which is fairly well built and ished in the ordinary methods looks sound l healthy when new. It is when such houses ne to be examined after a certain lapse of ie, for a new tenant, or for purposes of valuaı or dilapidation, that the inherent defects of inary building are so prominently brought . Every one who has had to survey old ise property, especially in the smaller streets large towns, knows how many things there in such houses which are certain to be found state of dilapidation. Wainscots and skirtings broken and started from the floor, and con l behind them long passages and crevices ore all kinds of minute *débris* have accumed unknown and unremovable. Casings have er been properly fitted or backed, and ough the decay of wood blocks are loose in ir seat, and leave gaping crevices between woodwork and the plaster; chinks for which only good word that can be said is that they uetimes afford compulsory inlet ventilation when otherwise there would be no such thing. Chimneypieces are in like manner whited sepulchres, which mostly do not even appear "beautiful outward"; they are all in slabs one of which is sure to have got loose, having been badly set originally, and is either gone, leaving an unsightly gap into the regions behind this arrangement of slabs, or is knocking about half in its place and half out. The papers are thick upon the walls one over another, forming so many layers of semi-decayed and sometimes even putrid paste and paper. And what goes on between the ceiling joists and the flooring-boards, who can tell? The house is full of spaces which no one can get at to clean them, and of constructions which have been essentially rickety at first, though looking well enough when quite new and covered with fresh paint, but which are now ragged, and shaking in their places.

All this, of course, may be a providential arrangement for securing work to repairing joiners and to "dilapidating" surveyors, but in an economical point of view no other class of person, except the original speculating builder who produced the structures, is likely to find a good account in it. There is, however, another view of the matter which is even more important than the economical one. The difficulty of keeping houses healthy (apart from drainage questions) is undoubtedly very much greater in a crowded town than in the country. The population is much denser, the air is laden with impurities of smoke, of dirt and dust, of human and animal emanations, all of which find a lodgment somewhere until cleaned off or otherwise dispersed; and if not cleaned away attach themselves to and become almost a part of the softer and more porous materials, which thus become radically unwholesome portions of the structure.

To avoid this the great desideratum would be that there should be as few porous substances and as few concealed and un-cleanable places as possible in which impurities can lodge. It may be added that a great part of the depressing effect in the lower parts of crowded towns arises from an aspect of squalor and dilapidation, which is owing in great degree to the employment of methods of building or of finishing buildings which almost inevitably succumb to rapid decay, and become rickety and unsightly. Now, all these drawbacks to the healthiness and cheerfulness of a crowded town district we encourage and foster by certain methods of building which have become traditional, and are carried on without thought and as a matter of course, and as if they were inevitable conditions of building. This applies almost as much to the houses of the better class in the superior districts of towns, as in the inferior; only the evil is more felt in the latter. It is difficult enough under the most favourable conditions to keep crowded districts of a lower class healthy and cheerful; but it becomes more so when the buildings themselves are so constructed as to have a natural tendency to harbour what is unhealthy, and to appear (and to be too often in reality) rickety and falling to pieces.

To exemplify more particularly what we mean, we will draw attention in the first instance to the manner of finishing shop-fronts which prevails both in the better and inferior districts of our towns. By common consent, and merely because it is the fashion, almost every shop has constructed before and around the front of its ground-story a joiner's erection of perishable shallow cornices and pilasters of wood, which, when made gaudy with paint may pass off very well before the uncritical eye of the general spectator, but which is really a mass of utterly useless gimcrack hung on to the building, an excrescence at the very best. In the inferior districts of a town, the frequent re-painting and garnishing of these pieces of cradling cannot be carried on to the same extent as in the superior districts, so that even their value in making a gaudy show is lost. Their effect from an architectural point of view is mean and confused; but this mass of gimcrack shop-fronts must surely have a bad effect in a sanitary sense also. Instead of solid walls, which even if not artificially cleaned, are washed by the rain without any harm to their structure, we have a mass of woodwork with hollow spaces behind, wherein dirt and vermin may lodge unseen and undisturbed, where decay may go on unperceived, and which are not susceptible of outward cleansing except by the application of fresh coats of paint. Surely it would be an advance in the favourable conditions for sanitation of a crowded town neighbourhood, if we did away with all this gimcrack, and insisted on the building of honest brick walls and arches, or stone or iron lintels, showing a plain sound construction, with "no deception," and getting rid of a mass of unmeaning stuff which must come to pieces sooner or later, and which renders the cleaning of the front of the building twice as difficult and ineffectual as it might otherwise be.

When we come to the interior of the house where sanitary considerations more directly, concern the inmates, we find various forms of unpermanent and uncleansable material and construction have established themselves as a matter of prescriptive right. We have a quantity of really unnecessary joiners' work put together, with hollow spaces for the accumulation of dirt and rottenness, in the pulley casings, which are matters of course in English window-hanging. Far more solid and sound construction is the casement-window, with its solid frame, leaving nothing behind and out of sight, no hollows to fill up, no hidden wooden boxes that no one can get at. People imagine that casement windows are not as weather-tight as the sash-windows, a mere prejudice resulting from bad making of the former more than anything else; and it is quite certain that in buildings where work has to be done cheap a casement-window is more likely to be accurately fitted in the walls, and less likely to admit damp and draughts between the wall and the frame, than a sash-window, with all its band-

box appsratns of cssing, which can only he really well and solidly made and kept np at much grsster expense than can nsually he bestowed upon it in houses of an inferior class.

A great part of the interior finish of an ordinary room is composed of perishable, frail, and dirt-holding materials. The ordinary wainscot, which pretends to he a plinth, is a kind of woodsn shell fastened in front of the wsll, the spscs behind which forms a psrade-ground for mice when they get into a house, which they constantly do when tbey find such commodious arrangements msde for their privacy and aecurity. A wsll-sxecnted wsinscot, carried full sbove "chair-back heigbt" ronnd the wall, or a completely wsinscoted room, each has a good effect, tbough it may he doubted whether the latter forms the healthiest lining to a room. When the expense of so costly an adjunct can he gone to, there is a possibility that the work will he solidly put np; but the ordinary house wainscot is a mers piecs of joiner's sham, worst of all when, as is often done, thers is the silly pretence of a sub-plinth to it, of course, in another separate piece set on. A solid piecs of thick wood, with the moulding worked out of it, and fixed olose against tbe wall, would he a very different affair, tbough one can hardly, sven in that cass, see the ahsolute necessity of the addition; but whers this cannot he afforded, it would he far better to he content with merely a solid rail of wood, with a concavs quarter-circle moulding run in it, so as to connect the lines of the floor and wall hy a small curve, which csn he easily swept, instesd of allowing them to for m an angls whers dust and dirt will lis in a way difficnlt to remove. Tbis is assuming the existence of a plastered coating on tbo wall. It seems a qnixotic undertaking to tilt st plaster, whicb has enjoyed so long a lifs as the accepted internal coating of walls; and ws may hs asked what ws would propose as a general snbstitute for it, and may admit that consistently with necessary economy, it is, perhaps, not so easy to say. But it is quite certain that a model wall-finish ought to havs ons of two qualities: it should he capahle of heing easily and tboronghly clesnsed, or it should be capable of easy renewal. Plaster has neither characteristic. It holds a great dcal of dirt, and can hardly he cleaned at all, and it cannot he renewed without much tronhle, dirt, and expense, and emptying the honse or tbe apartment for the purpose. For hospitals there is not so great an objection, hecanse in every well-regnlated hospital every ward should be empty for a time by rotation, and the plaster could be chipped off and renewed dnring that period, if medical sanitarians think (and some of tbem do) that this entire removal of the lining of the ward is the only way to disinfect it thoroughly. But snch a proceeding cannot he conveniently undertaken in a private dwelling-house. In a majority of houses tbe resonrce is papering, and, artistically speaking, a great deal may be said for papering as a means of producing an agreea'le effect in an inexpensive manner, and a great deal of very good decorative art has of late years heen applied to the design of wall-papers. But papers, like plaster, come under tbe denomination of materials which can neitber be well cleaned nor easily changed, and which absorb and hold a great deal of unhealthy matter. They are, of course, much more easily renewed than plaster, hut the temptation in cbeap house property which is not very well looked after to lay one paper over another is very great, and is often indnlged; and nothing can well he more deleterious to tbe healthiness of the room than this; and stripping off and repapering, though much simpler than replastering, cannot be done often enongh to ensure a really clean and healthy state of the walls. Tbere appear to he three courses open to us. One is tbe employment of Parian cement, or some other hard and washahle cement, as the interior lining for walls, when nothing is to be placed over tbe surface. In the poorer class of houses which are not papered, the plaster surface is one of tbe worst in sanitary condition and even in nnsightly appearance, after a certain term of occnpation, which could he fonnd. Mere lime-wbitening, if the wall is a sound one, is a mucb better and healtbier finish, tbongh certainly not agreeable in aspect, and is easily renewed. Where Parian or otber cement is deemed too expensive (although nothing ongbt to he considered too expensive which concerns the actual healtbiness of a babitation), and wbere lime-wash is considered too rough, coating the plaster with such a preparation as silicate paint, which will hesr washing, is a great improvement on papering or on the ordinary paints. In houses of the best class there remains the alternative of building the inner faces of the walls with solid materials of a high class, such as glszed brick or some of the numerous terra-cotta materials which are now offered to tbe choice of those who build. Tbers is then something perfectly capahle of heing cleaned, provided always that it must not have surface decoration which is too deeply cut and which would leave hollow places whers dirt would collect and which would be difficult to clesn satisfactorily. If such an intsrnal finish hs thonght too cold for this climate, then there is the resource (ws are now speaking of habitations whers expense is not a primary consideration) of hangings which can bs sasily tsksn down and pnt np again, changed, cleaned, or renewed, which can he removed from the room when not in use and thoroughly airsd. Thers is the question of picture-banging to bs considered, of course, in a majority of honses. Where some matsrial can be strsined closs to the walls when hnng, pictures can bs hung over it (ss at the Grosvenor Gallery), or a very good effect, combined with warmth and comfort, may hs produced hy tapestry or otber hangings on the lower part of the wall, with tbs solid intsrior surface left above a certain level as a background for the pictnres. Ths object which runs throngh all these suggestions is the same,—to havs tbs walls of our rooms sither of such material, if permanent, ss csn he efficiently cleansed without injuring it, or hung or fitted with such decorative matsrial as csn he easily removed and clesnsed or replaced as often as the greatsst attention to sanitary conditions demands. Now the fsct is that nesrly all inhahited rooms srs at present finished internally in a way which precludes the observances of either of these conditions. With impervions walls, however, let it always bs remembered that ventilation must bs mors especially attended to.

Plastsr is an insidious tempter also in the sxcnse it gives for those foolisb and unmesning ornaments which are called plaster cornices, and which are made worse hy being "enriched" with ornaments nsually qnestionahle in design, always perishable in material, and almost always contrived so as to hold a qnantity of dust, dirt, and soot wbich is never dislodged. It is not easy to say whetber this superstition of the plaster cornice arose in the first instance from the idea that every internal wall mnst have a plinth at the hottom and a cornice at tbe top, because tbe external wall has; or whether the plaster cornice is a kind of reminiscence or anggestion of a corbel to carry the floor ahove. Wbichever he its origin, it is eqnally unmsaning. There is perhaps no part of the internal economy of onr hnildings whicb is more marked hy the spirit of the jerry-builder than the jnnction of walls and floors. A large and pretentious plaster cornice, with its wooden hacking or hraoketing, is really a process of hanging a quantity of stoff on to the walls at that point, in a form which simnlates that of a hracket bearing on the walls and supporting the over-floor. The reasonable and solid way of doing tbe thing would he to project a corhel, say of terra-cotta, built into the walls, and projecting snfficiently into the room to give a hearing for the floor-joists over; and this would form the finish of the wall-surface and fill up the angle hetween it and the ceiling.

The ceiling is a question hy itself, heing as it is under different statical conditions from the wall-surface, and depending even more than that on the principle of construction and the material that may he employed in hridging the space from wall to wall. When wood flooring is employed, the simplest way, no donht, is to leave the joists open, and varnish tbem and the under-side of the flooring-boards, which, in such case, should be thicker than usually employed, and, of course, grooved and tongued. But this is bad in the way of light, and, moreover, does not sufficiently damp sonnd hetween tbe room above and the room helow. What is quite certain is, that to underdraw the joists with lathing and plaster is one of the worst metbods that can be employed. The plaster reflects light, it is true, hut it also collects and renders peculiarly visible all dust from occupation of the room and soot from combustion; it cannot he cleaned except hy the process of rewhitening it, which means shutting up the room for some days, and the plaster is a material peculiarly liahle to crack under the shaking of tbe joists from traffic in the room above. We have before now drawn attention to and explained the small phenomenon which most people bave noticed, especially in small rooms where much gas and coal is hurned in proportion to the area of the room, of the lines of the joists showing on the plaster ceiling in lines rather whiter than the rest of the plaster. The appearances results from the fact that in interspaces between the joists, the porons plastar receives and retains a great amount of soot and dust, which seems to work its way right into tbe plaster, hut which does so less readily where the plsster has the solid hsoking of the joist immediately over it. The shaking of the plaster may no doubt be obviated hy placing it on seps-rate ceiling joists, hut what an amount of perishable material and what holiday spaces for vermin this involves. A wood ceiling is, of course, much snperior, but rather dark, and decidedly costly if well done. A well-known firm of decorators have patented a form of enamelled iron-ceiling material whicb offers some advantages, and can he affixed to wooden joists. The specimens we have observed have been tawdry in design, but this need not be so, and tbe material appears capahle of such treatment as to reflect as much light as a plaster ceiling, and to bs capable of ready cleansing. But it is a matter for serions consideration whether some of the various methods of solid floors of iron and concrete, or other materials, should not he far more used than they are, sven in ordinary dwelling-houses. They possess the immense advantages of solid construction,—no internal hollows and dark recesses; they are mors sound-proof and more safe against firs than timher floors, snd they are capable of being finished as ceilings in a way perfectly capahle of cleansing as often as is thought desirahle. In tbe case of rooms of the better class, a very good effect might he got hy dividing a concrete and cemented ceiling into low domical sections. In houses of the poorer class, and with smaller rooms, concrete floors csn he so easily and chsaply applied, even without any iron in tbe case of small rooms, and are so much mors conducive to good sanitary conditions and constant clsansing, that they seem to hs the most natural method for use in this class of property. There is an objection to concrete floors on account of want of warmth and of the elasticity of a wooden floor. In the case of poor houses in crowded districts, however, the sanitary advantages of a wasbable floor (if utilised) greatly overhalance these drawbacks: in the case of houses of a superior class wood flooring-hoards can be laid down on hearers over the concrete floor, and in tbat case could he laid so as to be easily removable for tborough cleansing of the structure, so as not to leave any long accumulation of decaying matter hetween the boards and the cement floor.

The "hox" marble chimney-piece is not so directly connected with unsanitary results, though it is apt to leave pernicions spaces and hollows in its rear; and it may certainly he said that there is an unhealtby effect produced on the mind by the mero sight of things constructed in a rickety manner, and so as to he bound to come to pieces sooner or later. In a similar way the wooden cornices for carrying gutters, or pieces of joiner's cradling hung on to the wall, contribute to give a disagreeable impression of rickety building, and are indirectly injurious in putting in an exposed sitnation a piece of questionable constrnction in a perishable material. Gutters should he carried on or made of a solid material.

The unsanitary results of insecure foundations, and walls without sufficisnt hond in construction or solidity and mass of material, are too well known and too generally admitted (in tbeory) to need fresh demonstration here. We have wished rather to point out that some methods of hnilding in the detail and finishing of houses, which are almost nniversally nsed, are not only somewhat mean in effect and perishable in quality, but that they have, directly or indirectly, a prejndicial effect on the sanitary character of habitations, especially in a crowded district. In the country this part of the question may be less important. In towns it seems certain that the more solidly and durably houses are built and finished, the more capable they are of continual cleansing without damage to the materials or serious inconvenience to the inmates, the more nearly do they approach to the best sanitary conditions of town hnilding (other sanitary provisions being equally attended to); and that very few ordinary town dwellings are at present built without incorporating in their structure, in a most promiuent and often

wholesale manner, a great amount of perishable, nnwashable, and dirt-holding material. We say therefore emphatically, give ns ths most solid hnilding and the most solid durahle form of internal finish that can be had, even at the expense of heing very plain and losing some cheap form of pretty decoration. Ths real ends of huilding will he hest answered so.

One important *caveat* mnst not, however, be passed over. It mnst be remembered that in proportion as houses are solidly and imperviously hnilt, in that proportion must all provisions for ventilation, hoth for inlet and ontlet, he the more complete and systematic. Pervious walls and floors let in and retain things which they ought not, no douht; hnt they also serve to let in air, for the ingress of which there is often no other provision, and which mnst be had. It is one virtne of solid constrnction that it also almost inevitahly leads to and demands scientific construction.

A GLANCE AT OLD DUMBARTON.

No tourist who has sailed down the river Clyde on hoard the swift *Iona* or *Lord of the Isles* has failed to make special note of the rock of Dnmharton, rising 240 ft. high, with its donhle peak and the scanty remains of its hattlements that from times far remote kept grim watch over the mountains and the valleys of the Lennox. Of this Castle of Dnmharton, the guide-hooks have little to tell heyond the information supplied hy that venerable tourist, Pennant. It is described hy Buchanan as an *arx inexpugnabilis*, and must have heen impregnahle to the ancient manner of besieging. Its name was Dun Briton, and it was also called Arcluith or Alcluith. Wallace was confined here. In A.D. 756 its garrison capitulated throngh famine; in 1571 it was taken hy escalade; and in 1639 it was "surprised" hy the Covenanting party. The castle at this time was held hy Sir William Stewart on hehalf of the king. On the last Snnday in March, Governor Stewart, with his family, attended the parish church, unaware that the enemy had fixed npon that day for the carrying out of a scheme to take possession of the fortress. After service Provost Sempill, a zealous Covenanter, invited Stewart to dine at his honse. On Stewart declining the invitation he was snrrounded hy a troop of forty men, conveyed to the provost's house, and forced to give up the keys of the castle. "Stewart," says Spalding, in his "History of the Troubles in Scotland and England," was compelled to cast off his clothes, "which were shortly put upon another gentleman of his shape and qnantitie, and he putt on his cloathes upon him sgaine. Thus, apparel interchanged, they commanded the captain, under paine of death, to tell the watchword, which, for fear of his life, he truly told. Then they go in the night quietly, unseen hy the castellans, and had their counterfeit captain with them, who cryed and called hy the watchword, which, being heard, yeitts (the gates) are cast open, in goes the Covenanters with greater power than was within to defend it, and mans and fortifies the castle to their mind." A two-handed sword, said to have helonged to Sir William Wallace, is exhihited in the old armoury. Here does not end the romance of the castle; hut we cannot pursue it.

"Dumharton is a small hnt good old town seated on a plain near the confinx of the Leven with the Firth of Clyde. It consists principally of one large street in the form of a crescent. On one side is the Tolhooth, and at the sonth end the ohurch, with a small spire steeple: it had heen collegiate, and was fonnded (1450) hy Isahel, Duchess of Lennox and Countess of Albany." This is all that Pennant had to say ahont the town in 1771, and Robert Chambers, in 1827, has still less to say: "It is a small town undistinguished hy commerce, and possessing no manufactures except glass-making and ship-huilding." The phhlication of the "Dumharton Burgh Records," lately given to the puhlic, is especially valuable for the light these Records throw on the daily life of the townspeople in the seventeenth and early part of the eighteenth centuries. Here are a few extracts. The words are slightly modernised:—"June 22, 1627. The which day they ordained the hailies to cause the glasswright make np a new glass to the Tolbooth in the lowest window, seeing that the old window is all hroken. Also, that the roof of the Tolhooth and the cross be painted and dressed. Also, in regard the painter is in this town, painting Sir William Alexander's ship, they think it meet to cause him to renew the painting and colouring of the orlage (the town clock), *if the bailies can agree with him cheaply on the town's charges.*" We hear of this travelling artist on the 27th of June, 1628: "They ordaine the magistrates to agree with the paynter and cause couler the stake of the cross after it has been oiled." In 1660 the magistrates employ another painter: "James McArthur, the Treasurer, is ordained to pay Gay Littlejohne, painter, the sum of 20 merks, and that in full payment to him for colouring of the council seat and of the horologe; and because the said Gay Littlejohn is owing certain sums to Elizabeth Stirling, ordains the Treasurer to pay the said Elizabeth." This "horologe" was a frequent annoyance to the magistrates. The last heard of it is in 1700, when "Andrew How, of Kilharchan, undertakes to provide a new pendulum-knock (clock) for the Tolbooth, and paint the dial of the same, for 12*l*." Shortly before 1607, Dumharton had snffered from an inundation of the Clyde and Leven, and in that year the Scottish Parliament made a grant to the town of 3,700 merks for the raising of hulwarks. In the "Records" these are referred to as "The Water Work." Scarcely a week passes without a visit paid hy the magistrates at low or high tide, hy night or day, to the "Wattir Wark." Those of the inhahitants who failed to contribute to the expenses of the undertaking were summarily dealt with. "July 20, 1629. The which day it is concluded that the whole persons owing money helonging to the wattir wark he chargit in ward [imprisoned] within the Tolhooth, therein till they pay the same." The Tolhooth, or townhall and prison combined, is in a chronic state of disrepair. The roof of the council-chamher lets in snow and rain, and prisoners are constantly escaping. To remedy the latter evil two hlacksmiths are employed by the magistrates to "make a pair of hogies of a great gad of iron and six iron schikills [shackles] to run therenpon for keeping malefactors in regard of the weakness of the Tolhooth."* Among the motley prisoners were many accused of witchcraft: "March 5, 1632. Forasmuch as David Glen has heen exectionsr of the witches that has heen execnte in this burgh, he is to have a salary of sixteen merks yearly for his thankfnll services."

The townsfolk enter with spirit into the building of an hospital. The stones are to be carried to the place of hnilding hy hoat, and in consequence of the height of the sands, the council "ordains the town to make a trench through the sand, wherehy the hoat may the hetter float, and the stones to he carried away in harrows." The townsmen are divided into "three-thirds," each third, in its turn, coming to the work with spades, shovels, and harrows. The Laird of Buchanan presents his "carrying" hoat to the town to convey stones for the hospital, on condition that hereafter they maintain a hoat, and pay a certain duty out of it to the hospital. The Collegiate Church, already referred to, was in ruins, and its hroken walls formed a convenient quarry for municipal hnilding pnrposes. "April 22, 1628. That the holes in the church vennel [passage or way] he helped and filled up with earth and stones from the colledge [Collegiate Chnrch]," and the magistrates and council appoint a master of the work.

Another of the town improvements is a pier, the construction of which is resolved on in 1632. Nothing more is heard of the pier or "keye" till the last day of June, 1655, when "Rohert Glen, who was appointed overseer of the work and huilding of the common key of this burgh, produced his accompt." The acconnt is interesting, as it shows some of the prices of lahour in those days. The wrights or carpenters are rated at 14s. Scots a day, the layers and hnilders of the stones at 13s. 4d., and the harrowmen at 8s. As all the houses and even the church were thatch-roofed, many precantions had to be taken against fire; the hlacksmith,—there was hut one,—was honnd to use stone and lime in the construction of the wall against which his fnrnace was placed; and Myrie McFarlane, a servant-maid, who, throngh her carelessness with lighted candles had set fire to the honses of two of her masters, was hanished the town, and the inhahitants were cantioned, under heavy penalties, not to admit her into any of their dwellings.

Just one peep into the "Kirk Session Records," appended to those of the hnrgh. "1620. For a sand-glass, 13s.; for an iron to set the glass into, 20s." A shilling Scots equalled in value the present bronze penny.

Before leaving Dumharton mention mnst be made of Tobias Smollett, who received the rndiments of classical learning at the grammar-school of the town. An interesting letter written hy the novelist and historian from Chelsea, March 9th, 1756 (not published in any collection of his works), concludes,—"I have had occasion, lately, to inqnire into the antiquities of onr country. I find the Scots came from Ireland hnt yesterday in comparison with the central city of the Caledonians and Britons of Arcluyd (Dumharton). I would fain derive myself from these last; hnt whether ancient Scot, Briton, or Norman, I am with equal affection and esteem, yonrs, &c., Ts. SMOLLETT."

* See in Scott's "Guy Mannering," the incarceration of Dirk Hatterick.

LONDON WATER SUPPLY.

THE ancient proverh, "That wisdom may cry ahroad in the streets, hnt men will not regard it," seems to he illnstrated very forcihly in the history of the dehate as to the water supply of London. The propriety of beginning at the beginning, in any endeavonr to interfere with a question of such extraordinary magnitnde, is for the most part stesdily ignored. It was ignored hy Sir W. Harcourt's Committee. It was ignored hy the meeting of the delegates from various vestries and district hoards whioh was held on the 20th inst. in St. Martin's Vestry-hall. We are very glad to see snch a meeting convened to discnes snch a snhject; hnt we should have heen more content if any of the speakers had pnt before the assembly the really salient and controlling points of the question.

In the state of jumhle in which the matter is now left, it is almost safe to predict that no real reform can he effected. The qnestions of the rights of the pnhlic, the rights of the companies, the qnality of the existing supply, and the machinery of a new authority, are all hopelessly tangled together; any remark that any speaker makes on one head usnally calling forth some irrelevant remark from some one else npon another.

Coming to husiness: at the meeting we have named, Mr. Beal moved that the Home Secretary should he asked if the Government intended to give notice of a Bill for the constitution of a water anthority,—a Bill limited to snoh object. Of course there can he no objection to the pntting of such a qnestion, though it is a somewhat feehle issue of a pnblic meeting. Mr. Berry, in seconding the motion, referred to the views of Dr. Frankland as to Thames water, and said that it was a question for them to consider whether they should not petition in favonr of an independent source of supply altogether. Mr. Morton supported the motion, and was in favour of a competing supply. Mr. Reed was in favour of the principle of the motion, hut thought the question should not he encnmhered by entering into details. Mr. Potts thought that the different vestries shonld he consulted, and was of opinion that the people of London wonld stand appalled at the idea of having the streets torn np and household affairs completely disarranged in order to estahlish a fresh water-supply. Mr. Redall appealed to the experience of those who had heen drinking London water for many years, and were there still, in proof of the opinion that the water was not so had as was stated. The motion having heen carried, Mr. Beal was for proceeding at a hound to ask the Home Secretary "to arrange, hetween this and the meeting of Parliament, for a valnation of the works and plant of the companies; for a completion of the audit to the 31st of December of the accounts of all the companies; and for a report on the present condition of their works, and on the outlay requisite for their transfer in perfect order." It did not seem to occur to the speaker that his plan could not he carried ont without the full consent of the companies, except hy virtne of some futnre legislation. Mr. Berry very justly protested against the motion as premature, and as invading the functions of the wished-for water anthority. Mr. Potts hoped that the time was not distant when there would be a municipality for all London; and the delegates adjourned to the 3rd of Novemher.

As advocates of the need of water reform, long before the subject hecame a fashionable topic, we wish to say one or two earnest words to those who really, and with single aim, desire satisfactory amendment to he effected. First of all, London is the master of the sitnation, if

London only makes up its own mind. London has not to come as a suppliant to Parliament. The existing companies, sooner or later, all must do this. They must come to Parliament for increased power, and most of them must do so shortly. If London, then, has made up its mind, it can dictate its own terms, or it can raise such an opposition as no company can hope to overcome. The position of the metropolis as a petitioner for a Bill is one thing; its position as the opponent to petitions for Bills to which the great body of the inhabitants are opposed is another. The first position is questionable, the latter is almost unassailable.

Secondly, no new legislation can be anything but tentative, and probably both costly and mischievous, that is effected before the physical problem of the sources of supply is satisfactorily solved. We find that the most opposite views are enunciated on this subject, but the pages are few and far between in which will be found any reference to the real difficulties of the matter. It is not a subject to be dealt with on the hand-to-mouth principle. The water-supply of London in the year 1892 seems to be the utmost range as to which any one has permitted himself even to think. What is to be the source of the supply in 1980? What even in 1930 A.D.? It would be worse than childish to spend millions upon millions without looking forward to the wants of at least another half-century. Yet we have one set of critics gaily cantering on one hobby, and another set on another, just as if the source of the water supply were a matter as to which we had any great choice. One person would not use Thames water on any account; another would only seek supplies from the chalk; a third would avoid the chalk-water as laden with mineral matter, and the hardest of all supplies; another would tap the lakes of Wales, of Westmoreland, or of Cumberland.

But the ugly fact remains that the whole water supply of the Thames valley, or water-shed area, as measured by the outflow of the river, will not very long serve the need of London, unless we invent some method of utilising what now runs to waste. And as to bringing a supply, at the cost of tens of millions of money, for hundreds of miles, the objections are so grave that they may well be regarded as conclusive.

What is needed, then, for the real improvement of the water service of London, is, in the first instance, a thorough settlement of the question of the available sources of the future supply. Until this is made plain, nothing but squabbles can result from attempts at premature legislation. With that question once solved, the details of the settlement with the existing companies will be matter of comparative ease, if we always bear in mind,—although Sir W. Harcourt's Committee omitted to find it out,—that it is the companies that will have to come forward as petitioners, and not the metropolis. London, we repeat, is the master of the situation, when London knows its own mind. And the first facts which London requires to have made plain, in order to come to a wise decision, are the physical facts of the hydrometric supply of water. A businesslike technical inquiry into this controlling part of the subject is the first object at which every honest and intelligent champion of water reform must persistently aim.

OPEN COMPETITION FOR A MONUMENT IN ROME.

In pursuance of a law passed in July last, Signor Cairoli, the president of the Royal Commission appointed for the erection of a monument in Rome to the memory of King Victor Emmanuel, has issued a programme inviting the competition of artists, whether native or foreign, without any distinction. This document declares:—

1. That a competition is opened for designs for an honorary monument to the memory of Victor Emanuel II., liberator of the country, founder of its unity.

2. All artists may compete.

3. No limit is fixed to the invention of the competitors, either with reference to the conception, the style, or the choice of site.

4. The cost of the monument must not exceed 360,000*l.*

5. The "*disegni modelli*" must be so executed as to show clearly the idea of the author. (We leave the words untranslated, in the conviction that it will be important for any artist in the United Kingdom or United States who intends to compete to ascertain directly from the Secretary of the Commission whether that condition will be held to be fulfilled by the preparation of drawings alone, or whether what we usually understand by the word "modelli" will be requisite.)

6. The competing designs may either be signed by the artist, or marked with a motto, which is also to be written on the outside of a sealed letter, containing the artist's name. Only the letters of the authors of the prize designs will be opened.

7. According to the terms of the law of the 23rd of July, 1880, the close of the competition will be the 23rd of September, 1881.

8. The designs must be sent to the Secretary of the Royal Commission, at the Ministry of the Interior, not before the 25th of August, 1881. All the designs, except those obtaining prizes, are to be withdrawn within two months from the publication of the decision.

9. Before the decision, the works are to be exposed to public view. The decision will be published in a report in the official *Gazette* of the kingdom.

10. Three premiums, one of 2,000*l.*, one of 1,200*l.*, and one of 800*l.*, will be adjudged to the three first designs in order of merit. Not less than ten favourable votes will be necessary for each adjudication. The drawings will become the property of the State.

11. The adjudgment of the premium will not bind the State to employ the artist to execute the work.

12. The members of the Commission were named by Royal decree on the 13th of September. They comprise four engineers, two sculptors, one painter, five senators, and four deputies, under the official presidence of the President of the Council of Ministers. The secretary is Signor de Renzis.

As eye-witness to the great peril produced by the Revolutionary movement in South Italy, from which the reluctant intervention of King Victor Emanuel delivered the country, we hail with pleasure this attempt to raise a noble monument to his memory in Rome. For an international competition the terms are well judged. The only question is as to the justice of Article 11, but it must be remembered that a foreign artist might have great difficulty in personally superintending the erection of a great architectural work in Italy. The provision that the designs shall be exhibited before the prizes are adjudged is to be praised, as the public voice will then be heard before it is too late. We beg to offer the committee a motto for the monument:—

"Olim dirept'â Tarquini fronte coronâ
Patria facta a te cingit tua tempora, Victor."

PUBLIC HONOURS TO DAVID D'ANGERS.

The appreciation of artistic genius has overcome the prejudices of party feeling in the land where the Vendéans held out for so long against the Republican forces. The town of Angers has been the scene of a grand demonstration, of public rejoicings, illuminations, and torch-light processions, to celebrate the unveiling of a statue in honour of the sculptor David. The Minister of Foreign Affairs, M. Barthélemy de Sainte Hilaire, and the Under Secretary of State for the Fine Arts Department, were the principal speakers on this occasion, and they both rendered full homage, not merely to the memory of David, but to the success of M. Louis Noël, the artist who conceived and executed the statue which has just been unveiled. The memories this ceremony have recalled are interesting and pregnant with encouragement and a good moral. David d'Angers, like most great artists, had to struggle against adversity during his earlier days, and his efforts were much impeded by the wars that distracted the country at the time. Following his father on the battle-fields, he fought for the Republican cause, and the memory of these experiences furnished him with the subject matter of some of his best works. His father was one of the 5,000 prisoners who were kept in the Church of St. Florent, and would have been executed, but for the dying request of the Vendéan leader, Bouchamp. The politic and humane action which Bouchamp enforced with his dying breath saved the life of David's father, and the son, throwing political animosity aside, carved with his own hands a splendid monument in memory of the Vendéan chief. It was in 1825 that this monument was inaugurated, and the sketches which David took on that occasion are among the most interesting objects exhibited in the Musée David. The old Vendéans came in great numbers to pay homage to the statue of their great chief, and brought with them the guns they had so often levelled against the Republicans. The groups formed by these armed veterans standing round the statue were not only sketched by David, but under each portrait he wrote a few biographical notes. The following is one of David's notes, and it will give some idea of the times and the subject:—

"Louis Châtigner, of Bouchamp's army. After the rout at Le Mans, he was captured with his brother, and both were shot. His brother died instantly, and he fell struck by a bullet that passed through his cheeks. Feigning death, he remained motionless on the ground for several hours, and at night took flight, escaping through the woods."

David d'Angers knew how to respect all great men of whatever party they might be, while remaining himself a fervent Republican. Among his most celebrated works are his statues of Condé, Corneille, Cuvier, Biohat, La Fayette, Goethe, Guttenburg, and Barra. His life was one long devotion to the perpetuation of the features, history, and memory of great men,—of men who rendered notable services to their fellows. Animated with this great idea, he made the cold marble look as if it breathed, and left behind him heart-stirring examples of his genius in immortalising the genius of others. It is satisfactory to find that at present his artistic capacity and work, and not his political views, are uppermost in the public thought, and that all parties are ready to do honour to his memory.

THE LATEST AMERICAN WONDER.

The operation which is necessary for cutting a round or octagon bar of steel into short lengths, such as those that are required for masons' chisels, has never been very elaborate; but a new invention is said to have made its appearance in America which will simplify the process still further. The method that has hitherto prevailed has been to place the bar on an anvil, and after having given it a nick by the blow of a sledge-hammer falling on a sharp chisel in contact with the steel, little difficulty is found in knocking off a length by another stroke. The molecular change that takes place in the neighbourhood of the incision produced by the hammer and chisel is the immediate cause of the bar being so weakened as to admit of its being readily broken, and this alteration in the physical constitution of the steel can be readily recognised by the microscope. Instead of the molecules of the metal lying in the direction of the length of the bar, they are turned about under the sudden pressure of the chisel, and present the same appearance as the section of a bar that has been violently snapped asunder. But interesting as this phenomenon is to the initiated, it is far surpassed by the new invention that is said to be in use in America.

Now-a-days, unless statements are made that are in evident antagonism to known facts, it is often the wisest course to reserve one's judgment. Radiometers and vortex rings, telephones, microphones, and phonographs, were all capable of being romanced about in the earlier stages of their development in such a way that the greatest expert in applied science who happened to have heard of them for the first time, might well have been pardoned if he had regarded them with blank incredulity. Since, however, they have all asserted themselves as facts and not fictions, and have, at the same time, opened up an aspect of natural law that had hardly been suspected and is still little understood, one must listen to the story of further discoveries with reserve. The new American machine includes the apparently inconceivable anomaly of a highly elastic fluid cutting through a solid by reducing it to molten drops that do not burn. Nothing could be more simple than the arrangement of the parts of the apparatus which is said to work such wonders, and indeed it is so simple that any one on this side of the Atlantic who is anxious to test the veracity of the narrative can do so with very little outlay. It consists of a thin disc of soft iron revolving at a high velocity, placed very near to a bar of steel turning in the same direction, at a lower speed, but not touching the disc. When the bar and the disc are revolving, the side of each is, of course, moving in an opposite direction to the other, and it is alleged that when a properly-proportioned

speed is maintained, the steel hegins to melt and drop away, so as to allow of the soft iron disc being moved forward till nothing is left but a narrow neck of steel at the very centre of the bar. This phenomenon of itself must he sufficiently extraordinary and altogether ont of the rango of our previous experience, but what follows in the heatlessness of the molten steel, if the absence of any sensation of heat is to be taken as a test, is still more startling. Along with an account of the apparatus itself, an attempt at explanation has already reached this country, hnt whether it is the real one or not it is impossible for us to say. Certainly, if it be once demonstrated that the har of steel is melted, then it follows that even in the face of this phenomenon there can he little or no exhibition of what we have hitherto known as sensible heat, or else how could the soft iron disc remain unaffected by it? Meantime we can hardly expect ginger any longer "to he hot in the mouth" if molten steel has ceased to convey the impression of beat. If the story is true, it must necessarily lead to some new and very important departure in the study of molecular phenomena. If the machine is only available for cutting small steel hars, then it is qnite in the way of many of our readers who are large users of chisels. If they think the extent of their business would justify them in using machinery for cntting steel bars into longths, they could hardly have a simpler appliance than a thin revolving disc of soft iron. The revolution of the steel bar, which is said to be a necessary condition of success, adds slightly to the complication of the machine, but not so much as to tax very severely the ingenuity of a skilled mechanic. Perhaps, however, it would he wiser, without alleging that the story is a hoax, to wait until we hear something more of its performances, or until a specimen that has done what has been ascribed to it has been actually imported and proved in England.

WOOD-PAVING: ROAD-CLEANSING.

There are several examples of wood paving in London. Some of these may be seen in Pall-mall, at the top of St. James's-street, along parts of Piccadilly, at Knightsbridge, and on to the South Kensington Museum; Sloane-street and King's-road, Chelsea; along the Strand, Oxford-street, and other streets. Most of the wooden blocks are creosoted; some, however, are not. The *Builder* (I assnme) has no desire to puff one form of paving over another, hut it may be allowable to indicate the samples which appear to wear best and look best in wear. The wooden blocks laid on sand and boards, with wide joints filled in with gravel-conorete, have not lasted, and were never smooth to travel over, whilst the wooden blocks laid on concrete, and bedded and jointed with felt (the blocks laid close) present an even, smooth surface; apparently water-tight, and very easy to those who drive over this pavement. London can well afford to pay any moderate extra cost for a sound, safe, smooth, and noiseless road, which shall have n minimum of mud in wet weather, and of dnst in dry weather. If the oheapest road is not also the soundest and safest, it is not even cheap in the end. The traffio of London is so enormons, and clean, noiseless streets have so much to recommend their nse, that any moderate difference in cost is not of much consequonce; that is, from 15s. to 20s. per sqnare yard, and tbe "fad" of having a covering of nsphalte over the concrete, and felt over the thin coating of asphalte, and also close-jointing witb felt, might bring the cost up to one pound per square yard. It may seem to he an absurdity to say that soft wood forming an elastic pavement will wear longer under a quick traffio than a road similar in all other respects, only that the wood shall be harder, and shall he laid hard down upon a rigid foundation; hut experience will give proof in favour of the softer wood, bedded on an elastio cnshion, as the strokes of tbe wbeels in quick motion will be expended in the elastic wood and elastio cnshion; and the springing or jumping of the wheels will be less on the one than on the other. The best granite sets, bedded on concrete, and jointed with Portland cement grout, will no doubt make a sound, long-wearing, and clean street-surface, but will be jarring to vehicles, and noisy to the residents and public. It is, therefore, evident that length of endnrance will not give granite paving the first preference. Asphalte heing semi-vitreous, answers admirably on level streets, hut is slippery, and therefore dangerous, with tbe least greasy mnd. Horses may fall on wood, bnt if they do, comparatively little injury is a consequence.

Asphalte, granite, limestone, and wood may be made dangerously slippory by mnd on level ground, and any one of these forms of pavement will be slippery on steep gradients; bnt horses falling on wood will do themselves least injnry. There will be no broken knees, as on macadam; so that in this respect wood will be the best pavement.

The Corporation of Norwich, some five years ago, allowed one of the companies to lay down wood paving, at a cost of 12s. per square yard, inclnding a concrete foundation. The local surveyor is now going to accept the old street bottoms, and lay down upon them, as a foundation, wood at a oost of 7s. the square yard, saving 5s. per yard; 62,687 square yards of wood are to be so laid, at a cost of 21,940*l*. The life is estimated to he twelve years.

Wood pavements are said to have heen tried in America, and to have heen abandoned, as they absorbed moisture, and became rotten, foul, and pestiferous. These are the assertions; hut we do not know all the facts. Will not some American reader of the *Builder* snpply these, and so enlighten and oblige the residents in the old country?

For good or for evil, London and many other places in England are in for wood pavements in streets of great traffic. We sincerely trnst the evils reported of American wood pavements will not develop here.

Road Cleansing.

It needs no elahorate argument to prove that clean foot-walks and clean streets would he a great comfort, especially if they could be secured all the year round. For foot-walk and street washing, labour, implements, and water will be reqnired. The labour and implements should, however, be parts of the regular scavenging staff. The water must be obtained from one or another of the existing water companies who have water to sell, so as to secnre a dividend-paying profit. This contingent cost is, no doubt, the main canse why the footways and streets of London never are washed so as to be clean, excepting by a thunder-shower; and it is thunder-shower washing which onght to teach the lesson this article is intended to inculcate. The volume of water falling in rain may easily be imitated by hose and jet, which will wash as clean as the thunder-shower does, and do no more injury by splashing. The cost of the water is, however, at present, the bar in London, as will easily be seen when the price is taken into account. The companies do not all charge at the same rate per 1,000 gallons for sanitary and trade purposes, as this ranges from 4d. to 1s. per 1,000 gallons, the lowest price being prohibitive for street-washing. The actual oost of pnmping 1,000 gallons of water does not cost ½d., and if the works were in the hands of a municipality or Government Water Trust, the actual working oost of pumping would be all that need he looked to. Where water gravitates, as at Dnblin, Glasgow, Manchester, and other places, and occasionally flows to waste over the bye-washes, such water might just as well be used in foot-walk and street washing as not, the only cost being that of the labour. The misery of dirty, greasy foot-walks and streets in difficulty of walking is great, whilst the cleanliness of a well-washed and clean foot-walk is a comfort.

Many of the leading streets of London will soon have wooden paved surfaces, and here slipperiness may be easily removed by washing. Foot-walks are now formed of asphalte, York paving, or concrete, and any one of tbese snrfaces may he easily washed, and ought to he washed hy hose and jet, the washing being done from six to eight o'clock in the morning. Hydrants, npon which to fix the bose, should not be more than sixty yards apart. Reels for the hose, on wheels, are nsed for fire-service, and for street watering and washing in Paris, Vienna, and other Continental cities. There is, therefore, no reason why hose ou wbeels should not be used in London.

To wash an area equal to one square acre of surface as effectively as a heavy thnnder-shower does might require about 300,000 gallons of water, which, at ½d. per 1,000 gallons, would give a cost of ahont 12s. 6d. This will be eqnivalent to nearly one mile of foot-walk, 9 ft. in width. The wages of three men, say, equal to one day for one man at 5s. per day, will bring tbe cost np to 17s. 6d.: let 2s. 6d. represent wear and tear and incidentals, and we have 1*l*. as the cost of washing one mile in length of foot-walk. If, however, no charge is made for the water the cost wonld be 7s. 6d.

The foot-walks might not require washing more than once a week, or, say, fifty times in the year; so that the cost per annum for lahonr only to perfectly wash clean one mile of foot-walk would be less than 20*l*., or fifty miles of foot-walk might be perfectly washed ahout fifty times in each year at a cost in round figures of abont 1,000*l*. Think of tbat, „yon shopkeepers in the City, the Strand, Regent-street, and other leading thoronghfares.

Wooden surfaces in streets need not be washed in this perfect manner, and their cost wonld merge in that of scavenging.

These suggestions are made, but with no hope of their being adopted by vestrydom; to bring ahout such work there must be municipal government and the water must he public property. Then hydrants may be multiplied to serve watering-carts and to enable sewer flushing hy properly-arranged flush-tanks heing done each day. Foot-walks washed clean once each week, and water be used on the street surfaces to aid the scavengers. Mnd wonld then he cleansed from tbe surface, and bad smells from the sewers be done away with.

Civil Engineer.

P.S.—At present the notion is that eaoh householder must cleanse the footway in front of his own premises. Consequently, in very bad weather, with muddy streets, the foot-walks are not oleansed. And when heavy falls of snow take place the householder is subjected to heavy hlack mail, in the shape of hired labour; and wbere there are blanks and dead-walls, foot-walks go uncleansed. The entire scavenging shonld, therefore, be by a public department, vestry, or municipality.

THE "LIVADIA" AT SEA: DANGER OF THE ELECTRIC LIGHT.

The first voyage of the *Livadia* has been marked by one of those incidents whioh show how new inventions often develop new and unexpected dangers. One of the great points urged in favonr of the electric light has been its safety. For great libraries, for ships, for coal mines, we are told, absolute security might be obtained by this method, nt the same time with hrilliant illumination. One element of danger, however, was overlooked. On the 16th current a stoker on board the *Livadia*, who was helping to swing an electric lamp in the stoke-hole, while holding the apparatus in one hand, unawares completed the electric circnit with the other. He was instantly struck dead by the force of the electric onrrent. And, as occurs in cases of men struck hy lightning, decomposition of all within the skin almost immediately became evident. The ornate ritual of the Greek Church marked the committal to the deep of the remains of the first victim of marine lighting by electricity.

The vessel is said to have behaved splendidly. But the weather was exceptionally fine. Forty-eight honrs were occupied in running 500 miles. If we allow that five or six were lost in the Irish Channel, hy slackening or lying to in fog, we still have a speed of but little over eleven knots an honr. To obtain this, we are told that *only* 5,000 horse-power was employed, only six of the boilers working. Referring to what we said in July last (*ante*, p. 70) as to the cost of the propulsion of the *Livadia*, it will be seen that this speed should have been attained by under 3,880 horse-power, instead of 5,000, by a vessel of the displacement of the *Livadia*, bnt of better lines. As the difference of resistance increases with the cube of the velocity, the advantage of good lines becomes more and more evident the greater tbe speed. It cannot be donbted that the *Livadia* is a very costly toy, to work as well as to build. We very heartily congratulate the builders, not only on the noble bonns of 40,000*l*. which they are said to have received, hut also on having got the vessel safe off their hands, in spite of the diabolical plot with which it is said that it was menaced; although it is not quite certain that the existence of the plot was anything but a pure invention, framed for the purpose of obtaining money for its denunciation.

On Thursday morning, the 21st inst., in the gale, the bow of the *Livadia* struck some floating wreck, and the vessel has bad to put into Ferrol for repairs.

OLD LONDON.

During the present week a party of from fifty to sixty members and friends of the British Archæological Association has been engaged in visiting some of the principal architectural antiquities of London, and a very pleasant and profitable time has been spent by the visitors, notwithstanding the unpropitious state of the weather. These visits, as we stated last week, were arranged chiefly for the behoof of a few of the country members of the Association, as suggested at Devizes, but were participated in by some of the town members.

Assembling on Monday, at 11.30 a.m., in the Chapter-house of Westminster Abbey, the visitors were met by Mr. J. T. Micklethwaite, F.S.A., who, acting as *cicerone*, first gave a brief historical sketch of the abbey, and then proceeded to conduct the party over the church and its precincts. He commended, as very accurate, the restoration of the Chapter-house by Sir Gilbert Scott, for although a great deal of the work was new, there was was authority for it all, with the exception, perhaps, of the figures in the circle over the door inside. As the company passed out of the Chapter-house, Mr. Micklethwaite called attention to the collection of old capitals on the left-hand side, some of which formed part of Rufus's work in Westminster Hall. The others were contemporary, and belonged to the Early Norman cloister which was built after the Confessor's sanctuary was finished. Many years ago, in pulling down an old house north of the Abbey, another of the last-named series of capitals was found. It was engraved in Brayley's "History of the Houses of Parliament," but Mr. Micklethwaite would be glad to know of its present whereabouts. Conducting the visitors round the cloisters, he pointed out to them the positions of the monks' book-cases, the benches on which the Maunday men sat while having their feet washed by the monks, and, in the portion set apart for the novices, a series of indentations in the benches which must have been made, he said, by the novices themselves in idle moments for the purpose of indulging in a game similar to, if not identical with, that now known as "Go-hang." In the south walk of the cloister two or three early effigies were pointed out. Taking the visitors into the substructure of the dormitory, Mr. Micklethwaite observed that this was about the oldest part of the monastic buildings that now remained. The voussoirs of the arches were, to a great extent, of tufa. This work was not of the Confessor's time, but immediately subsequent to it. Proceeding to the cloister of the infirmary, the visitors were allowed, by the kindness of Canon Duckworth, to pass through his residence, and to descend to a cellar which originally formed part of the prison, and in which is to be seen a fine Early Norman arch in good condition, backed by a wall which Mr. Micklethwaite thought might possibly be of the Confessor's time. Mr. Loftus Brock, F.S.A., however, thought that the wall had been erected subsequently to the arch. Through this cellar passes the Northern Low Level sewer of the Metropolitan main drainage system, the crown of its arch rising through the floor. The remains of the Infirmary Chapel, dating from the twelfth century, were next inspected. This chapel took the form almost of a parish church, having an aisle on each side and a small chancel. The columns of the arcade had the peculiarity of presenting the angle of the octagon to the front instead of the flat face. In this chapel took place a severe pugilistic encounter between the Archbishops of Canterbury and York. It was on record that at a synod held here, the Archbishop of York arrived first and assumed the seat of honour. On the arrival of his Grace of Canterbury, Roger of York was requested by the primate to vacate the seat. His Grace of Ebor refusing to do so, he was literally sat upon by his Grace of Canterbury, and this led to a severe fight, in the course of which the combatants severely "punished" each other. Entering the abbey, the visitors next inspected the choir, the shrine of the Confessor, and Henry VII.'s Chapel, where Mr. Brock took occasion to remark that what was supposed to be a representation of the abbey in Saxon times was shown on the Bayeux tapestry. The church there represented had a central tower arranged not at all in accordance with generally-received notions of Anglo-Norman work, and it had long been suspected that this was a "make-up" on the part of the artist. There had been found of late years, however, so much that was in accordance with what was shown on the tapestry that there could be no doubt that the latter did in a rough way indicate the character of the building, and concurrent testimony in favour of the probability that the tapestry did really represent the building was found in the curious fact that a portion of the figure-head of the Viking ship recently found was precisely the same as a feature which occurred over the ends of the Confessor's church as shown in the tapestry. Having thanked Mr. Micklethwaite for his pleasantly-rendered services,

The visitors next paid a flying visit to the recently-restored Church of St. Margaret, Westminster, where Mr. Lambert said a few words about the curious history of the east window. The general opinion seemed to be that the fine interior of this Perpendicular church had gained very much by restoration.

Westminster Hall and the Crypt of St. Stephen's Chapel were next visited and inspected. Mr. Brock expressed his regret that the superstructure of the latter had not been restored after the fire, as, in the opinion of many archæologists, it could have been. However, it was a great satisfaction to have preserved the beautiful crypt, so well restored by the late Edward Barry, but it was to be regretted that it was now disused.

After luncheon, the visitors crossed Westminster Bridge and proceeded *viâ* the Albert Embankment to Lambeth Palace, where they were received by Mr. S. W. Kershaw, M.A., the librarian, who said he was commissioned by the Archbishop of Canterbury to express his Grace's regrets at not being able to be present to receive the company. Mr. Kershaw first gave a brief outline of the history and character of the library, now, as most of our readers will know, occupying Archbishop Juxon's hall, called after him from the fact that he restored it, the present roof being a copy of the earlier one. The library largely consists of works on divinity, the canon and civil law, histories, and rare pamphlets, but its strength and importance lie in the records and MSS. of the see of Canterbury. There is also a very fine collection of illuminated MSS., the gem of the collection being, perhaps, a ninth-century Celtic one known as the Gospels of Mac Durnan, somewhat of the same character, but smaller than, the famous Book of Kells, preserved at Trinity College, Dublin. In the guard-room the visitors inspected the portraits of a long line of Archbishops of Canterbury, including those of Laud (by Vandyck), Sheldon (founder of the Sheldonian Theatre at Oxford), Tillotson (by Sir Godfrey Kneller), Cardinal Pole (a copy of the portrait in the Barberini Palace at Rome), Warren (by Holbein), Herring (by Hogarth), Secker (by Sir Joshua Reynolds), Moore (by Romney), Manners-Sutton (by Sir Martin Archer Shee), and Sumner (by Richmond). With regard to the portrait of Archbishop Warren, Mr. Kershaw said it was lent to the Royal Academy for their last winter exhibition, and in a note in the catalogue it was stated that it was a copy. He did not know what foundation there was for that statement. Having visited the chapel (recently restored by Mr. Seddon), the "post-room," Cardinal Morton's gateway, and other features of interest, thanks were accorded to Mr. Kershaw (on the motion of Mr. Lambert, seconded by Mr. Morgan), and

An adjournment was made to the adjoining parish church of St. Mary, Lambeth, where Mr. Brock expressed his great regret that the restoration of the church twenty-five or thirty years ago was not carried out on the old lines, as it might easily have been. As it was, a great deal of modern work had been interpolated. One departure made in this restoration could not be justified at all, in his opinion, in any case of church restoration. He referred to the alteration by the restorer of the style or character of the architecture, which was, so to speak, put back from very late Perpendicular (*circa* 1530) to the flowing Decorated of the middle of the fourteenth century now seen. This unwarrantable change of course necessitated the demolition of a great deal of the old work. True it was that when the building came into the hands of the restorer a great deal of the work was structurally unsound, and needed re-building in parts, but that could have been done by taking down the work where necessary, and rebuilding it stone for stone. Fortunately, the tower was unrestored, but with the exception of two beautiful tombs in the chancel, the whole of the body of the church, as it existed prior to its restoration, had been swept away. A word of commendation might, however, be given to the manner in which two brasses had been preserved from destruction by fixing them against the wall. Where a brass had to be removed, from whatever cause, or where it was likely to be worn away by every hob-nailed boot that came in contact with it, no better course could be adopted than that of fixing it to a wall, where it could be seen without being injured. In conclusion, Mr. Brock referred to a few historical incidents connected with the church, reminding his audience that it was in its porch that Mary of Modena, wife of James II., waited with her child for a boat to take her down the river to a ship to enable her to escape from the kingdom at the time of the Great Revolution. Allusion was also made to the pedlar and his dog,—a local tradition, commemorated in one of the windows of the church.

In the evening, several of the members dined together at the Freemasons' Tavern, under the presidency of Lord Nelson.

On Tuesday (a very wet day) the visitors assembled in the Church of St. Saviour, Southwark, where Mr. Brock gave an interesting though brief historical sketch of the church. He referred to the undoubted fact that Southwark, or the "south work," was a fortified place in the time of the Romans, and mentioned in this connexion that in the churchyard, some fifteen or sixteen years ago, a small pavement of Roman tesseræ was dug up by Dr. Druitt, who had evinced great interest in the care of the monuments of the church. After alluding to the legend that the church was founded by a ferryman's daughter in Saxon times, he said that mythical as the story no doubt was, we knew that a Saxon church did exist on the spot, and that church was attached to a nunnery. In about the year 1106 it was re-founded for an order of secular canons, with the assistance of William Gifford, bishop of Winchester, who was said in the old chronicles to have rebuilt the body of the church, by "body" the nave being doubtless meant. A few fragments of enriched Norman work, no doubt part of the rebuilding, were found during the demolition of the nave some fifty years ago,—a demolition that was quite gratuitous and greatly to be lamented. Nothing was mentioned in the old chronicles as to the building of the choir and transepts, but they were of later date than the period referred to as the time of the rebuilding of the nave, but yet earlier than 1209, the date mentioned as that of the rebuilding of the church in an old chronicle now in the British Museum. It might, therefore, safely be assumed that the building of the Norman church commenced at the west end. The architecture of the choir clearly showed that it was earlier than 1209 in date, the piers being built more in the Norman manner, having a casing of Caen stone filled in with rubble masonry. A great fire which occurred in 1212, destroying the houses on London Bridge and many buildings in the immediate vicinity of the church, also burnt down the church, the greater part of which seems to have lain in ruins for many years. Next in chronological order came the founding of the chapel of St. Mary Magdalene, which served as the parochial church in monastic times. This part of the fabric was entirely demolished during the restoration of the church about the year 1822. The architecture of the west end, all swept away at the date last named, was somewhat later still. During the time that the rest of the church is said to have been in ruins, the beautiful lady-chapel was erected. This chapel might also, in Mr. Brock's opinion, have served as a retro-choir. Speaking of the tower over the crossing, Mr. Brock said it was to be regretted that the ringing-floor for the ringers of the celebrated peal of bells had been placed so low as to block out the triforium arches above the four great arches of the crossing, for they formed a sort of lantern. Reverting to the lady-chapel, Mr. Brock said it would be impossible to find a more beautiful example of Pointed architecture anywhere. London was remarkable for three beautiful specimens of Early English architecture, and England might be searched from one end to the other without finding more elegant specimens of Early English work. He referred to the Temple Church, the Chapel of Lambeth Palace, and the lady-chapel of St. Saviour's, Southwark (or, as it was anciently called, St. Mary

Overy's). It was a matter of much congratulation that after the vicissitudes of so many centuries this lady-chapel remained in such good and comparatively perfect preservation. It was built about the middle of the first half of the thirteenth century, that is, 1225; its general resemblance to the work at Lambeth Chapel and the Temple Church hinted the probability that they were all three by the same architect. The lady-chapel had been very carefully restored by Gwilt, to whose memory a tablet and a stained-glass window were erected by the inhabitants in acknowledgment of his labours. Having alluded to what was known as the Bishop's Chapel (from the fact that it formerly contained Bishop Andrewes's tomb, now removed into the lady-chapel), which was a projection eastward of the lady-chapel, demolished at the time of making the southern approach to new London Bridge, Mr. Brock recounted some of the many historical associations of the church. The lady-chapel was used as the Bishop's or Consistory Court, and it was here that Bishop Gardner sat in judgment on Bishop Hooper and many other ecclesiastics who subsequently suffered martyrdom. The church contains a number of very interesting tombs; but the gem of them all is that of John Gower, the poet, now removed to the south-west corner of the south transept. Gower contributed largely to the repairs of the church in 1400. Philip Massinger and many other celebrities were buried in the church or churchyard.

A projected visit to the Coal Exchange, for the purpose of inspecting the remains of the Roman villa found beneath that building (in the preservation of which the Association actively interested itself) was abandoned, owing to stress of weather and want of time, and the party, crossing London Bridge, made direct for the Guildhall, and inspected the interesting and finely-preserved crypt, which now, owing to the preparations for Lord Mayor's day and other festive occasions, presents somewhat the appearance of a temple sacred to Gastronomy.

The Church of St. Bartholomew the Great, West Smithfield, was next visited, and the party was very kindly received by the rector, the Rev. Mr. Ahhiss, to whom was accorded by Mr. Brock a well-merited meed of praise for the measures taken by him to preserve and open out to view some of the most important features of the church, notably the very fine circular arcade at the east end, which had been cut off from view by a wall erected in Perpendicular times. Mr. Brock pleasantly recounted the history of the church, which was built by Rahere, and is the oldest remaining church in London. The oldest work is that at the east end, a marked variation in style showing itself westward of the choir, as was pointed out by Mr. Picton and other visitors. Of the nave, which some said extended westward as far as the present entrance-gateway from Smithfield, only a small portion westward of the crossing now remains. A curious feature in the church is Prior Bolton's oriel window on the south side of the choir, containing on a panel his well-known punning rebus, a tun pierced by an arrow,—"the bolt-in-tun." Leaving the church, after thanking the rector,

The visitors next threaded their way north of St. Bartholomew's Church under the curious overhanging wooden houses known as the Long Alley, and crossing Long-lane and passing through Charter-house-square, arrived at the Charterhouse, where they were received by the Rev. H. V. Le Bas, and conducted over the principal portions of the buildings. In the hall Mr. Lambert read an interesting paper on the historical associations of the place, prefaced by a vigorous argument principally deduced from the Scriptures against the system which he called "monkism," and by a brief history of the rise of the Carthusian order, of which the Charterhouse was one of the principal establishments.

St. John's Gate, Clerkenwell, was the next point made for, and here luncheon was partaken of in the great room over the gateway, Mr. Patrick describing the structure, which has now, by the completion of the new street known as Clerkenwell-road, been more fully opened out to public view. The party afterwards visited the well-known crypt beneath what now remains of the Priory Church of St. John. A visit had been arranged to Gray's-inn Chapel and Hall, and hither some few of the visitors found their way, although the visit had to be abandoned by most members of the party. Those who did not miss Gray's-inn spent some time very pleasantly there under the guidance of the Rev. Alexander Taylor, M.A., the chaplain of the Inn, and Mr. Douthwaite, the librarian. There are some good portraits of legal luminaries in the hall, including, of course, Lord Bacon, whose name is so indelibly associated with the history of this Inn, once the leading legal seminary in London.

It was nearly six o'clock, and therefore quite dark, before the members reached the Temple Church, and the dim light of the few candles which were in requisition was quite inadequate to enable those visitors who had not previously seen the building to fully appreciate its beautiful architecture. This disadvantage was in a great measure compensated for by the address given by Mr. Brock, who said that the body of the church was one of the most beautiful specimens of Early English architecture which the country contained. It bore great resemblance to the Lady Chapel of St. Mary Overy, although far superior in loftiness and size, and there was at any rate, he hoped, an absence of rashness in the statement he had made that the designs of both structures probably emanated from the same hand. He referred in terms of commendation to the public spirit which had restored the church from the deplorable state which it presented at the beginning of this century, although the facing of the walls of the round portion of the church with smooth stone in lieu of the pre-existing rubble work was an instance of zeal untempered by knowledge. However, a great deal that was good had been done, and the custodians of the church were especially to be commended for the care they now took of the building and of the recumbent effigies now preserved in the round portion of the church. In conclusion, Mr. Brock expressed the thanks of the Association to Mr. Hall Dare, Sub-treasurer of the Inner Temple, and the Dean of Llandaff, Master of the Temple, for the facilities they had given for the visit to the church.

A projected inspection of the Hall of the Middle Temple was given up for want of time, and the company separated until the next day, hoping for finer weather.

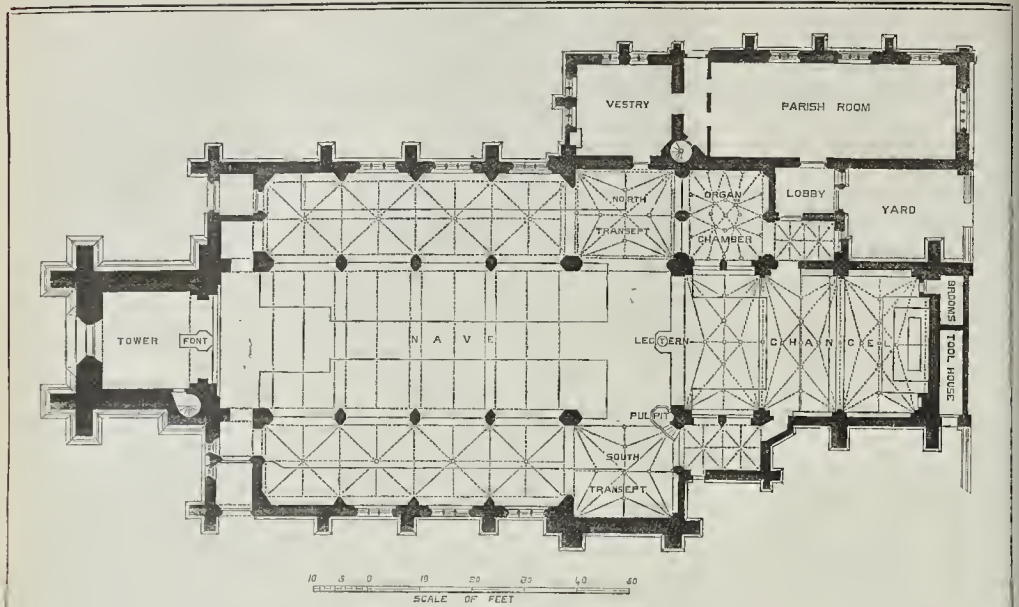
On Wednesday morning the rain was, if anything, more persistent in the spoiling of an archæological outing than on the previous day, and it need hardly be said that the party did not obey the behest of the programme by assembling "in the garden of Trinity-square, Tower-hill." A large party, however, their ardour nothing damped by the weather, did assemble in the waiting-room at the entrance to the Tower precincts and wherever else they could get under cover, and shortly after half-past ten o'clock were very kindly met by General Milman, C.B., Major of the Tower, by whom, and by Mr. Thomas Morgan and Mr. Compton, assisted by other gentlemen hereafter mentioned, the visitors were conducted in and around the fortress, many members of the party penetrating every accessible nook, and most of them ascending every tower which is not modern. The jewel-house, the armouries, and other of the usual "sights" of the place were not forgotten, neither were the recently-restored church of St. Peter-ad-Vincula, on Tower-green, and the exceedingly interesting chapel of St. John in the White Tower, omitted. Beneath the floor of the former lie the mortal remains of many royal and illustrious personages who fell by the executioner's axe; and the latter is, as Mr. Brock took occasion to point out, the earliest example of Norman work we have to which a date can be positively assigned. It was built between 1080 and 1090, and exhibits all the characteristics of Early Norman architecture, the masonry being axed on its surface and laid with wide joints. Of the different places visited, the lower part of the Well Tower (one of the towers of the outer ward, at the south-east end of the river frontage) was one of the most interesting. It consists of a vaulted chamber about 15 ft. long by 10 ft. wide, lately cleared out and conservatively restored, all old work being left untouched. It is utilised as a living-room for one of the warders, and a winding-stair of stone gives access to an upper chamber, used as a bedroom. In this apartment, and elsewhere, the inscriptions and some masons' marks have been carefully protected by movable hinged covers of oak. One of the most interesting sights of the day, however, was that presented by what was declared by Mr. Brock and other authorities to be a veritable piece of the old Roman wall, just uncovered during some excavations near the White Tower. The wall at this point is 7 ft. in thickness, and contains layers of the usual flat tiles, alternating with thick layers of fine rubble-mortar or concrete. It is expected that further explorations will reveal more of this part of the wall. Before leaving the Tower Mr. Morgan proposed, and Mr. Compton seconded, a cordial vote of thanks to General Milman for his courtesy in receiving the company and conducting them over the fortress; to Mr. Taylor, Government surveyor in charge of works now in progress; to Mr. McLishe, clerk of the works; and to Sergeant Andrews, R.E., for the assistance rendered by them. This was of course carried by acclamation, and General Milman replied, expressing the pleasure it would afford him at any time to facilitate the inspection of the fortress by members of the Association.

From the Tower the party proceeded to Barber's Bonded Warehouses in Cooper's-row, Tower-hill, where they dived down into the extensive wine-vaults to inspect another fragment of old Roman wall, touching which Mr. Brock said the wall here had been traced to its foundations, and it was found that its lower portion was of Roman work, containing two courses of Roman tiles, each laid regularly, and each being traced for a long distance. These were, he said, evidently *in situ*, and the contrast between the Roman work and the Norman work above it was most striking.

The visitors next proceeded to the Trinity House, where Mr. Morgan, F.S.A., read an interesting paper descriptive of the topography of Old London and of the characteristics of the Tower as a fortress. This paper would have been read within the Tower precincts but for the badness of the weather, and in the straits to which the company was reduced the authorities of the Trinity House very kindly granted hospitable shelter for a time. Here Mr. Brock again referred to the fragments of Roman wall which had been seen by the visitors, remarking that he was at a loss to understand those who sought to maintain that the Romans did not build a wall round London, although they took care to circumvallate the provincial cities. On the motion of Mr. Williams, one of the Bristol contingent, a vote of thanks was given to Mr. Morgan for his paper, and at the instance of Mr. Compton thanks were tendered to the Corporation of the Trinity House (coupled with the names of Mr. Allan, the secretary, and Mr. Inglis, the sub-secretary) for the use of their premises. A projected visit to the Church of All Hallows, Barking, Tower Hill, having been abandoned, the party proceeded to luncheon at the London Tavern, Fenchurch-street. After luncheon, other items on the programme underwent excision, these including the Church of St. Andrew Undershaft, the Church of the Austin Friars, and Cripplegate Church.

The only churches visited after luncheon were St. Katherine Cree, Leadenhall-street, and St. Helen's, Bishopsgate. At the former the Rev. Dr. Whittemore, the rector, and Mr. Brock, explained the principal features of the church, which, as was also pointed out by Mr. Godwin, is very notable as having been built at the very time when the Gothic and the revived Classic or Renaissance architecture were battling for supremacy. It was extraordinary to find a church with the Classic columns and imposts of the arcade and the cinque-foil headed windows and groining all co-eval. In Godwin's "Churches of London," as Mr. Brock stated, the date assigned to the older work (the remains of the tower of the preceding church, and through which the present church is entered) is 1509. The building of the existing church was commenced in 1628 and finished in 1631. It has been attributed to Inigo Jones, but whoever was the architect, the Catherine-wheel window at the east end was evidently, in Mr. Brock's opinion, designed by some one who was familiar with the large circular window at the east end of Old St. Paul's. Among the tombs in the church is that of Sir Nicholas Throgmorton.

The company next proceeded to the Church of St. Helen, Bishopsgate, where, however, the gas could not be turned on. The few candles hastily procured only sufficed to give those who had not previously seen the church a faint glimmer of its beauty, and many present resolved to make themselves better acquainted with it hereafter. The church was described by Mr. Godwin, who, after referring to the many evidences of Roman occupation of the locality, said that one writer had asserted that there was a church here in 1010, but the evidence he adduced was not convincing. It was known



ST. MARK'S, MILVERTON.—*Plan.*

however, that a church here was made over to the Canons of St. Paul's in 1180. In 1210, the Priory of the Holy Cross and St. Helen was founded here, in honour of Helena, the mother of Constantine, and the discoverer of what was believed to be the true cross, the desire to gain possession of which led to the Crusades. The present church was part of the original priory buildings. It is divided into two aisles by an arcade down the middle, and the northern side or aisle was formerly the nuns' choir, and was screened off from the southern half of the building. The priory buildings extended northward, and there was in existence until 1799 the nuns' hall, with a fine crypt beneath it. The hall above the crypt was for a long period occupied by the Leathersellers' Company as their hall. Having dilated further on the architectural features of the church, Mr. Godwin mentioned several incidents of interest connected with the many eminent men who lay buried here, Sir John Crosby and Sir Thomas Gresham chief among the number. The church was remarkable for the number and richness of its monuments, and on that account it had been called by more than one writer, "the Westminster Abbey of the City." That such an appellation was not undeserved would be seen from the statement that the church contained twenty-five handsome monuments of important personages, besides smaller ones and a large number of brasses. The most important of the monuments from the Church of St. Martin Outwich have lately been brought here, owing to the demolition of that structure and the union of the parish with that of St. Helen.

On the motion of Mr. Morgan, seconded by Mr. Lambert, thanks were given to Mr. Godwin for his discourse, and most of the company ended their three days' outing by a visit to Croehy Hall.

A visit to the British Museum was arranged for Thursday.*

ST. MARK'S, MILVERTON.

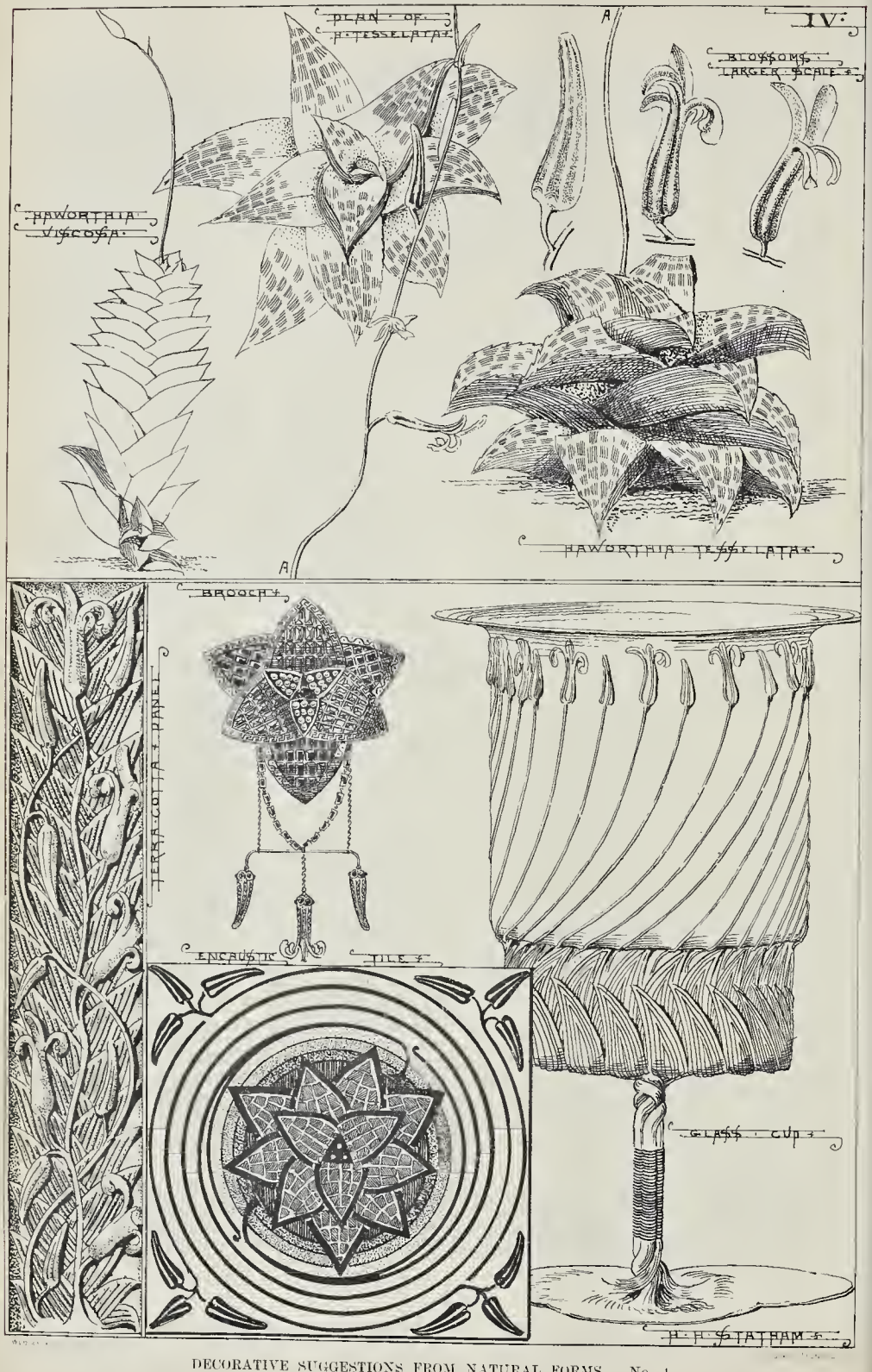
The new church recently erected at Milverton by private munificence takes the place of an ugly old chapel known locally as the Pepperbox. The new building is in the Decorated style, in some parts treated freely. We give a view and plan of it. The materials used are red brick with Box stone dressings. The buttresses are all of Bath stone, and the roof covering is of plain tiles. The internal arrangement comprises a chancel at the east end, a lofty nave, north and south aisles, and at the west end a substantially-built tower, in which it is proposed to place a peal of eight heavy bells. The chancel is 49 ft. by 27 ft., and about 51 ft. high. It is lighted by seven mullioned windows, three on the south side, three on the north, and the large east window over the communion-table. The roof of the chancel is composed of wood-groining, with carved oak bosses. The precedent for this part of the work is to be found in the lady-chapel of St. Alban's Abbey, and other old ecclesiastical buildings. The floor of the chancel is laid with black and white marble, and Minton tiles. The altar is a plain oak table, with dossal hanginge and altar-cloth, which have been furnished from designs by the architect by Watts & Co., of Baker-street, London, who have also carried out the decorations of the vicarage-house under the directions of the architect. On each side of the table is a tapestry curtain, fixed against the wall; and the sides of the chancel, above the stone sedilia, are in like manner hung with tapestry. The kneeling-desks are copied from those in the Beauchamp Chapel, Warwick. The lectern is founded on an ancient model, and has been excellently worked out by Watts & Co. The pulpit and choir-stalls have been executed by Messrs. Farmer & Brindley, of Westminster Bridge-road, who have efficiently carried out the carving throughout the church. The nave is separated from the chancel by an arch with carved angels at the springing-points, bearing in their hands musical instruments. The nave is about 87 ft. long by 32 ft. 6 in., and the north and south aisles 40 ft. by 15 ft. 8 in. The seats are open oak, and altogether there will be accommodation for nearly 1,000 persons. The roof of the nave is noticeable for its height, nearly 53 ft. It is an open roof, and is left for coloured decorations. The front of the first row of seats and the back of the last row are carved with sunken tracery. The floor of the church is laid with blue and brown York paving. At the end of the nave there is a tower, 18 ft. square, in which is placed a font, the base of which is Manefield stone, the pedestal marble, while the bowl, which is of alabaster, is supported by eight columns, and is carved with angels. The cover is a carved wooden canopy, nearly 12 ft. in height, and balanced by a gilt cross suspended from an enriched beam. A wooden panelling about 5 ft. in height is carried all round the church against the walls. The adoption of this arrangement gives a warm effect to the church, and is a source of much comfort to those whose seats are near the walls, or who have to stand against them occasionally, or against the pillars. The bottom of the tower at the west end is lighted by a large mullioned window. A spiral staircase in the south side of the tower leads up to the belfry. The side aisles are lighted by three large traceried windows, and the nave by four small clearstory windows on each side. Haden's hot-air apparatus has been introduced for warming purposes, and the lighting arrangements include gas jets along the nave beneath the clearstory windows, and gas standards in the aisles. The pulpit, which is of carved oak, stands on the south-west side of the chancel arch, and is surmounted by a carved canopy. It is the production of Messrs. Farmer & Brindley. On the north side is a chapel (above that an organ-loft), a vestry, and a parish-room for the transaction of parish business. There are also two small chapels on the south side. The groined roof in the chapel beneath the organ-loft is noticeable.

The architect is Mr. George Gilbert Scott, M.A. This church is one of a series of architectural works which have been entrusted to Mr. Scott, amongst which we may mention the new halls at St. Peter's and Christ's Colleges, Cambridge, the extensive works now in progress at Pembroke College, Cambridge, and St. John's College, Oxford, Garboldisham House, Norfolk, and several new churches in different parts of the country, including one at Kennington, and one at Southwark, both of which are of large size.

The work has been carried out by Mr. G. F. Smith, builder, Milverton; Mr. T. Godfrey, of London, being the architect's clerk of the works. The site of the church has been given by Lady Charlee Bertie Percy, and the font is also the gift of the same lady. The entire cost of the buildings, including the vicarage adjoining, comes from the estate of the late Lady Wheler. Her ladyship devised a sum of 9,000*l.* for the purpose of providing a new church for the district of New Milverton, and the remainder of her property went to her two brothers, Mr. Edward Shepheard Carus-Wilson, of Truro, and the late Rev. Carus-Wilson, who was formerly Vicar of New Milverton, and who died suddenly while travelling on the Continent. These two gentlemen have erected St. Mark's, at a cost of 35,000*l.*, and have also provided an endowment fund of 6,500*l.* as a memento of their sister, the late Lady Wheler.

* The visitors are indebted to Mr. G. Wright, Mr. Patrick, and Mr. Reynolds for the arrangements which enabled them to see so much in so short a time.

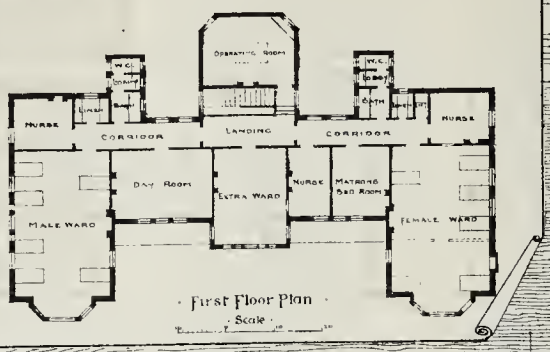
ST. MARK'S, MILVERTON.—Mr. G. Gilbert Scott, F.S.A., Architect.



DECORATIVE SUGGESTIONS FROM NATURAL FORMS. — No. 4.

Patrick St

Hale



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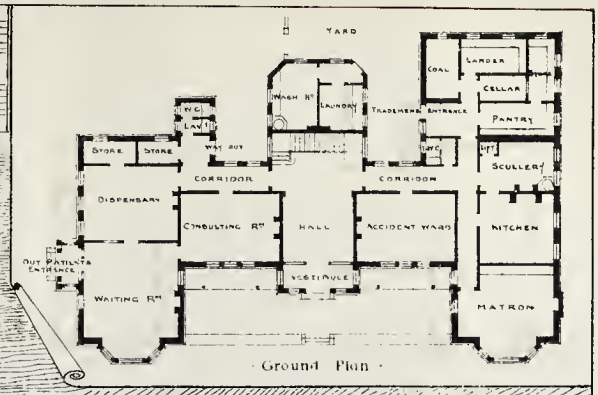
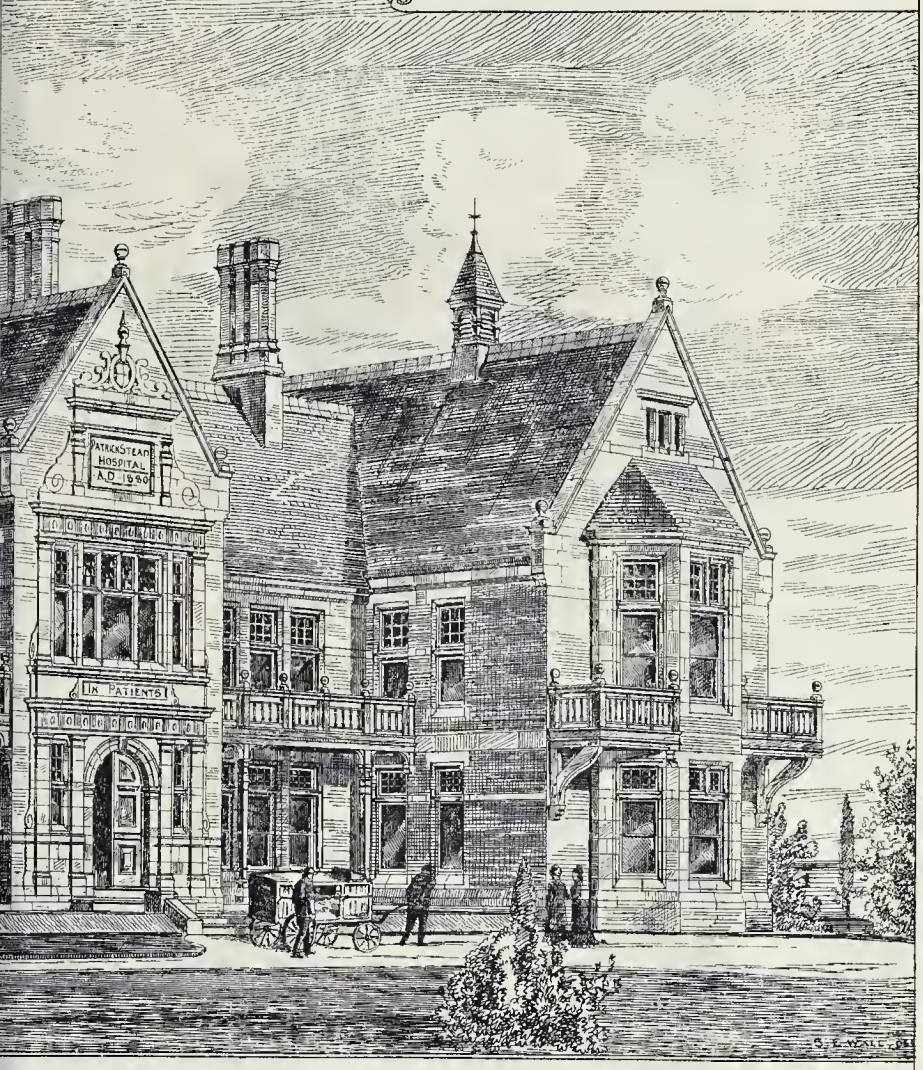


Ground Plan



VIEW

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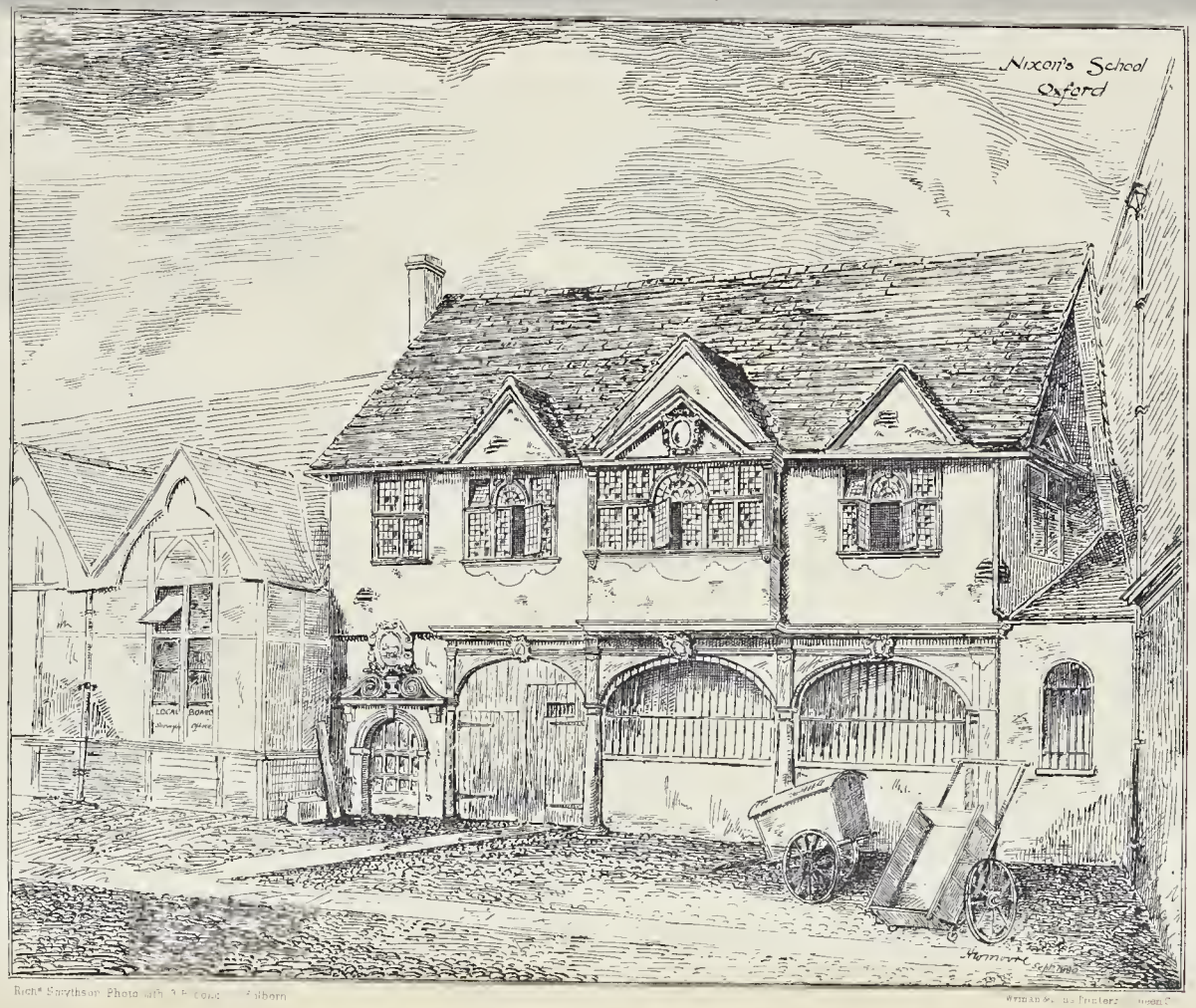
HENRY HALL F.R.I.B.A.
ARCHITECT

Wyman & Sons Printers to Queen St.


Nixon's School
Oxford
LOCAL BOARD

DECORATIVE SUGGESTIONS FROM NATURAL FORMS.—No. 4.

Haworthia is a tribe of dwarf aloes, of which there are many species; the two figured here (*viscosa* and *tesselata*), which are drawn the natural size, while they mimic in the body of the plant the usual characteristic of design of the aloe tribe, thick infolded spiky leaves, send out long slender shoots, adorned with blossoms of the most exquisite and delicate design, such as seem to have no relation to the general character of the plant from which they spring. In the specimen of the *tesselata* from which this sketch was drawn the shoot bearing the flowers was about 18 in. long; only a part of it is shown here. The blossoms are drawn larger size, in order to show something more of their design, the delicacy of which, however, can be but inadequately expressed with a lithographic pen.

The specialty of these specimens of Nature's design consists in the combination of the short spiky aloe leaves, with the long, fine stalk and delicate blossoms: this is the idea aimed at in the designs based on it. In the tile the body of *Haworthia tesselata*, seen in plan, forms the centre, and the stalks are twisted round and round it, while they carry the blossoms to fill up the angles. The special marking of the main leaf, from which the plant derives its specific name *tesselata* (as if laid with *tesseræ*), makes it very suggestive as a feature for tile design. In the sketch for a brooch above, the tesselated idea of the leaf is carried out by the arrangement of the stones which are set in it, and the buds and flowers droop from it, as a pendant, instead of rising from it. In the glass cup the main leaves of the *viscosa*, which bears nearly the same flower, are on the same principle made the base of the bowl, while the long stems arise from it, and twine round the upper portion. The slight sketch of a panel for terra-cotta shows the two elements in the plant superimposed, instead of following the natural order of growth one from the other.

It will be obvious that we do not attempt to keep to any special scale in drawing the artificial objects: their intended scale must be indicated by their character. Thus in the present case the brooch and the cup would be taken as full size, and the tile would work well at about twice the size shown.

PATRICK STEAD HOSPITAL.

This design was accepted in open competition, the committee adopting the selection of Mr. J. K. Colling, architect, who was appointed referee. The committee's instructions required the arrangement of dispensary, waiting and consulting room, with a separate entrance for out-patients, accident ward, kitchen, and offices, male and female ward for six beds each, day or convalescent room, operating-room, and the necessary bedrooms for matron, nurses, &c. The plans will sufficiently show the disposition of the requirements, special care being taken to obtain compactness and economy in working. Mr. Henry Hall, of Doughty-street, is the author of the design, and the work is being carried out under his direction, the builders being Messrs. Howard & Son, of Halesworth and London.

NIXON'S SCHOOL, OXFORD.

This picturesque old building is situated in the Town-hall yard, at the back of the Post-office. It is built of timber and plasterwork, the entrance doorway being made a little more important by some stone dressings and an ornamented shield over, carved with the city arms. The school is held on the first floor, the ground-floor being appropriated for post-office purposes. It was founded in 1658, by John Nixon, a worthy alderman, to provide free education for forty boys of the city. A master's residence used in old times to adjoin the school (in the left-hand corner of the sketch), but this has long since been demolished. The old school may probably soon share its fate, as preparations are, it is said, in train for building fresh premises elsewhere. H. W. M.

Association of Municipal and Sanitary Engineers and Surveyors.—The Lancashire and Cheshire District meeting is to be held at Salford, on Friday, the 5th of November.

SMOKELESS LONDON.

Sir,—It so chanced that, remembering an article which appeared in your columns on the 21st of February last on the subject of fog, I was just about to address you on the return of the London fog season, when the number of the *Builder* containing your more recent remarks on the very subject reached me.

With the greater part of that article I fully concur. The difficulty that I feel as to altogether agreeing with its outcome is this:—Coal, as we buy it, is a natural product. It is one that is remarkably free from adulteration. Slate, or bricks, or other materials, may be sold by the roguish dealer as coal, but the fraud is easy of detection. There is good coal and bad coal, but the consumer can learn, at little trouble, the earmarks of the different qualities of the mineral, and can purchase (if he goes to a respectable coal-merchant) that kind which suits him best.

Now, it is very possible that an artificial fuel may be produced which shall be better than coal,—at all events, in the matter of smokelessness. But this has yet to be done; that is to say, to be done in so simple a manner that the purchaser will be able to obtain a ton of smokeless fuel at a fair price, and with as much certitude as to what he buys as if he ordered a ton of Hartley's Walls-end. The first thing, then, it strikes me, that would be necessary, in order to introduce such a general improvement in fuel, would be the production of so distinct a manufacture that there would be no room for adulteration or for cheating, so that the purchaser would know what he was doing as well as if he ordered a ton of any given quality of coal.

Practically speaking, this can only be done by the gas companies. The first step, then, it seems to me, towards giving any practical sequence to your suggestion, is to ascertain how far any gas company would be prepared to submit coal to a much less destructive distillation than at present, with the view of offering the public a fuel that would be intermediate between coal and coke. I do not feel prepared to offer an opinion as to the feasibility of the plan. But it seems to me that the way to put it to a practical test will be to make such an application to a gas company. It would probably be found that a considerable alteration, not only in their mode of procedure, but in their retorts, would be necessary to carry out the plans. But it is only by manufacturers of gas on a large scale that it would be economically possible for the scheme to be effected.

My own views point in another direction,—indeed, in that indicated by your former article to which I referred as to the use of gas as fuel. Dr. Carpenter, I observe, suggests that a poorer gas than that ordinarily used might be made for the purpose of combustion for calorific purposes. It must be remembered, however, that a great demand for gas as fuel must be established before it would be worth the while of any one to lay down a new set of pipes to convey this less carboniferous gas wherever it was required. Meantime we have to see what is to be effected with ordinary coal gas, of which the calorific value is so much higher than the luminous value, that more light can be produced by a dynamo-machine, driven by gas, than by burning the same quantity of gas directly for light.

This leads me to another part of the subject; and it is one in which the key to the question will, I think, be found to be hidden. It may be described as carrying out the reflections you suggest as to heat of combustion; but looking at the matter upside down, or in the reverse direction to your view. You say combustion, to be perfect, requires a high temperature. I fully agree. But do we take the proper steps to attain a high temperature? I think we go in quite the contrary direction. Your illustration of the hot-blast is precisely one of the facts on which I have based my opinion. I may add the example of the air-furnace, a contrivance that I have often watched at large works in Staffordshire, in which a nearly perfect combustion is effected by a very simple arrangement. The great requisite for perfect combustion is TO SUPPLY TO THE FUEL THE EXACT AMOUNT OF ATMOSPHERIC AIR NEEDED, AND NO MORE. It is here that our stove-makers err. "Plenty of air, plenty of draught, blow the fire!" is the cry, and the result is to blow so much unconsumed fuel away. For it must be remembered that every cubic foot of air that passes by, through, or over, a mass of burning matter unconsumed, carries off so many units of heat. It chills the fire; it makes smoke. With too little air the combustion flags. Smoke is thus produced from readily vaporizable fuel such as oil or paraffine. Give the exact quantity of air, and you have perfect combustion, and no smoke. Give too much air, and fuel that would not burn, and therefore would not emit smoke, with too little air, now sends out dense volumes of smoke, just in proportion to the chill caused by the excess of air.

I have made many experiments on this score, though they have been principally confined to the combustion of gas. So certain is the scientific basis of the theory, and so great an economy can be produced in the luminous effect of gas by the application of the rule, that I for some little time entertained sanguine hopes of being able to effect a very great reduction in the consumption of gas. My experiments, however, were brought to a close, not by any want of success, for the result went beyond my expectation, but because I did not see my way to an indisputable protection of my process, and thus to any remuneration for months or years of toil. I shall be glad, however, to communicate on the subject with any one who takes an interest in it, and who, by taking the matter in hand as a manufacturer, would not be obliged to rely exclusively on the validity of a patent. And I may add that the first practical application of the method might be to the great desideratum of a better and brighter safety-lamp for the miner.

By regulating the pressure at which ordinary coal-gas issues from the burner, and by proportioning the quantity of air admitted to the flame, the illuminating power of a given quantity of gas may be increased more than ninefold. I refer,—as a proof that I am not speaking without book,—to the report made in 1871 to the Board of Trade by the gas referees, in which it is shown that 1·65 foot of gas per hour can be so burnt as to produce by one method light measured as 7·36, and by another method light measured as 63·5. And in this experiment only a portion of the regulation that I propose was effected. Now if this can be done in the consumption of gas, I do not see why something of the same kind should not be done in the consumption of coal. The question really comes to this. Are we so fondly attached to the barbarous custom of burning coal in an open grate, under a hole in the wall, that goes to the outer air, through which 80 per cent. or more of the heat is abstracted, that we refuse to attempt any improvement in the method of combustion? A great many people, no doubt, are. To those people it is of but little use to preach. Whether you offer them a smokeless fuel, or I offer them a perfectly consuming arrangement, we shall lose our labour. It seems to me that it is only by the argument to the pocket that this prejudice can be combated. Let us convince the public,—or the younger and convincible part of the public,—that they spend five or ten times as much in fuel as they need to spend, and then there will be a *που στω* for the smoke-reformers. As long as we only attempt to modify the open grate,—being careful to supply abundant air to our little furnaces,—so long shall we only increase our annual smokiness. But when we seriously put the question—"How can we warm our houses and cook our dinners most economically?" another state of things will become possible. When the question, "How shall we burn the thousands of tons of coal which we now daily send unburnt up the chimneys of London?" is once put in earnest, it will not be put without a reply. The answer is, "Economise, not only fuel, but heat. Secure perfect combustion by the exact regulation of the supply of air to fuel, and retain all the heat produced by that combustion for use, instead of sending it up the chimney." The margin is so wide, the economy to be effected is so immense, that there is an ample field for the inventor. In fact, it is as to details alone that invention is necessary. The first step to take for the prevention of smoke is the providing for perfect combustion. That step is at the same time a great economical gain. I do not say that London would be rendered smokeless in six weeks, or in the course of the ensuing winter. But I do hold that it may be rendered smokeless by the application of the principles I have ventured to suggest as cardinal, and that this can be done to the great pecuniary gain of every householder. F. R. C.

The Mansion House.—The Right Hon. the Lord Mayor Truscott has sent out invitations to meet members of the Royal Academy at dinner on Wednesday, November 3rd.

PRIVATE BILL LEGISLATION OF THE LATE SESSION.

The list of private Bills passed during the Parliamentary session of 1880 has just been issued, from which it appears that the total number of Bills of all kinds which received the sanction of the Legislature is 172. Of this number, 65 are Bills connected with railways, being about two-thirds of the entire number of Bills of this character which were promoted during the session, amounting to 100. Of the Bills passed, however, 41 only are for the construction of actual works, 24 of them being either for the abandonment of works, or for an extension of time for the construction of works already sanctioned. As regards 18 of the Bills which have become law, they are for the construction of distinct additional railways by entirely new companies, who are empowered to make new lines having an aggregate length of 224 miles, at an estimated outlay of 5,790,299*l.* Nine of these intended new railways are in England, their total length being 131 miles, and their estimated cost 5,306,966*l.* The most important of the new English lines is the Hull, Barnsley, and West Riding Junction Railway, which is 67 miles long, and will involve an outlay of 4,000,000*l.* Four of the new railways are in Scotland, their length being 37 miles, and their estimated cost 845,333*l.*; four in Ireland, length 43 miles, cost 505,000*l.*; and one in the Isle of Wight, length 13 miles, cost 133,000*l.* The number of Bills promoted by existing companies for new works which have received Parliamentary sanction is 23. These several companies propose to construct an aggregate of 152 miles of additional railways and other works, at a cost of 5,298,900*l.*, the intended additional outlay of the Midland Company alone being 1,800,000*l.*

The number of tramway Bills passed during the session is 14, authorising the construction of 114 miles of tramway in different parts of the country, at an estimated cost of 975,550*l.* The longest of these intended tramways are those at Huddersfield, which are 18 miles in length; Gateshead and South Shields, 17 miles; and Coventry and Nuneaton, 15 miles. The powers obtained by these three last-named companies authorise them to use steam power on their lines. It should be added that, besides the several tramway Bills sanctioned by Parliament, the construction of a large number of tramways has likewise been authorised by Board of Trade orders.

In connexion with the construction of new and extended gasworks in the different towns and districts of the country, nineteen Bills were passed during the session, the estimated cost of the various works authorised amounting to 1,204,000*l.* The largest intended expenditure on these works is 187,500*l.* at Eastbourne; 150,000*l.* at Reading; 150,000*l.* at Wandsworth and Putney; and 100,000*l.* at Maidstone. Twelve Bills have also been passed authorising the construction of new waterworks, at a total estimated cost of 4,056,400*l.*, of which sum 3,250,000*l.* are for the works about to be carried out by the Liverpool Corporation for a supply of water from the rivers Vyrnwy, Marchnant, and Afon Cowny, in Wales, leaving 806,400*l.*, as the estimated expenditure for the whole of the other works sanctioned. Of this amount 300,000*l.* are intended to be expended at Wakefield; 120,000*l.* at Edinburgh; 100,000*l.* at Great Yarmouth; and 75,000*l.* at Wrexham. The same remark applies to gas and water projects as to tramways, the Board of Trade having authorised the construction of such works in several towns at an estimated aggregate cost of 392,250*l.*

The town improvement Bills sanctioned are fifteen in number, authorising works of this character in Nottingham, Huddersfield, Preston, Oldham, Liverpool, Bristol, Aberdare, Barton, Glasgow, Kensington, Lancaster, Sandwich, Rochester, Wigan, and King's Lynn.

Case of Mr. Strachan, Architect.—In response to the statement made at p. 514, *ante*, we have received 1*l.* 1*s.* from Mr. Daniel R. Dale, of Union-court-chambers. We shall add 1*l.* 1*s.* ourselves, the case being well recommended, and will wait a week before transmitting the amount, in case any other of our readers should think fit to send a little aid. They have heard of the old epitaph,—

> "What I spent, that I lost;
> What I gave, that I have."

AN ELECTRIC LAMP.

A lecture on Electric Lighting was delivered by Mr. J. W. Swan, before the Literary and Philosophical Society, Newcastle-on-Tyne, on the 20th inst., in which the lecturer seemed to substantiate a claim to a further advance in the subject than has before been made, and to being before Mr. Edison in effecting the economic divisibility of the electric current. Having described the different generators of electric currents in use, and shown that all the means of producing light by electricity are divisible into two classes, namely:—

1. Lighting by the electric arc.
2. Lighting by incandescence,—

he went on to say:—Whilst Mr. Edison was endeavouring to produce a useful incandescent lamp by means of platinum, I was endeavouring to obtain the same end by means of carbon. It had appeared to me for many years that if ever electric light was to become generally useful, it would, most probably, be by means of the incandescence of carbon. I had, long before the time to which I am referring, attempted to render this idea practicable. As a matter of history I will briefly describe an experiment which I tried about twenty years ago. I had a number of pieces of paper and card of various forms and sizes buried in charcoal in a crucible. This crucible I sent to be heated white-hot in one of the pottery kilns belonging to Mr. Wallace, of Fortb Banks. From the pieces of carbonised card which I thus obtained, I selected a long spiral, the ends of this I clipped between small blocks of carbon carried by uprights, and connected with conducting wires. A small glass shade was cemented over this mounted carbon spiral, and the air was exhausted by means of a very good air-pump, lent to me for the purpose of this experiment by the Rev. Robert Green, of Longhorsley. A good vacuum (according to the ideas that then prevailed) having been produced, I applied the wires of my battery (consisting of ten cells of Callan's modification of Grove's battery) with great expectation of a brilliant result; instead of this, there was the most absolute negative presented to me, not a vestige of heat or light appeared in my long ringlet of carbonised paper. It was evident, and I immediately recognised the fact, that the electric current of the strength I was using would not go in sufficient quantity through so long a piece of carbon as I had taken. I, therefore, repeated the experiment with shorter carbon and a greater number of cells, and I obtained, under these altered circumstances, an extremely interesting result. . . . .

After describing the way in which various difficulties were overcome, Mr. Swan exhibited his perfected lamp, and continued:—Is it not a pleasant light? It is not so white as the arc light, but yet a whiter light than gas. Colours are correctly seen by it, as this picture shows. But the great merit of this light consists in its not being in contact with air, and therefore there cannot possibly be the slightest air-pollution caused by it. The rooms in which this light is used will be as pure by night as by day. It is essential to economy in lighting by incandescence that the incandescent carbon should be very thin. The carbon I use is not one-twentieth the thickness of the thinnest of the carbons formerly employed, and therefore one-twentieth of the current costing one-twentieth the price, will produce in my thin carbon the same degree of luminosity as twenty times more current will produce in such carbons as were used in those ancient lamps. You will notice that in my lamp leakage is very thoroughly guarded against, the wire which passes through the glass not only having the glass fused around it where the wire and globe meet,—but in addition to this, the wire is coated with glass almost up to the carbon. In this way the vacuum is preserved very effectually. . . . .

With regard to distribution, I believe it will prove to be practicable to light any large town,—all Newcastle, for instance,—by means of wires laid in the ground as gas pipes are laid, and all branching from one centre, and conveying the electric current to lamps like this. . . . . The economy of lighting by incandescence has not been exemplified by so many instances of actual practical use. One thing is quite clear, and that is, that electric lighting by incandescence is an economical process,—it will be less costly than gas lighting. That is conclusively demonstrated by the fact that 1,000 feet of gas employed in working a gas-engine to develop an electric current, and used in my lamps, will yield more light than 1,000 feet of gas consumed in the ordinary way in gas-burners. This room is now lighted by twenty of my electric lamps, and to produce the current which feeds them 160 cubic feet of gas per hour are being burned in a gas-engine; before my lamps were kindled the room was lighted by seventy gas jets, consuming, I am told on good authority, 210 feet per hour. It is very evident that we have got more light out of the gas through the medium of electricity than was got from the larger quantity of gas which those burners consumed. Our conditions here are somewhat unfavourable to my light for a fair comparison, but from measurements carefully made, both of light produced and current required to produce it, I am warranted in saying that at least twice as much light will be produced by a certain quantity of gas used to generate an electric current employed in my lamps, than would be obtained from this quantity of gas burnt in gas-burners in the usual manner. If that be so, then it is evident that when, instead of the motive power of gas, that of steam produced in the most economical manner is employed, this method of electric-lighting will be very much less costly than gas-lighting. I reckon that 40 lb. of coal employed in raising steam to generate electricity is capable of producing in my lamps the effect of 1,000 ft. of gas burnt in gas-burners in the ordinary manner. The economical view of the question is therefore, in my opinion, very favourable to electric-lighting, and I think fully warrants me in anticipating an extensive substitution of electric light for gas-light. The great difficulty which, till now, has completely blocked the way to any general use of electric light was *the difficulty of division: that difficulty is now completely overcome* by the method of producing electric light by the incandescence of carbon in vacuo.

DISADVANTAGES OF BACK STREETS.

NORTHERN ARCHITECTURAL ASSOCIATION.

At the annual meeting of the Northern Architectural Association, held in the Old Castle, Newcastle, on the 19th inst., Mr. Thomas Oliver, president, read a paper "On some of the Disadvantages of Back Streets in Towns." In his opinion, he said, the retention or abolition of back streets was merely a sanitary question, although there was an economic, as well as an æsthetic aspect of the subject well worthy of consideration. These streets arose out of a necessity, fifty years ago, viz., the removal of refuse, ashes, &c., but this necessity no longer existed, owing to the introduction of sewers, water-closets, and dust-bins. The back street had served its day, and they were now called upon to substitute, under the altered circumstances, a cheaper and a healthier arrangement for the laying out of the environs of dwellings. Before doing so he would draw attention to some of the disadvantages at present felt. The streets themselves, even when paved, were not unfrequently dirty and badly swept, and in remote places they were rarely attended to. They gathered the scattered refuse from neighbouring places, and in windy weather this refuse came whirling in eccentric eddies to the entrances of the back streets, and after passing up and down, left a deposit of straw, paper, old rags, and other filth. The look-out upon the ends of these lanes, from houses on the opposite side of the street, was far from being picturesque or pleasant; for, according to the hour of the day, they might have presented to them the beggar, the thief, the burglar, the burglar's female pioneer, the sweetheart, the tradesman's boy, or the obscene drunkard and vagabond. The view from the back rooms of the houses themselves was not by any means interesting. People thought they could not, and therefore they would not, keep such places clean and respectable. The whole of the ground, both of the yard, outbuildings, and back street, was wasted; for there might be grass, flowers, shrubs, and other healthful or useful things. Just think of the air, after passing over the insalubrious places referred to, entering the bedroom windows, just being closed for the night,—what a mixture of the pure and impure for the sleeping inmates to breathe for the next eight or nine hours! New estates were being laid out, and new streets built up, with a waste of 20 ft. at the back of each double block of houses, while dirty yards and unsavoury outbuildings, for which there was no need, occupied the place that ought to be devoted to grass and trees. During his visit to various cities on the

Continent, to the metropolis, and some of our own more ancient towns during the last 25 years, he had been struck with the absence of the back street nuisance. This led him to suggest in 1875, to a gentleman in Newcastle, the desirability of laying out his estate at Jesmond on the principle he (the speaker) advocated. The Corporation were not yet prepared to carry out the principle, but he had no doubt that they would do so. The plan represented a rectangular plot of land with houses on all sides. There was a small area in front of each house, which was appropriated to dust-bin, coal-place, &c. There were no back streets and no back yards. The back portions were laid out as gardens with low division-walls between the respective portions. The flow of air would be greater than that provided by the back-street system, and it would be quite pure. In the place of unsightly out-buildings there would be gardens capable of growing trees, and large enough for grass lawns, valuable both for pleasure and utility. By adding the quantity of land saved by the back street, it was proposed to make the houses wider in frontage than usual (20 ft. to 24 ft.), and thus obtain three or four rooms on each floor, each room having what might be termed a front view. If the plan were adopted, not only would there be a larger proportion of land to sell, but the tenants or purchasers would be freed of the cost of paving and flagging. It would be a saving of rates, and would certainly redound to the credit of the Corporation officials, as they would be relieved of one of the most unwelcome duties they had to perform.

SOME RECENT METHODS OF TESTING PORTLAND CEMENT.

At the usual meeting of the Manchester Association of Engineers (employers, foremen, and draughtsmen), on the 9th inst., Councillor W. H. Bailey, of the Albion Works, Salford, read a paper on "Some Recent Methods of Testing Portland Cement."

Mr. Bailey said Portland cement, as a material of construction, had increased in popularity during the last twenty years, but especially so during the past five or six years, owing entirely to the scientific methods used both in its manufacture and in the methods of testing the material by those engaged on government, municipal, and other large works. At a recent meeting of the Institution of Civil Engineers a communication was read from Mr. Higgin, who has charge of the extensive operations at Buenos Ayres, under the direction of Mr. Bateman, as engineer-in-chief. The sum of 2,000,000*l.* sterling has been spent in city improvements there, and the spending of this money has afforded a good opportunity of showing what can be done with cement concrete in almost every form that could be devised. No stone was to be obtained in Buenos Ayres; in a radius of 200 miles not a pebble could be found. When the works were begun the province produced no bricks fit for use, and recourse to concrete became imperative. About eleven miles of large subterranean conduits had been built almost entirely of concrete, as well as twelve miles of intercepting-sewers, and twenty to thirty miles of collecting-sewers. Concrete has been used for the workmen's houses,—for the roofs of engine-houses, in the copings of walls, tops of columns, retaining-walls, filters, settling-beds,—indeed, for every conceivable purpose. Mr. Higgin states that for all the fine work the mixture used was one part of Portland cement to six parts of coarse sand. Portland cement is composed of silica, alumina, and carbonate of lime. This is produced by mixing clays and limestone or chalk in combination with water, which mixture, after being baked and calcined in a kiln, is ground to fine powder. Mr. Henry Reid, who has written many books on the subject, insists that it is absurd to send this useful material many miles any where, as the ingredients for its manufacture can nearly always be found at one's elbow if we only look. In many rivers and creeks the raw material exists. Common flint, pit-clay, marine-clay, the shales and sand of Warwickshire, Derbyshire, Northamptonshire, and Somersetshire, should be used for cement-making. For the like purpose Mr. Reed names the basaltic columns of the Giant's Causeway, the limestone formation at Kendal, and the various lavas and slate deposits in different parts of this country. The strength of Portland cement increases with its fineness. The most popular method of testing the cement is by subjecting it to a severe tensile strain; but much can be said in favour of testing by compression, and the latter would be more in use but for the costliness of the apparatus. Mr. Bailey described a simple hydraulic compressor for the testing of Portland cement, which he had designed. It was possible, however, that cement should be tested both for tensile strength and resistance to crushing. Professor Thurston (America) has introduced a method of testing by torsion or twisting. The Thurston tester not only gives the torsional resistance, but also the limit of elasticity and the exact angle of torsion. The limit of elasticity is the amount of twist a material will bear without becoming permanently distorted. The quality of elasticity is of considerable importance in a cement, especially where it is used for concrete work in footpaths and roads. Mr. Arthur Jacob, the borough engineer of Salford, has given considerable attention to the tensile testing of Portland cement. He has introduced cylindrical moulds. The shape is perfect, and by a careful filling of the moulds and exact measurement of the water used in each case, tests are made under conditions which seemed to him (Mr. Bailey) to be rigidly equal in every particular. Mr. Jacob's machine has the weight,—which consists of a long can into which a small stream of water flows,—placed at the end of a lever. This enables the test to be applied in a very gradual and nearly imperceptible manner, without any vibration; in fact, the operator may sit down and watch the machine, after the tap has been turned on, until the fracture is effected. The height of the water in the cistern is indicated by means of a glass tube similar to the water-gauge glass of a steam-boiler, the graduation being painted down the can or cistern. When the material is broken, a small trigger closes the tap, and prevents any further supply of water. So uniform are the tests by Mr. Jacob's system, that, with good cement, the figures obtained scarcely vary. On the 26th of September, six samples were taken from one bag, and were tested, with the following results:—810, 815, 820, 820, 820, 820. Mr. Bailey said he had had considerable experience of testing, but with any other form of clip, and under the most careful conditions, no results like these had ever come under his observation; and if tensile strain is the proper one to place on Portland cement, Mr. Jacob, he thought, had introduced the most perfect form of testing. But it was desirable to caution those who consider a high tensile strain the best, that this mode may result in the manufacture of a dense and treacherous cement, and elasticity was a quality which in future would have to receive quite as much attention. In past years Portland cement has been ill-treated. Ignorant and unscrupulous persons have sold and used cement under that name, and have brought it into undeserved disfavour. For workshop use it is invaluable. It preserves iron; indeed, it is used for preserving the insides of iron boats. Its uses and applications are innumerable,—tanks, walls, foundations, piers, solid lighthouses in one piece, are built of it. As its qualities become better known to mechanical engineers, it will be more extensively employed than at present.

Mr. W. H. Bailey, in replying to several questions raised in the discussion, said that sand intended to be used in the mixing should be dry, and the process of mixing carried out under cover. The quantity of water used in mixing was ¼ lb. to every pound of concrete. Too much care could not be taken in the mixing, and in many instances where cement had failed, such failure had been clearly traced to some want of attention in this particular. This had been proved by the entire destruction of a large breakwater in the South of England from the simple reason of a few rusty nails getting into the cement during the mixing.

Clarkson Memorial.—It has been proposed for some time to erect a memorial of Thomas Clarkson, in his native town of Wisbech, and we published a view of the design by the late Sir G. Gilbert Scott, R.A., which had been selected. About 2,000*l.* were required for its completion, towards which the sum of 1,400*l.* has been contributed. The want of a suitable site has occasioned delay, but this difficulty being removed, the committee have accepted a contract for the memorial (without the statue and bas-reliefs), and the first stone was laid on the 25th by Mr. Jonathan Peckover, the treasurer. Mr. Charles Gane (Wisbech), ex-mayor, or Mr. John Leach, will gladly receive subscriptions, so that the design may be completed.

"CLOSET" CONSTRUCTION.*

Great importance must necessarily attach to the deliberations of an Institute like this, which aims at disseminating information, and guiding public opinion on sanitary matters. It may, however, be questioned whether the real importance of a given subject is not shown less by the amount of talk to which it may give rise, than by the amount spent upon it in the production of an article the best fitted to meet advancing requirements.

The amount of brain-power and hand-labour expended for many years past in invention and experiment for the production of a perfect water-waste preventer and regulator, and an unexceptionable water-closet apparatus, is alone sufficient to testify to the paramount importance of investigation into the proper principles to be followed in their construction, with the view of arriving at some intelligible lines within which they should be restrained.

To all who have taken an active interest in sanitary matters, nothing can have been more evident than the dangers attending the old system of pans and valves, with D traps fixed out of sight, inside the house. At the annual meeting of the Parkes Museum, Sir William Jenner spoke of these last in no polite or measured terms. And truly the terms used by him were not exagerated. But the difficulties attending the amendment of an established state of things with the British citizen are almost insurmountable, especially if it be such as to touch his inner man, whether through his pocket, or (if there be one) some equally tender point. And unquestionably there are vast commercial interests which stand in the way. So far as we can be judged by outward appearances, under the present state of things even the value of the great bulk of house property is but little affected by the presence of sanitary or unsanitary arrangement in these respects. On a recent occasion in a house in which I have sojourned, and in which there has been constant ailment with one or more of the inmates,—to say nothing of several cases of blood-poisoning attributed by the medical attendant to sewer-gas,—I have endeavoured in vain to induce the landlord to provide a water service for domestic purposes, apart from the only one which is supplied from a cistern over the water-closet, this closet being served by the customary spindle valve, with water-box, which inevitably releases the bad air from beneath into the water at the bottom of the cistern. I appealed to him, further, to remove and to ventilate the decayed and constantly leaking lead soil-pipe (occasionally eaten through by rats from the drain), which runs down inside the house, adjoining one of the sitting-rooms, leaving it in an almost chronic state of stench. And, more than this, I appealed to the sanitary inspector, but could get no redress in these matters. This landlord, being also the agent of an enormous house-property, was imperturbable alike under threats of quitting and under appeals to authority. There is every reason to fear that such is no uncommon case. And in the great mass of speculative building hitherto, a few pounds per house of additional outlay, in these respects, has not been considered remunerative by way of investment. The houses must be had, and are often occupied almost before they are properly completed, irrespectively of these trivial considerations, about which it is said meddling people make so much fuss. People have become habituated to it. No death in their families has been traced to such causes. Almost all houses are alike in these respects. There is but little choice, and other occupants have lived on without complaining. Surely there cannot be so very much the matter, or we should hear more about it, and we can only go on as others do, and if we tried to examine into the matter ourselves, we should be no wiser. We must take what we can get, and either grumble or be thankful as the case may be. This, I venture to say, without exaggeration, is the prevailing state of feeling, and mode of action, or rather inaction, in these matters.

The remedies usually proposed for this state of things are, first, legislation for the enforcement of sanitary conditions; secondly, the education of the masses to understand and appreciate their own true interests, and to insist upon these being respected. Excellent remedies in their way, and they will doubtless effect much. But the difficulty of a general

* From a paper by Mr. William White, F.S.A., architect, read at the Exeter Sanitary Congress.

application of them meets us at every point. The great precedent remedy must be looked for mainly in the production of satisfactory sanitary apparatus and appliances, of the greatest simplicity, and at the most moderate cost; and then at imparting information respecting their principle, and their practical application, to the more educated classes of persons, and to those through whom such appliances are brought into use, rather than in any amount of crusade against mere recklessness, ignorance, or prejudice.

Let me now endeavour to give effect to the foregoing remarks by a few practical considerations as to water-closet construction. I would, in the first place, deprecate the use of all closets by which, on the pulling up a handle, the contents are dropped down by means of the withdrawal of a plug, valve, or pan, whether into a trap, or directly into the soil-pipe and drain itself. Apart from valves and plugs being liable to derangement, it is evidently possible, and in many instances of accidental deficiency of water extremely probable, that they may be used without water, to the great danger of corroding the pipes and choking the drains. Secondly, I would eschew everything but some description of hopper-basin or flushing-pan. The contents of those cannot be let down, to the great danger of soil-pipes and drains. In case of the water service failing, or being frozen up, or otherwise deranged, a pail of water poured down will carry everything away safely. Thirdly, I would have the best possible flush of water which can be obtained by a regulator or waste-preventer, constructed without any valve, except only the ball-valve which supplies the "feed" or serving cistern. Fourthly, I would, in all cases, insist upon the use of this feed-cistern, or other intermediate receptacle, for cutting off completely all contact between the closet and the main service, or house-cistern, which may then be placed at any convenient distance from the closet, whilst affording the opportunity of regulating accurately the amount of water to be used for each discharge. Fifthly, I would avoid all traps except the one which is formed in the construction of the hopper-basin; this being made to flow out into a ventilated or open soil-pipe, which, again may be carried up within an external ventilated flue, for protection from frost, or for carrying off the foul air more effectually. There have been several inventions which I cannot regard as wholly satisfactory, with a system of flushing which merely washes out the contents of the basin into the trap below, in which the contents commonly are only partially concealed, and which does not clear itself properly with any ordinary flush of water which can be let in upon it. They are, however, a wonderful improvement upon previous descriptions of hopper-basins, and of still greater value as aiding in the superseding of closet valves and pans. The old hopper-basin has in the main worked far better than these; but the small stream of water, through an insufficient nozzle, has been quite ineffectual for its proper cleansing. The "Shrewsbury" patent basin, made by F. Peirce & Co., is calculated to meet most of these objections. But invention has been rife in the direction of the valveless waste-preventers for the flushing of closets in the manner which I have indicated. Of these Hailstone's patent and Braitbwaite's patent appear to be excellent, if the stream discharged be sufficient. The water is discharged through a syphon, which is set going, in the one case by immersing a block of terra cotta, to raise the water to a sufficient height to fill the syphon; in the other, by raising a small quantity of the water in a cylinder. By the Shrewsbury patent the result is produced by the mere process of lifting out of the regulator, or feed-cistern, the requisite quantity of water in a pan or tray, and so tipping it into a funnel, thus securing the sudden and effectual flush which is required for the specially-formed basin or pan. It surely is to the fulfilment of such conditions as these that all our efforts must be turned, and the stream of invention directed, as, indeed, latterly it has been to a great extent. If there are principles in closet construction radically wrong and bad, and there are others which are essentially true and good, it is only by thoroughly sifting the one and the other that just conclusions can be arrived at, and advancement made. I have not been advancing theories without giving, as I conceive, good and sufficient reasons for the general principles which ought invariably to be followed. Let them be well weighed, and if they cannot be defended, let them be amended. Whether they be accepted as good and true or not, I cannot, I am sorry to say, conceal from myself the fact that they are not likely to be generally carried out, at all events for a long time to come, even with the most strenuous efforts of sanitarians to enforce them, either by precept or by law. The present state of things has too firm a hold on the people at large, and there are commercial principles at stake which will greatly stand in the way of such a general improvement.

I am not one to advocate interference with personal rights or vested interests, and I may therefore state freely what I believe to be the almost insurmountable difficulty attending it, even supposing a general agreement as to this system being the best. The best and largest firms necessarily live by advertising. And enormous is the good which they have effected by spreading the knowledge of improvements. Advertising is the only means by which such things can be brought before the public; and that which will pay, and will meet the public requirement, however bad in principle it may be shown to be, must not be omitted from the catalogue of the useful articles supplied. The good and the bad are *equally set forth, side by side*. The generality of people take the recommendation of a thing in this manner, and are only too glad to take what is thus brought before them, without further trouble or question. And so long as the great variety of opinion upon these matters exists amongst those who are supposed to be well informed, it is not to be wondered at that so little real result should be obtained. With all this, however, we are far in advance of our Continental neighbours. At Berlin, and at Rotterdam, they rest content, as it was described to me a few weeks since by well-informed persons, with merely a pan and a tap; and nothing could be more simple. At Dresden, Hanover, Bremen, and Hamburg, much more attention is now being paid to these mundane things; but one's reminiscences of Continental sanitation are by no means pleasant. I am not at all sure that the same remarks might not be made by a casual observer, as to the state of the case in our own country; for, as yet, I fear, we are, after all, but little in advance of them, and that typhoid fever, certain skin diseases, and much general debility and ill-health, will continue to be, as now, but too common; for up to the present time all that has been written and said by our most eminent physicians and sanitarians seems to have made but little practical impression on the educated, the heads of families, and house-owners generally.

RE-ARRANGEMENT OF MONUMENT YARD.

NEW BUILDINGS AND THOROUGHFARES.

The entire area of Monument-yard is at present being re-arranged, and so laid out as to convert a large portion of it into a new carriage-way, which is intended to be constructed between Fish-street-hill and Lower Thames-street, opposite Billingsgate Market. Hitherto the whole open space around the Monument has been flagged, and served only as an approach to the Monument itself and the buildings on the north, south, and east sides respectively, with the exception of a narrow passage at the south-east corner, leading into Pudding-lane. All this is now being changed. The old flags have been taken up, and the level considerably lowered, with the view of adapting it to the gradient of the intended new thoroughfare. There are to be new footpaths on the north and south sides of the Monument, with carriage-road approaches to the new thoroughfare eastward, which will intersect Pudding-lane, buildings there having been taken down for the purpose of opening out the new street. The new carriage-road around the Monument will be paved with granite, resting on a concrete bottom. It may be interesting to add that in making some necessary excavations for the new roadway, an old crypt was opened out at several feet below the level of the yard, in close proximity to the Monument. The old buildings on the north and south sides of the Monument, fronting Fish-street-hill, have recently been taken down, and on the site so cleared on the south side an extensive block of new buildings is in course of erection, which will have a frontage to Fish-street-hill of about 40 ft. in length, and be carried to a depth of 70 ft. eastward, the Fish-street-hill elevation, as well as that facing the south side of Monument-yard, being uniform in architectural design. The ground floor of the two frontages will consist of seven shops, five of which will be in the Monument-yard frontage, and two in Fish-street-hill. The building, which will be carried to a height of between 65 ft. and 70 ft., will have ornamental frontages in Portland stone and polished granite. The upper floors will consist of offices. Mr. W. Smith, of Gresham-buildings, is the architect; and Messrs. Lark & Son, of Fore-street, E.C., are the contractors. The site which has been cleared on the north side of the Monument in Fish-street-hill remains inclosed and not yet built upon. It belongs to the Fishmongers' Company, who, we learn, do not propose to erect any new buildings upon it until the Inner Circle Completion Railway project is finally settled.

THE PATENT LAWS.

In the Economy and Trade Department of the Edinburgh Social Science Congress, on the 11th inst., Sir U. J. Kay-Shuttleworth in the chair, the question set down for discussion was "The Effects of Patents on Science, Capital, and Labour."

The Rev. S. A. Steinthal, secretary, in the absence of its author, Mr. John Standfield, London, read a paper on the subject, in which the writer asserted that the three things which most required protection were science, capital, and labour. It was evidently our interest, he submitted, to afford inventors all the scope we possibly could, so that our trade and income might increase and our expenditure diminish. Contending that we had legislated so badly with regard to the development of science that the value of both capital and labour had been kept considerably below what it would otherwise have been, he remarked that the prosperity of a nation depended upon its scientific progress,—using these words in a wide sense to embrace all discoveries and improvements in our numerous and varied industries,—that scientific progress, in its turn, depended upon invention, and that the inventions of a nation were practically dependent upon its patent law. This was, perhaps, more particularly the case in this country than in any other. In the United States, a patent was granted for seventeen years, after careful examination by experts, for the small sum of 7*l.*; whereas a patent in this country was burdened with the heavy stamp-duties of 175*l.*, and was not subject to any examination. This enormous difference handicapped the British inventor by twenty-five to one in favour of the American, and thus, taking the average of the last ten years, there were 13,356 patents granted in the United States against 3,030 in this country. Mr. Standfield accordingly proposed that our stamp-duties should be so reduced that a patent in this country could be obtained as cheaply as in America. His proposal is to charge a stamp-duty of 2*l.* on application for a patent, and a further duty of 3*l.* when the patent is granted, and an annual stamp-duty of 1*l.*, 2*l.*, or even 3*l.*, so that the Patent Office may be more than self-supporting. He also proposes that patents should last twenty-one years, including provisional protection for one year.

Mr. E. J. Watherston said it was to be feared the Britisher was most unfairly handicapped in competition with foreigners. Most unwisely England omitted to raise up those sensible barricades of national and technical education; and farther, she failed to get rid of the "dead hand," the insane laws of our ancestors, by which many of our trades were sought to be governed. Thus it was that an excise was still to be found upon trade, in the shape of an oppressive tax upon "inventions." How foolish, he said, it seemed to be to fetter trades by so monstrous a charge for a simple patent as 175*l.*—a prohibitory charge, especially when a similar patent in the country that entered more closely into competition with us than any other cost but 7*l.*, and was shortly to be reduced to 5*l.* He maintained that, if it were desired to discover how not to encourage manufactures in this country, and to encourage imports at the expense and to the detriment of our manufacturers, an important factor might be found in our senseless patent laws. He held that we wanted a Minister of Commerce, whose duty it should be to relieve trades from all hindrances to progress, to let trades and manufactures be free, and, above all, to get rid as soon as possible of the shackles and hobbles upon inventors' brains.

Mr. R. A. Macfie opposed licence duty for patents, on the ground that it granted a monopoly, and that every monopoly was an impediment to trade and manufactures.

Professor Heinemann, London, opposed the abolition of patent duty, on the ground that it would discourage invention. He did not think the American system would do here.

Mr. Westgarth, London, contended that our patent duties were the greatest possible hindrance to invention. He did not, however, agree with the American system, but he regarded our present patent system as most gross and unjust. The Government should take in hand the training and restraining of inventors, should regulate the patent fees, and give the patent right to every applicant subject to those fees.

NEW MISSION-HALL, KILBURN-LANE.

The Queen's Park Hall, adjoining Queen's Park estate, was opened last week. The new building, the foundations of which were begun just three months since, comprises a hall 50 ft. long by 28 ft. wide, approached from Kilburn-lane through a side porch. The roof, which is lofty, and rests on stone corbels, is open-timbered, stained and varnished, and has a light and graceful appearance. The windows are constructed for ventilation, and are fitted with obscured plate-glass. The walls are painted a light violet, with a plinth 5 ft. high, of deep red. The platform is raised a few steps from the floor level, and has a moulded front and balustrade with massive polished mahogany handrail, the desk being raised and panelled in front. The doorways at each side of the platform lead to the inquiry and retiring room, with a lavatory, &c., conveniently placed in the rear, also to a room fitted up with boiler and other requisites for tea meetings. The seats in the large hall are of pine, stained and varnished, the ironwork (like the gas-fittings and straps, &c., of roof-timbers) are painted blue. The hall will seat upwards of 400 people with ease, a larger number being accommodated if necessary. The buildings, including heating, lighting, water-service, drains, seats, and all other matters, have been provided for the sum of 810*l*. Messrs. Hook & Oldrey, Cowley Wharf, Kensal Green, have done the work in a substantial manner within the short space of three months. The architect is Mr. Heffer, of Victoria-road, Kilburn, who designed the Albert Memorial at Hastings, the Mission Hall, New Ferry, and other public works.

SALE OF BUILDERS' WORKS, AND THIRTEEN ADJOINING HOUSES.

At the Auction Mart, on Tuesday, Messrs. F. Lewis & Co. offered for sale the extensive business premises, situated in Palace-road, Lambeth, facing St. Thomas's Hospital, which for several years past have been in the occupation of Messrs. G. Baker & Sons, builders and contractors. There was a large attendance at the sale, including several persons connected with the building trade. The premises occupy upwards of an acre in extent, and comprise several buildings, including large offices, deal-shed, saw-mill, joiner's shop, engine and boiler house, large engineers' and fitters' shops, 192 ft. long, and 40 ft. wide; three drying-sheds, with stabling for fifteen horses, and general stores. The steam power for driving the working machinery of the establishment was described as consisting of 16-horse power vertical engine, with a 60-horse power Cornish boiler. Included in the sale were likewise four gate-houses, in Palace-road and Paris-street, suitable for manager, clerks, and foreman, estimated together to be worth 145*l*. per annum. The property was stated to be held upon lease for a term of sixty-five years from June, 1844, at a ground-rent of 375*l*. per annum, and estimated to be of the net annual value, after deducting ground-rent, of 469*l*. The first offer made for the property was 3,000*l*., and by advances of 100*l*. at each bidding it was brought up to 3,800*l*., at which it was sold, it being stated in the room that it had been purchased by a firm connected with the building trade, by whom it would in future be carried on.

The several dwelling-houses in Palace-road were offered in thirteen lots. They were stated to be held on lease for a term of seventy-seven years from June, 1831, at an aggregate ground-rent of 115*l*., the ground-rent of each house being 9*l*. a year, with the exception of one of the houses, the ground-rent of which was 7*l*. a year. The rents of the several houses, all of which are let on yearly tenancies, range from 41*l*. to 46*l*. a year each, the aggregate annual rental being 531*l*. 4*s*. They realised prices varying from 460*l*. to 570*l*. each, fetching altogether 6,136*l*., the total amount realised by the whole of the property, including the builders' business premises, being 9,936*l*.

DEEDS AND TITLES OF LAND.

Sir Robert R. Torrens read a paper before the Jurisprudence Department of the Social Science Congress at Edinburgh, on the 8th inst., on the question, "Is it expedient that there should be one system of registration of deeds or of titles of land for the United Kingdom, on the basis of the system presently in operation in Scotland or on any other?" He said the benefits of the system in Australia had been that, through its operation, a saving of 19*s*. in the pound sterling had been effected in the cost of conveyancing. The wealth of the community had been increased by restoring to its intrinsic value as building sites land which, deprived of that special character by imperfect evidence and technical defects in title, lay waste and unprofitable. In answering the question how it came to pass that hitherto all attempts to apply this system to the lands of this country had completely failed, though taken in hand by three Lord Chancellors, he stated that the permissive use of deeds granted under the 63rd section of Lord Westbury's Act involved a combination of two incompatible principles,—"registration of deeds" and "registration of titles,"—producing a hybrid, unworkable measure. Lord Currie's Act was to some extent open to the same objections; but even if free from other defects, the result of giving nominally to the proprietor, but practically to his solicitor, the option to place land under the system, and the power to withdraw it again from that system, was in itself sufficient to ensure its failure, as had been demonstrated in the case of the Irish Act. It would be difficult, not to say impossible, to imagine conditions more favourable for introducing the system of conveyancing by registration of titles than those which existed in Ireland. But, unfortunately, the legal gentlemen who undertook to revise his Bill of 1863, preparatory to its re-introduction in the following session, deemed it politic, in order to propitiate Lord Westbury, and induce him to undertake the carriage of it through the House of Lords, to import into it certain provisions of his own measure, which were antagonistic to the principle of registration of titles, and his remonstrances were ignored.

Mr. R. Denny Urlin, of the Middle Temple, barrister, F.S.S., next read a paper on the same subject, in which he stated that the system of registration of title has several distinct advantages of its own; and it has been tried, though under heavy disadvantages, both in England and Ireland. Professional dislike led to the virtual rejection of a measure which was only optional; and only a few hundred titles are on the record of ownership. Still, the problem has been solved; for contracts can be made and completed within an hour, and dealings with the few estates on the record are enormously simplified.

NEW PUBLIC BATHS FOR LONGTON.

The foundation-stone of new public baths for Longton, Staffordshire, was laid on the 7th inst. by the mayor (Mr. George Bennion). The buildings are being erected on a site belonging to the Corporation, situated near the railway station, from plans prepared by Mr. Arden Hardwicke, C.E., the borough engineer, there apparently being ample provision made to insure convenience of arrangement in the many requisite sections of the building. While disposed not to lavish money in mere ornamentation, the Corporation wisely determined that the new baths should not be altogether devoid of exterior ornament. The style of the building is Gothic. There will be two main entrances, one for ladies and one for gentlemen, with a central ticket-office. The section devoted to gentlemen's warm baths will contain a number of both warm and vapour baths, and will have a large waiting-room attached. The dimensions of this part of the building are 38 ft. by 22 ft. There will also be a second-class bath-room, 30 ft. by 20 ft.; and it will be fitted up with eight baths. Provision is made for three swimming-baths, two for gentlemen and one for ladies. The first-class bath will be 70 ft. long by 30 ft. wide. It will be lined with white glazed bricks, fitted up with good dressing-apartments, and have a gallery, a diving platform being also provided at the deep-water end. The second-class swimming-bath will be of smaller area, 56 ft. by 30 ft., and it will be fitted up with all necessary conveniences. The ladies' swimming-bath will be 22 ft. by 17 ft.; and will be well fitted up, suitable dressing-rooms being provided. The roofs of the swimming-baths will be lighted from above by Shelley's patent system of glazing. Warm baths for ladies will be provided, and will be approached from the left of the entrance to the ladies' section of the building, and branching from the main entrance on their side. A waiting-room will be attached, and the baths will be of two classes, warm and vapour. The general Turkish baths will be on the first floor, over the ladies' section of the building, and will be suitably divided into compartments, the heating being done by a convoluted stove placed in the basement. The boiler-house will be situated in the rear of the main building, and will contain two powerful boilers, while the laundry will be fitted up with a six-horse power engine and have all requisite washing-machinery. The general work in this department will be done by Messrs. Bradford & Co., of Salford, under contract, for 750*l*. The tank-room is situated above the laundry, and will contain three large tanks. The superintendent's apartments will be on the first floor; and will be convenient in arrangement and fitting up. The builders are Messrs. H. & R. Inskip, of Longton, the amount of whose contract is 5,900*l*.

CHRISTMAS CARDS COMPETITION.

The offer of 500*l*., in fourteen premiums, made by Mr. Raphael Tuck for the best designs for Christmas and New Year cards, and the evidences of good faith given by the appointment of three well-respected artists as judges, led to the submission of a large number of designs; 925 frames are hung in the Dudley Gallery, many of them containing four designs each, and the large majority exhibiting a fair degree of skill. The decision has just now been announced, and it will be seen that the ladies have carried all before them, having taken eleven out of the fourteen prizes. The following is the list:—First prize, 100*l*., Alice Squires; second, 75*l*., Herbert Allobin; third, two of 50*l*. each, Harriet M. Bennet and Patty Townsend; fourth, five of 25*l*. each, Ellen J. Miles, Mary S. Story, R. J. Abraham, Mrs. Koberwein Terrell, and Rebecca Coleman; fifth, five of 20*l*. each, Marian Croft, Miss Balfour, Elizabeth B. Bayley, Geo. Clausen, and Kate Sadler.

THE BIRKDALE SEWERAGE WORKS.

The Birkdale Sewerage Works, which have been in course of construction since 1875, have just been formally opened by Mr. F. Hillé, the inventor and patentee of the system.

The Local Board did not determine upon Mr. Hillé's system before they had visited various towns where different ones were in operation, and were convinced that it was suitable. It was shown at the time that at Edmonton, at Tottenham, Windsor, and other towns, the process worked satisfactorily. The system consists mainly of two parts,—first, chemical treatment; and, secondly, filtration either artificial or through land. Chemical treatment has for its object the precipitation of all the suspended matter contained in the sewage and of whatever smaller proportion of the matter is held in solution. The liquid resulting from chemical treatment, commonly known as the effluent, is either discharged directly into the river or sea, or it is turned upon land for further purification. Where there are large rivers the effluent may be discharged directly from the depositing-tanks; but in the case of simple watercourses or streams chemical treatment is always desirable, so that the treated sewage may in no way be injurious either to vegetable or animal life.

The Birkdale Sewerage Works are situated at the top of Aughton-road, at the junction of the latter with Chatham-road. The sewage enters the works through screening-chambers, and from them into an underground reservoir, which will hold 500,000 gallons of sewage. From this

reservoir the sewage is condnoted into a pnmping-well, where it receives tbe chemicals, and is lifted by two ten-borse power engines into two depositing-tanks with a capacity of 370,000 gallons. From the depositing-tanks, after precipitation has taken place, the effluent, or purified sewage, passes on to filter-beds an acre and three-quarters in extent, which are divided into five separate beds that will be used in rotation, so as to insnre complete aëration or oxydation. Previonsly to the chemicals being sent into the pnmping-well they are mixed in tbe mixing-pan, whence they are delivered into two mixing-cylinders fitted with agitators, and thence pass into tbe well named. All the treated sewage before being discharged into the brook is passed over the filtering-beds. The extent of the gronnd covered by the seworage works approacbes five acres. The engineer is Mr. Fairbairn.

SMOKELESS TOWNS.

Sir,—May I offer a snggestion? To prevent tbe smoke of domestic coal poisoning tbe atmosphere is very desirable, and I venture to snbmit to yon that any row of bonses might be so altered as to the chimney ontlet, although new streets built to this plan would be mucb better, that all the smoke could enter a common flne leading to an exhausting fan and a fire. The fan should be so constrncted as to compel all the smoke arriving at tbat end of tbe horizontal flne to pass throngh a furnace and be destroyed. An engine would be required to work the fan, which might be utilised in another manner, namely, snpplying the electric light to all the houses. Large blocks of workmen's dwellings might be easily constructed on this plan, and the common flne might be so arranged as to give warmth to the building. This would effectually cnre smoky cbimneys, and would also ventilate every room wberein a grate was placed, if the inlet of the chimney remained open. The fire would also be nsefnl if made to consnme vegetable refuse, and possibly many otber valnable services could be found for it. Of conrse the furnace would be fed with a smokeless coal so as not to be in itself a nuisance, and the engine could supply power to the bonses for coal-lifts, dinner-lifts, &c.

Sunshine.

HOW PARISH AWARDS ARE TAKEN CARE OF.

Sir,—Whilst engaged in surveying an estate the other day, we had occasion to refer to the parish award, and accordingly sought out the clerk, to gain admission to the church, expecting to find the award there. He, however, informed us that the parson had it at the Vicarage. We therefore called on the worthy vicar, who most affably produced the award, and said he regretted he could not show us the plan which should accompany it, as he had lent the same for a few days to a man at the other end of the village, to make a tracing of it. Bidding the vicar "Good day," we went in search of the plan, which we found at the house of tbe man to whom it bad been lent, *nailed* to a table, to enable him to make bis tracing. The plan was evidently a most carefully prepared one, and certainly deserved better treatment.

Surely such plans and awards should be kept with more care, and as far as possible free from tbe danger of fire, &c., and not be lent promiscuously to any one who may think fit to borrow and take them off the premises of the person who has charge of tbem.

Maughan & Cuxson.

A HINT TO THE MIDLAND RAILWAY COMPANY.

Sir,—In a recent article in the *Builder*, headed "The Wreck of the Scotch Express," it is stated, "The London and North-Western, the Great Northern, and Midland Railways have twelve tracks of rails for more than twenty miles out of London," but although the two former have four tracks each out of London, the Midland Company have only two, making a total of ten instead of twelve. The travelling public have a very great deal to thank the Midland Railway Company for, and I have often been surprised that the Company do not do more for their local traffic between Luton and St. Alban's and London than they have done. If four tracks of rails were laid down as far as Luton or Bedford, it would give the Company a chance to keep their local trains more punctual, for it is a notorious fact that scarcely any of their local trains from Luton to London are ever in proper time, especially those in the early morning, which are used largely by business men. At several places down their line some large plots of building land have recently come into the market, and the Midland Railway Company would reap a great deal of benefit if they provided punctual accommodation to London from Luton and St. Alban's in the morning.

A Traveller.

ROAD FORMATION AND STREET PAVEMENTS.

Sir,—As the patentee of the asphaltic wood pavement referred to in your issue of the 9th inst., and in the letter signed "Fact," I trust you will allow me to point out that your letter correspondent might have stated his "facts" more clearly, at least one of them being misstated. In order to correct which, I may say that I am informed the Asphaltic Wood Pavement Company have laid in London over 85,000 yards on that system, and, I believe, 35,000 yards is a near approximation to that laid on Henson's system, making a total of about 120,000 yards on those systems, and not 10,000 yards, as stated by "Fact": thus showing the opinion of the authorities, though in a different manner to that he conveyed. This will be more evident when it is known that of the 200,000 yards, which I will take as correctly representing the quantity of wood pavement laid direct on concrete, a very large proportion (I believe, about 150,000 yards) was originally laid by the Improved Wood Pavement Company on their plank system, which has proved such a costly and utter failure as to rapidly require entire renewal; and, therefore, they have under their maintenance contracts relaid the greater part with wood blocks placed direct on concrete.

Now, as to the "fanciful bedding of felt or asphalte." It is acknowledged that the foundation forms the true road, the surface blocks in all systems being a mere covering to afford a foothold, and protect the foundation from the impact of, and loss by attrition from, the traffic. We have also to deal with the following facts, which do not seem to be clearly appreciated by your correspondent of last week:—1st. That the disintegration of the foundation in wood, as well as stone pavements, is due to the direct pounding action of detached or imperfectly connected blocks, assisted by the access of surface water. 2nd. That the cost of wood pavements is largely influenced by the proportion of timber employed, and as the price of suitable timber will continue to rise with an increased demand,—the supply being limited,—such pavement as requires the smallest proportion in original construction and renewals will always be the cheapest. The asphaltic wood pavement was designed entirely with a view to meet those conditions, and by the adoption of the impervious layer of asphalte the concrete is thoroughly protected from surface water, a less depth of foundation is thereby required, still retaining equal solidity. As regards economy in timber,—with wood paving generally, as with stone, a deep block is essential to stability; but in the above system the blocks are firmly held down to the asphalte layer, and agglutinated to each other by the asphalte, which is run half-way up the joints, and also enters the auger-holes, which should in all cases be bored in each, thus producing a compact parquet-like slab, extending from curb to curb, the strains from passing loads being in turn shared by neighbouring blocks, and transmitted to a largely-extended area of foundation, the result being that, whereas in other systems the block requires renewal when worn to within about 4 in. in depth, it is possible with the asphaltic wood pavement to wear them to within 2 in., or even 1½ in. of the base, without imparing their solidity. Blocks at least 2 in. shallower than are now employed in this country are thus sufficient for the requirements of the traffic.

The above are "*not the assertions made by any theoretical problems, but the actual experience*" obtained with the pavement, as laid over five years, under my foreign patents, in the streets of a Continental seaport town, over which a traffic passes from the shipping equal to the traffic of most average London thoroughfares. The following was the section:—concrete, 4½ in.; asphalte, ½ in.; sound red pine blocks, 3½ in. deep and 7 in. by 2½ in. on the surface, each block having two auger-holes bored to the depth of ½ in. near the base. The joints were run up half-way with heated asphalte, the remainder coarsely grouted. It has been in constant use to the present without repair, and is still in good condition, though the adjacent stone pitching has been thrice re-laid in the interval. The same section has been over twelve months in use for tramway traffic, and at the same time blocks only 2½ in. deep with ½ in. asphalte and 3 in. of concrete, were laid for light street traffic similar to that of most London squares. Both are in excellent condition, and there is every reason to expect continued good results.

It is unnecessary to remark that in this country the above sections should suffice for similar conditions of traffic, &c. That for very heavy traffic the depth of block need not exceed 4 in., with ½ in. of asphalte and 5 in. of concrete. That, far from being costly, all are cheaper than that advocated by "Fact," while retaining equal durability. Also, that the first cost of the shallower section is but little in excess of good macadam, whereas the annual cost of maintenance and cleansing would be considerably less.

In conclusion, I may add that it is evident from the facts I have adduced, an unnecessary quantity of concrete is required on the system advocated by your correspondent, and an average of about 30 per cent. of timber wasted, which might be saved by the judicious use of asphaltic wood pavement. That the cost of wood pavement is, therefore, generally about 2s. per square yard higher than is necessary for equal durability. And that, notwithstanding "Fact's" assertion that the asphaltic wood pavement is costly, it is capable of even more economic results than those contained in the table of your correspondent, to which he takes objection; for if the sections indicated above were generally adopted, a saving to the ratepayers of about 15 per cent. in the present cost of wood pavement would be effected, and for every three miles now paved with a given quantity of timber, about four miles could be paved in an equally serviceable manner.

Henry S. Copland, C.E.

Balsall Heath.—The new Church of St. Thomas-in-the-Moor, Balsall Heath, has just had its east window filled with stained glass. The principal subject, occupying three lights, is the Ascension. There are two minor subjects: on the right our Lord restores to health Peter's wife's mother, and on the left He gives sight to the blind. The window has been erected in memory of Mr Edward Townsend Cox and his wife, by their son, Mr. W. Sands Cox. It was designed and executed by Messrs. Camm Bros., of Smethwick.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The first ordinary meeting of the new session will be held on Monday evening next, the 1st of November.

The usual certificates will be presented to Messrs. Gass, Goldsmith, Johnson, Kemp, Marvin, and Summers, passed candidates in the class of proficiency at the voluntary architectural examination, 1880. Afterwards the opening address of the session will be delivered by Mr. John Whichcord, F.S.A., president.

A special general meeting of members only will be held at the close of the ordinary meeting to elect an honorary secretary in place of the late Mr. Thomas Henry Wyatt, and Mr. John Macvicar Anderson, member of council, will be proposed as a fit and proper person to fill the office.

A voluntary examination in the class of proficiency will be held on the 14th, 15th, 16th, and 17th of June, 1881. All candidates will be required to go through the examination, as a whole, in both the scientific and artistic sections; but those who have previously passed in one section will be permitted in 1881 to offer themselves for examination in the other section.

CHURCH-BUILDING NEWS.

Swynbridge.—The parish church of Swynbridge, near Barnstaple, was re-opened on the 21st ult., after restoration. The church consists of nave, chancel, north and south aisles, south chancel aisle, north transept, vestry, with priests' chamber over it, porch, and tower containing a peal of five bells. The church dates from about 1460, with the exception of the tower, which is fourteenth-century work. Before the restoration an unsightly gallery crossed the west end of the church, completely blocking up the arch opening into the tower; this has been removed. The font has been removed from the second pillar on the north side to its present position, and the paint has been taken off, thereby showing the carving more plainly. The pulpit occupies the same place as formerly. The whole of the nave, aisles, chancel, and transept were blocked up with old-fashioned deal pews. These have been removed, and open sittings have taken their place. The benches are carved after the pattern of the old ones, some of which were found doing duty as props to the deal seats. The old carved benches that were found have been put together again, and once more occupy their proper position. The tiles in the chancel are encaustic, supplied by Godwin, of Lugwardine. When the plaster was removed from the east end wall of the transept, a piscina was laid bare, believed to have been that of a chapel dedicated to St. Bridget. The whole of the works have been carried out by Mr. Jonathan Marshall, of Plymouth, with the exception of the stalls in the chancel, which are the work of Mr. Robinson, London. The total cost of restoration (exclusive of the chancel, which is being done by the Ecclesiastical Commissioners) is 2,600*l.*

Chideock (*Dorset*).—On the 29th ult. the parish church of Chideock was re-opened, after restoration, which appears to have been much needed, the building having been allowed by neglect to get into a very dilapidated condition. Several of the heavy timbers in the south aisle roof were found to be completely rotten at the ends, and as soon as the lead was removed fell in of their own weight, showing that instead of supporting they were actually supported by the lead roofing, which, happily, was deeply embedded in the walls. The east and west walls of the transept were also very much decayed and out of the perpendicular, and an unsightly beam had been substituted for the transeptal arch. The restoration has included the removal of the gallery, the complete reparation of the belfry, the rebuilding of the north wall of the nave, and east and west walls of the transept, the insertion in the former of two new Perpendicular windows, the re-roofing, reflooring, and re-glazing of the entire church, covering the south aisle roof with new lead, laying a six-inch bed of concrete beneath the new wooden floor and providing for ventilation between the concrete and the wood, the building of the new transeptal, chancel, and side arches, with supporting buttress outside the south wall, fresh mortaring of the interior, and pointing and renewing the decayed stonework of the exterior, at a total cost of about 1,100*l.* The work has been done under

the direction of Mr. G. R. Crickmay, of Weymouth, the diocesan surveyor. One of Porritt's stoves has been adopted for heating purposes. Mr. Jno. Beer, of Wareham, has carried out the works. The stained-glass windows are by Messrs. Lavers, Barrand, & Westlake.

Banbury.—On the 29th ult. the new tower of Christ Church was dedicated by the Bishop of Oxford. The tower has been built, at a cost of 1,200*l.*, of Gibraltar stone, with dressings of Corsham Down Bath stone, and rises to a height of upwards of 80 ft. from the ground. The architects were Messrs. B. & E. B. Ferrey, of London, and the builder was Mr. Franklin, of Deddington.

Heythrop.—On the 28th ult. the Bishop of Oxford consecrated the new church just erected in Heythrop Park by Mr. Albert Brassey, the owner of the Heythrop Estate. The church, which is dedicated to St. Nicholas, consists of a nave and south aisle, with a tower forming a porch at the west end of the aisle, a chancel with an organ-chamber on the south, and a vestry on the north. It is built partly of the materials of the Roman Catholic chapel which formerly stood near the house, and partly of new stone from the quarry on the estate. Milton stone has been used where a material of finer and more even quality was required for carving, &c. The general dimensions of the building are as follow:—Nave, length 50 ft., width 22 ft. 4 in.; chancel, length 30 ft., width 20 ft.; height of tower, 94 ft. There is accommodation for from 180 to 190 persons. The roofs are of pitch pine throughout, and covered with Broseley tiles. The chancel and sanctuary are floored with a pavement of Italian marble mosaic by Messrs. Burke, of Newman-street. The stained glass in the east window is by Messrs. Burlison & Grylls, who have also executed the cartoon for the mosaic with which it is intended to fill the large panel over the altar; it is a representation of the Last Supper. The glazing, of three tints of cathedral glass, for the rest of the windows in the church is by Messrs. Brown & Boreham. The chancel seats, the altar, and pulpit, which are of oak and walnut, and the vestry screen of oak, were executed by the contractor, Mr. A. Groves, of Milton-under-Wychwood, who has carried out the whole of the works. The clerk of the works was Mr. Calloway, of Heythrop; and the foreman of works was Mr. Jos. Buckingham. The carving is by Mr. T. Earp, of Lambeth. In the tower are hung three bells by Mr. T. C. Lewis, of Brixton. The church is heated from a chamber under the vestry by Grundy's hot-air system. The style of the building is Decorated. The architect is Mr. A. W. Blomfield, M.A.

Rawtenstall.—In the Manchester Consistory Court, on the 1st inst., the Rev. James Norris, vicar of St. Mary's, Rawtenstall, applied for a faculty to take down the tower of the church, extend the church westward, increase the number of sittings, extend the chancel, construct a new vestry, and to make other alterations specified. It was stated that the cost of the proposed improvements would be 2,310*l.* A citation for the alterations was decreed.

Brynamman, Carmarthenshire.—The foundation-stone of the new church about to be built for the 200 seceders from the Welsh Congregationalists' communion was laid on the 7th inst. The new building will consist of a nave, 55 ft. by 25 ft., 18 ft. high to the plate, and 36 ft. to the ridge, the pitch-pine roof being open all the way up, and plastered between the rafters, the principals arched and supported on Bath stone moulded corbels; a chancel, 26 ft. by 16 ft., with arched, ribbed, and boarded ceiling; a vestry, with heating-vault below, and organ-chamber; also a porch, vestibule, and baptistery arranged side by side, forming a kind of narthex at the west end, which will have a suitable bell-turret above. The walls are to be built of local stone, with Westwood Ground dressings, and the roofs covered with grey Whitland Abbey slates. The pitch-pine seats will be of open description, on wooden platforms, the passages and chancels being laid with encaustic tiles. The whole outlay will be 1,500*l.*, the number of sittings provided being 300. The architect is Mr. E. H. Lingen-Barker; and the contractors are Messrs. Balcombe & Price, of Pembroke Dock.

Tamworth.—The committee for the restoration of St. Paul's Church have decided to get estimates from the architect, Mr. Basil Champneys, for the north and south-west windows, and for the three north aisle windows, and the preference has been given to local tradesmen.

Birmingham.—St. Asaph's Church, Birmingham, has been re-opened, after re-decoration by Mr. Heritage, of Marshall-street. The organ has been removed from the west gallery to the floor of the church, near the choir, and fifty-four pipes have been added to it.

Newcastle-on-Tyne.—It has been resolved to carry out certain alterations in St. Thomas's Church as soon as funds come in. It is intended to remove the present high pews, and to replace them by open oak seats, the cost of which, according to the tender of Mr. James Gibson, builder, will be 423*l.* It was also resolved to remove the glass from the great east window of the church, it being seriously out of repair, and to replace it by a new stained glass window, to commemorate the connexion of the Rev. Richd. Clayton with the church. The cost of the whole contemplated improvements is estimated at 950*l.* The work will be carried out under the direction of Mr. Arthur Gibson, architect.

Ipswich.—St. Clement's Church, Ipswich, was re-opened on the 7th inst., after alteration and redecoration. Altogether about 200*l.* has been spent, Messrs. J. B. & F. Bennett having done the builders' work, and Messrs. Stearn & Sons the painters' work.

Bathford.—The new tower of Bathford Church was opened on Michaelmas Day. It is the gift of Mr. H. D. Skrine, who some years ago built the north aisle. The former tower, built by Mr. Newman, the father of the builder of the present one, was of small dimensions, and intended to suit the conditions of low-pitched roofs, and a church of smaller area than the one since enlarged by the addition of a north aisle and other extensions with higher gabled roofs. The new tower is of much larger area on plan than that which it has displaced, and considerably higher, the style being that of the date of the chancel and other fragments of stonework discovered in taking down the old north wall of the nave, and which were of the Decorated period. The new tower consists of three stages in height of local freestone, the ornamentation being chiefly confined to the upper stage, which is pierced with large window-openings and crested by an open-work stone parapet with pinnacles at the angles, the south-west angle having a stone projecting staircase surmounted by a turret of considerably greater bulk and height than the other pinnacles, having a metal corona and weathercock on the summit of its spire. The tower is designed of sufficient height to allow of the nave roof being raised in the event of a clearstory being added. The former small bells have been exchanged for a new peal, furnished by Messrs. Warner & Sons, of London. On the west front is a canopied and crocketed niche containing a statue of St. Swithin, nearly life-size, and on the same front the arms and crest of the donor, Mr. H. D. Skrine. The carving and figure are by Boulton, of Cheltenham. The architect is Mr. Preedy, of London, who carried out the restorations of the church at two former periods. The builder is Mr. W. H. Newman, of Bathford.

DISSENTING CHURCH BUILDING NEWS.

Abergele.—A new Wesleyan chapel was opened here on the 26th ult. The architect was Mr. Richard Davies, Bangor, the contract being undertaken by Mr. James Copping, Abergele, for 2,600*l.* The new building, Renaissance in style, occupies a site at the junction of St. George's-road with Bridge-street, and provides accommodation for 500 worshippers. The entire cost of erection, &c., will not fall much short of 3,000*l.*

Low Fell.—The foundation-stone of a Primitive Methodist chapel and school was laid on the 25th ult. at Low Fell. The estimated cost of the building represented by the plans is 1,000*l.*, but it has been decided only to proceed with the chapel and the shell of the school at present, an arrangement which will only necessitate the expenditure of about 600*l.*

Wraysbury.—The Baptist chapel at Wraysbury has been re-opened, after alterations which have cost 450*l.* A tower and spire, in which is a three-faced clock, was the gift of Mr. Virgoe Buckland. Above the door in the tower is a bas-relief in terra cotta, by Tinworth, the subject being "The City of Refuge." This panel was the gift of Messrs. Doulton, of Lambeth.

Halifax.—St. John's Wesleyan Chapel, Halifax, which has cost 17,000*l.* or 18,000*l.* in erection, was opened on the 1st inst. The block of buildings comprises vestries and schools in rear of the chapel. On plan the chapel consists of a nave and aisles, without chancel. The principal front is to the north, and faces the junction of Prescott-street with St. John's-lane. The narthex, or porch, which is 12 ft. high, is entered by three arches springing from clustered columns. On either side is the octagonal base of the lofty pinnacles that form a leading feature in the design. A two-light window opens into the north side of each aisle. Over the heads of the arches to the porch runs a richly-decorated band of carved work. In the centre of the gable is placed the great seven-light window, its head filled in with rich tracery work of the Perpendicular period. A cluster of pinnacles finishes the gable end, and rises to a height of 50 ft. The two flanking pinnacles break into rich arcading after leaving the spring of the gable. They rise to a height of 57 ft., and are elaborately crocketed and carved. Internally the length is 77 ft. 4 in.; breadth, 50 ft. 8 in.; and height from floor to apex of roof, 42 ft. The aisles are divided from the nave by arcades of three bays each, the shafts being monoliths of polished Aberdeen granite, cylindrical in form, 8 ft. 3 in. in length, resting on octagonal bases of fine millstone grit, each base being 3 ft. 6 in. high. They stand clear of the seating. The spring of the transept arches is marked by the granite shaft being doubled, but each coupled shaft is in one piece. All the capitals are circular. The arches are equilateral. The span of each arch in the nave is 16 ft. 4 in. from centre to centre; while the transept arches are 24 ft. wide. Each of the eleven principals of the nave roof is filled in with Perpendicular tracery. The roofs to the aisles are sloped. All are in pitch pine, as are also the gallery fronts. The seats are low, open ones, with moulded tops. They are cushioned in dark crimson, supplied by Messrs. Jones & Willis, of Birmingham. Altogether there is accommodation for 800 or 900 worshippers. The windows are filled in with cathedral tinted glass. The gasfittings have been supplied by the Architectural Metal Works, Coventry. The pulpit is in Caen stone, octagonal in form, and richly worked upon every panel. It has been executed, from designs by the architect, by Messrs. Thompson, of Peterborough. The whole of the lofty wall space over the pulpit has been decorated in colour by Messrs. Powell, of London and Leeds. Neutral tints prevail. Five large recesses are formed, in four of which are inscribed the Lord's Prayer, the Creed, and the Commandments, the central space being filled up with a richly-floriated design. The wheel-window above has been filled in with stained glass, also by Messrs. Powell. The large openings in it are filled in respectively with the Calling of the infant Samuel, Solomon dedicating the Temple, our Lord blessing little children, and St. Paul preaching. The heating apparatus throughout chapel and schools has been supplied by Mr. Naylor. Mr. Henry Wilson has been the clerk of the works, and the following have been the contractors:—Mason, Mr. Jenkinson, Halifax; joiner, Mr. Townsend; plumber, Mr. Naylor; slater, Mr. Firth, West Parade; painters, Messrs. W. Lee & Son; ironwork, Messrs. Hirst Brothers. The architect is Mr. W. S. Barber, of Halifax. The organ in South Parade chapel is now in course of re-construction by Messrs. Forster & Andrews, of Hull, and will be placed in the new chapel in course of a few weeks. It is to be placed in a new case, designed by Mr. Barber, and the cost of its alteration and extension will be 600*l.*

West Hartlepool.—A new Wesleyan Chapel has been commenced here. The site is at the corner of Frederick-street and Corporation-road. The design is semi-Gothic, and the structure will be of red brick with stone facings, the aggregate accommodation being for about 600 persons. The total cost is estimated at 850*l.* Mr. Garry, of West Hartlepool, is the architect, and Messrs. Curry & Tuke are the general contractors.

Hereford.—Memorial stones of the new Baptist Chapel in Commercial-road, Hereford, were laid on the 27th ult. Accommodation is to be provided on the ground-floor for 400 persons, and on the gallery-floor for an additional 250 persons, making a total of 650 sittings, for each of which 20 in. are allowed. The façade is to be executed in purpose-made white bricks with Beer (Devonshire) freestone dressings. The style of architecture adopted is Italian, treated with simplicity. The amount of the contract is 2,665*l.*, and the work is being carried out by Mr. William Bowers, of Hereford, under the superintendence of his foreman, Mr. Henry Williams, and the clerk of the works, Mr. Lloyd,

from the designs and under the direction of Mr. John Johnson and Mr. George Cowley Haddon, joint architects.

ROMAN CATHOLIC CHURCH BUILDING NEWS.

Maidstone.—The new Roman Catholic church in Week-street was opened for worship on the 4th inst. The plan consists of a nave with aisles at each side, about 60 ft. long, and together about 42 ft. wide, and a chancel, side chapel, organ chamber, and sacristy, 25 ft. long and together 40 ft. wide, the end of the chancel being apsidal. A tower, which forms one of the entrance porches, is attached to the western-most bay of the south aisle, and another porch at the west end of the north aisle. The style adopted is Geometrical Decorated, the building being constructed of red bricks, with Bath stone bands and dressings. The west end of nave contains a large four-light window, with deeply-recessed jambs. The tower has an entrance doorway, deeply recessed. Over this doorway is a recessed niche, in which is placed a statue of St. Francis of Assisi, the patron saint of the church. At a height of about 30 ft. from the ground, the tower, which is square to that height, is formed into an octagon-turret with bold broaches at the junctions; the spire springs from this turret, the total height being about 100 ft. The chancel is not yet erected. Internally the nave is separated from the aisles by lofty arcades of four arches each, springing from massive columns, with carved capitals, and the chancel arch and arches at each end of the aisles correspond. The roof is constructed of pitch pine throughout, and consists of raised tie-beam queen-post trusses, with arched braces and struts, and wall-pieces springing from stone corbels; it is match-boarded under the common rafters and collars, which boarding is perforated in ornamental patterns for ventilation, and formed into panels by moulded ribs placed over them. The floors of the passages, &c., are laid with Wilkinson's polished concrete, with Maw's glazed encaustic tile borders. The windows are glazed with cathedral glass of various tints, arranged in patterns. The altar and reredos are of Caen stone, of simple design. Mr. J. G. Naylar, of Rochester, has been the builder employed, and Mr. Boulton, of Cheltenham, has executed the carving, except the altar, which is the work of Messrs. Vaughan, of Maidstone. Mr. E. Hill has acted as clerk of the works, and Mr. Thomas Cramp as contractor's foreman. The buildings have been designed by and carried out under the superintendence of Mr. C. G. Wray, architect.

Salford.—The new Church of Our Lady of Mount Carmel, Oldfield-road, Salford, was opened on the 29th ult. The church has been built in the Early English style, Mr. S. Harrison, of Prestwich, being the architect, and Messrs. Healey & Sons the contractors. The building, the total length of which is 128 ft. by 42 ft., gives accommodation for 700 worshippers. The structure is of brick, with stone and terra-cotta facings.

New Brighton.—The foundation-stone of the Church of SS. Peter and Paul, to be erected at the corner of Hope-street and Rowson-street, New Brighton, was solemnly blessed on the 29th ult., by the Rev. Dr. Knight. The plans, which have been prepared by Mr. Edmund Kirby, architect, Liverpool, include nave, porch, gallery, chancel, side chapels, and sacristy. The length is about 85 ft., and the width about 35 ft. The style adopted is Early English, in brickwork, with stone dressings.

York.—The Lady-chapel of St. Wilfrid's Church has just been decorated, from the designs of Messrs. Goldie, Child, & Goldie, architects, London. The decorations have been executed by Mr. Knowles, ecclesiastical decorator, Stonegate.

Walton-le-Dale. — On the 10th inst. a new church at Walton-le-Dale was opened by the Rev. Dr. Hedley, O.S.B. It consists of nave, chancel, side-chapels, and aisles, and the style is that of the Early Decorated period. It is built with hollow walls, the inside being of bricks, the outside faced with Yorkshire parpoints. The whole of the dressings, both exterior and interior, are of Stourton stone. The total length is 96 ft., the width across nave and aisles 53 ft., and the height to ridge is 52 ft. It has been erected from the designs of Messrs. Pugin & Pugin, by Mr. W. Hothersall, contractor, of Preston. It will accommodate over 500 people. The amount of the contract, including benches, was 5,223*l.* The altar and marble floor in the chancel have been executed from the designs of the architects by Mr. Isaac Sherratt, sculptor, of Preston.

SCHOOL-BUILDING NEWS.

Plymouth.—The first portion of the new building of the Boys' High School in Ford Park, Plymouth, is approaching completion. The entire design comprises fifteen large class-rooms, each capable of accommodating twenty-seven boys; an assembly-hall, 40 ft. by 75 ft.; a library and headmaster's room, 40 ft. by 27 ft.; spacious principal and secondary stone staircases, board-room, assistant-masters' room, and pupils' day-room; commodious drill-shed, three excellent fives courts, and large workshops, or chemical laboratory; a residence for the headmaster, a serjeant's lodge, and a dining-hall with all necessary culinary offices. The portion now in progress contains eight class-rooms, six being to the north, and two to the south of the central front entrance; the library over the entrance-hall and the back wing containing the board-room, &c. Of this portion the central entrance-block and the two class-rooms to the south of it are as yet but slightly above the foundations. The principal front of the building faces the south-west, and consists of a central entrance projecting 4 ft., flanked by a two-storied façade containing twenty-four large mullioned and transomed windows, lighting twelve class-rooms. At the southern extremity will be the headmaster's residence, extending over a carriage archway, which unites it to the main building; and at the northern end will be the assembly-hall—standing at right angles—octagonal turrets rising up at the points of junction at both ends of the front, and also at the south-west angle of the assembly-hall. The external walls are faced with lime-stone and Portland stone throughout. The works are being executed by Messrs. Blatchford & Son, of Tavistock, under the superintendence of the architects, Messrs. Paull & Bonella, of London and Manchester. Mr. Siddell is clerk of the works.

Pinxton (Derbyshire).—New schools are in course of erection here. The ground-plan comprises a school-room 54 ft. by 25 ft. 6 in., with class-room 15 ft. by 15 ft., with two porches, affording accommodation for 200 children. The roofs are open, with framed principals, stained and varnished. The walls externally will be faced with common bricks, relieved with bands of stock bricks; also to arches of windows, weatherings to buttresses, &c., and internally with common bricks. The roof will be covered with Welsh slate and red Staffordshire ridge tiles. The cost of the work, exclusive of the fittings and boundary walls, is 550*l.* Mr. John Bird, of Pinxton, is the builder. Mr. John Lowe, of Manchester, is the architect.

Bilston.—The memorial-stones of a new Wesleyan Sunday and Day School building were laid on the 22nd ult. The school is to be a plain-built brick structure, 57 ft. by 26 ft. outside, and 33 ft. in height, the total cost of its erection being about 700*l.* Messrs. Hickman & Johnson are the builders.

Kimberley. — The foundation-stones of a Baptist School and Mission-room, in Victoria-street, Kimberley, have been laid. The school and mission-room will be a plain structure, and intended to accommodate about 100 persons. The buildings will be completed at a cost of 300*l.*

Ordsall.—On the 9th inst. the foundation-stone of new National Schools for the parish of St. Clement, Ordsall, was laid. The schools will cost 3,600*l.*, of which sum Lord Egerton, of Tatton, gives 2,500*l.* Mr. Lord, of Manchester, is the architect.

Wolverhampton. — On the 16th inst. the corner-stone of the Wolverhampton new Blue-coat School was laid by the Hon. Mrs. Maclagan. The new buildings, which will cost 3,500*l.*, were recently described in the *Builder* (see p. 340, *ante*). Mr. T. H. Fleeming, of Wolverhampton, is the architect, Mr. Lovatt being the builder.

Architecture in Modern Civilisation.—Among the lectures announced to be delivered during the approaching winter season at the London Institution is one on "The Prospects of Architecture in Modern Civilisation," by Mr. William Morris. The date fixed for this lecture is in March, 1881.

VARIORUM.

A REVISED edition of the "Ventilation of Dwelling-houses and the Utilisation of Waste Heat from Open Fire-places"; with a chapter on the "Country Parson's Grate," and other modern fire-places, by Frederick Edwards, junior, is about to be published by Messrs. Longmans, Green, & Co. —— "Picturesque Europe" is getting towards its end. It improves with age. No. 54, just now published, treats of Belgium, and contains a number of illustrations which may justly be called beautiful. The letterpress of the part, by Mr. Percy Fitzgerald, is bright and pleasant.——Mr. Wyld, geographer to the Queen, of Charing-cross, will shortly publish an elaborate map of the gold fields and gold reefs of Southern India.——The *Garden* treats of every branch of its subject in the most thorough manner, and is so planned as to be a cyclopædia of information on flower gardening, fruit culture, trees, shrubs, stove and greenhouse plants, indoor decoration with plants, room and window gardening, garden design, town and city gardens, and cultivation of all kinds, both for the supply of the private house and the markets with flowers, fruit, and vegetables. The coloured illustrations, of which one is given every week, and the many engravings, are beautiful and suggestive. This journal, with a view to make it more accessible to all classes interested in the subject of which it treats, is now reduced from sixpence to fourpence per week.——We have received the first number of Ward & Lock's "Universal Instructor, or Self-Culture for All." It is to be a complete encyclopædia of learning, meeting the requirements of students of all classes, and characterised by such features as will, the publishers believe, give it a superiority over every similar undertaking. It seems a little too much like in intention a similar work published by Cassell & Co., but there is room for both.——The current number of *The Quarterly* includes an exceedingly interesting article under the title "Art-Collections." It should be farther elaborated and printed separately.——The new series of "The Magazine of Art" is published in monthly parts, and is enlarged by the addition of eight pages to each monthly part, commencing with part 19, which forms the first part of volume III. of the work. With the additional space thus given, the editor has been able to add many fresh features of interest.

Miscellanea.

The North London Hospital for Consumption. — On Saturday last the Duke and Duchess of Connaught visited Hampstead, and took part in the ceremony of laying the foundation-stone of the middle block of the new hospital for consumption at Mount Vernon. The site is on nearly the highest part of Hampstead, and the style of architecture adopted for the buildings is that of the French Renaissance of the seventeenth century. In plan the hospital is a compact rectangular structure, about 163 ft. long by 55 ft. 6 in. deep, and is intended for 110 patients. The wards on the first floor will be for women, and those on the second floor for men. On each of these two floors a day-room 35 ft. long is provided, and on the sunny side of the building are open arcades. The building is being carried out in sections, and the carcass of the western section, which embraces more than one-third of the whole, is now completed, and progress is being made with the internal finishing. The architect is Mr. T. Roger Smith, and the builders are Messrs. Higgs & Hill, of Crown Works, Lambeth.

Society of House Decorators.—On Tuesday evening last the first annual tea, *soirée*, and ball were held in Cleveland Hall, Cleveland-street, under the auspices of the Amalgamated Society of House Decorators and Painters, to help in establishing the principle of a superannuation fund for aged and disabled workmen, painters and decorators. There was a large attendance. The chair was taken by Mr. G. Shipton, general secretary of the society, who, speaking (as a vice-president of the Trades Congress Parliamentary Committee of the United Kingdom) of the Employers' Liability Bill, said that he hoped the employers would meet them in a friendly spirit, and, by subscribing to a fund voluntarily provided to meet cases of accident, render, if possible, an appeal to the law unnecessary.

The Nottingham Corporation Sewage Farm.—On the 14th inst. a number of the members of Nottingham Town Council, with some of the chief officials, by invitation of the Sewage Farm Committee, paid a visit to the farm at Stoke Bardolph, on the banks of the Trent, between Carlton and Burton Joyce. In 1872, the Leen Valley District Sewerage Board was created under an Act of Parliament, and this body combined Nottingham with the upper districts of the Leen Valley for sewerage purposes, and gave power to execute whatever works were necessary for a united system to deal with the sewage. The first act of the Board was to complete the system of sewerage of the Leen Valley, which was done at a cost of about 50,000*l.*, the sewage being thereby intercepted throughout the whole of the valley of the Leen from the north end of Bulwell to the south end of Nottingham, and cast into the river along with that of Nottingham. The next operation was to deal with the sewage so collected, and, in 1875, Mr. Tarbotton, the engineer to the Board, made a report, in which he recommended that the whole of the sewage should be dealt with by irrigation. About this time the extension of the borough was determined upon, and in 1877 the functions of the Leen Sewerage Board were merged in the Nottingham Corporation, who undertook the completion of the works which had been designed and determined upon by their predecessors. These works consisted in the construction of a gravitation outfall sewer from Nottingham to the land selected by the late Board and approved of subsequently by the Town Council, at Stoke Bardolph. The works consist of an outfall sewer from Sneinton to Stoke. Into this outfall sewer the higher portions of the town deliver their sewage by gravitation, but the lower portions of the town will deliver their sewage into it by pumping, which will be carried out in the Eastcroft, dealing with the whole of the sewage brought down the Leen Valley from Bulwell and Nottingham. The sewage will, therefore, be brought partly by gravitation and partly by pumping into the main gravitation sewer, along which it will flow down to Stoke fields, the large outfall sewer having been constructed at a cost of 35,000*l.*, commencing at Sneinton, and passing through the Colwick hills by means of a tunnel, two miles long, at the eastern extremity, delivering its contents upon the land at Stoke. This land consists of 638 acres 22 perches of porous gravel soil. The cost of the works already executed has been 70,000*l.*, but a further expenditure of 30,000*l.* is contemplated. The whole of the sewage will not be dealt with for some time, as the disposal of manufacturers' refuse is causing much difficulty. The present contributing population is near upon 200,000.

Yorkshire Association of Medical Officers of Health.—The annual meeting of the above association was held at Sheffield on the 19th. There was in connexion with it an exhibition of sanitary appliances and other objects of special interest to members. Among them were models and drawings of the desiccator, concentrator, and carboniser, as used at Manchester and elsewhere. There was also a great variety of disinfectants, as manufactured by the Sanitas Company and others. Before the meeting the members visited the works of Messrs. Charles Cammell & Co., where they witnessed the rolling of an armour-plate; and the Union grinding-wheel. The general meeting of members was held in the Council Hall, and was presided over by Mr. S. W. North, of York. The annual report stated that the society now numbered sixty-seven members, and the committee earnestly desired that if possible the association should include the entire body of medical officers of health throughout the county. At the general meeting which was subsequently held, Dr. Hime read a paper on the recent outbreak of diarrhœa at Sheffield. Dr. Drew, of Chapeltown, read a paper on "Sanitation in Utopia," and Mr. Swann, the architect of the New Fever Hospital, explained the internal arrangements of that institution. The members dined together at the Wharncliffe Hotel.

Measures Bros. & Co. — Changes have been made in this firm (iron contractors and engineers) by mutual consent, and from the present date the business will be carried on in the London office, by R. J. & R. H. Measures, under the style of Measures Bros. & Co., as heretofore, and in the Manchester office by R. Swarbrick, as R. Swarbrick & Co.

Glasgow Sunday Society.—The meeting at Glasgow on the 25th inst. was large and enthusiastic, and the resolutions we have already printed were carried unanimously. Professor Tyndall, F.R.S., in the course of an elaborate and cogent presidential address, said: Sabbatical rigour has been tried, and the question is, have its results been so beneficent, so conducive to good morals and national happiness, as to render criminal our attempt to modify it? The advances made in all kinds of religious knowledge in this our day are enormous, and the public desire for instruction which the intellectual triumphs of the time inevitably arouses is commensurate with the growth of knowledge. Must this desire, I ask, which is the motive power of all healthy progress, be quenched or left unsatisfied, lest Sunday observances unknown to the Early Christians, repudiated by the heroes of the Reformation, and insisted upon for the first time during a period of national gloom and suffering in the seventeenth century, should be interfered with? Are we so much better than other nations, who have neglected to adopt our rules, that we can point to the working of these rules in the past as a conclusive reason for retaining them immovably in the future? The answer must be, no. My Sabbatarian friends, you have no ground to stand upon. I say friends, for I would far rather have you as friends than as enemies. You possess a strength and earnestness with which the world cannot dispense. But to be productive of anything permanently good that strength and earnestness must be built on the sure foundation of human nature. This is that law of the universe so often and so eloquently spoken of by your illustrious countryman, Mr. Carlyle, to quarrel with which is to provoke and precipitate ruin. Join with us, then, in our endeavours to turn our Sundays to better account. Back with your support the moderate and considerate demands of the Sunday Society, which scrupulously avoids interfering with the hours devoted by common consent to public worship. Open the museum, the picture-gallery, the library, the public garden as competitors to the public-houses. By so doing you will fall in with the spirit of your time, and row with instead of against the resistless current along which man is borne to his destiny. On the motion of Mr. Mark Judge, seconded by Professor Caird, a hearty vote of thanks was given to the Professor.——At a meeting of the London committee on Wednesday, a telegram was received from the Manchester Branch to the effect that it had been decided to again open the Royal Institution Exhibition on Sundays for a period of eight weeks, commencing November the 7th.

The Late Baron Visconti.—Baron Pietro Ercole Visconti, who died on the 11th inst., was for many years one of the most prominent fignres in the archæological world of Rome. He was great-nephew of the celebrated Ennio Quirino Visconti, and nephew of the architect of the same name. Among the more important discoveries made under Visconti's directions as Commissioner of Antiquities, the *Times* correspondent in Rome mentions the temple of Cybele and Atys and other valuable results of the extensive excavations at Ostia; the guard-house of the seventh cohort of the Vigiles, near the Basilica of Saint Chrysogono; that portion of the ancient quays on the banks of the Tiber where the marble was landed and many hundred blocks lie buried where they had been disembarked; some very important tombs and the long-lost Basilica of St. Stephen on the Latin Way; and the completion of the excavation and clearing of the Appian Way.

The Whitby Jet Trade.—The Whitby jet trade, which has been in a depressed state for so many years, is again looking up. According to *Capital and Labour*, when the bad times came the Whitby jet ornament trade was one of the first of the fancy industries to suffer, and the fashion or the taste for jet ornaments as articles of mourning changed. Jet, however, now appears to be coming into favour again, not only for mourning purposes, but for ordinary adornment. On inquiry it would appear that the increased demand is by no means confined to England, but extends over France and Germany. The chief exportations, however, are to America. A few years ago endeavours were made, by the distribution of prizes, for specimens of superior work to improve the artistic character of works in jet produced in Whitby. We are curious to know what effect, if any, the steps then taken had.

Foot-Bridges over Streets.—The Society for the Prevention of Street Accidents are pursuing very philanthropic ends, but we doubt whether they are very practical in their aims. They lately waited upon the Lord Mayor for the purpose of urging upon him the importance of placing bridges at points in different thoroughfares where the traffic is very dense. We think his Lordship took a very common-sense view of the matter placed before him, pointing out to the deputation that very few persons would take the trouble of mounting and descending twenty or thirty steps when they could walk across a street, even at some personal risk. The Lord Mayor might have drawn the attention of the society to the fact that such a foot-bridge was tried about ten years ago in the Broadway, New York, and had to be taken down again, for the simple reason that no one would use it. The society would greatly promote its humane intentions by looking more closely after the principal cause of street accidents, reckless driving. Drivers, as a rule, will not budge an inch from their route when a foot-passenger is in their way, even if they do not drive too fast. —*Iron.*

The Chamberlain Memorial.—A memorial erected by public subscription to commemorate the exceptional services rendered to Birmingham by Mr. Chamberlain, the President of the Board of Trade, during his connexion with the Town Council, was publicly unveiled and presented to the town on the 26th inst. The memorial, designed by Mr. J. H. Chamberlain, takes the form of a monumental fountain in the Gothic style, consisting of a square stone shaft, springing from a low flight of steps and terminating at a height of 65 ft. in a richly-carved and crocketted octagonal spire. Octagonal projections form the upper part of the shaft, carrying four smaller pillars surmounted by gabled arches, with pinnacles at the angles of the gables. The spaces between the main arches are filled with ornamental panelling, partly in carved stone, and partly in mosaics of various designs. A medallion portrait of Mr. Chamberlain, executed in Sicilian marble by Mr. Thomas Woolner, R.A., fills a large circular panel on the south side, and round the base of the main shaft are grouped three large semicircular basins, the lowermost of which is from 15 ft. to 16 ft. in diameter. The material of the memorial is white Portland stone, and the cost is a little over 2,000*l.*

A Trade Book.—Messrs. Walker & Son, house-furnishers, of Bunhill-row, have issued a very good one. It contains nineteen page-views of different rooms, fitted up with much congruity and taste in the prevalent style. The price of every article is given in each case, to the extent of nearly 1,000 items.

TENDERS

For the erection of Smack Boys' Home, Royal Harbour, Ramsgate. Mr. Alfred R. Pite, architect. Quantities by Mr. Joseph Rookwood:—

Newby	£2,777 0 0
Paramor	2,320 0 0
Mitchell	2,300 0 0
Hooper	2,280 0 0
Evans	2,165 0 0
Nicholls	2,139 0 0
Shrubsole	1,948 0 0
Dennel	1,940 0 0
Martin	1,880 0 0

For various alterations at the Tally Ho public-house, No. 6, Willow-walk, Fortess-road, Kentish-town, for Messrs. Watney & Co. Mr. James Robert Furniss, architect:—

Hockley	£2,335 0 0
Whitelaw	2,045 0 0
Dixon	1,883 0 0
Lamble	1,867 0 0
Durnford	1,800 0 0
Taylor	1,777 0 0
White	1,754 0 0
Axley (accepted)	1,650 0 0

For the erection of new schools, at Farrance-street, Tower Hamlets Division, for the School Board for London. Mr. E. R. Robson, architect. Quantities by Messrs. Northcroft, Son, & Neighbour:—

F. & F. J. Wood	£10,860 0 0
Higgs & Hill	9,088 0 0
Shepherd	9,045 0 0
Harris & Wardrop	8,995 0 0
Boyce	8,989 0 0
Jerrard	8,827 0 0
Atherton & Latta	8,800 0 0
Cox	8,758 0 0
Kirk & Randall	8,749 0 0
Hook & Oldrey	8,534 0 0

For new guest-house and completion of the cloister of St. Mary's Priory, Torquay, for the Nuns of the Third Order of St. Dominic. Messrs. J. A. Hansom & Son, architects:—

	1st Section	2nd Section.	3rd Section.
W. & J. Eddles	£503 5 0*	£590 10 0	£620 10 6

* Accepted for First Section.

For the erection of a warehouse in St. Thomas-street, Borough, for Messrs. G. R. Herron & Son. Mr. William Wimble, architect:—

Falkner	£6,835 0 0
Brass	6,463 0 0
Scrivenor	6,345 0 0
Laurence	6,181 0 0
Ashby & Horner	6,172 0 0
Crosker	6,042 0 0
Mortar	5,943 0 0

For reinstating Fairlawn, St. Leonard's-on-Sea, for Mr. W. M. Berkley. Messrs. Fowler & Hill, architects. Quantities by Messrs. Fowler & Hugman:—

White, St. Leonard's	£1,443 15 8
Rodda, St. Leonard's	1,400 0 0
F. Crattenden, St. Leonard's	1,290 0 0
Eldridge & Crattenden, St. Leonard's (accepted)	1,130 0 0

For repairs to the interior of St. Stephen's Church, Walbrook. Mr. Thomas Milbourn, architect:—

Dove, Bros.	£745 0 0
Sabey & Sons	723 0 0
Mansfield & Son	540 0 0
Macey & Son	536 0 0
Crabb	499 0 0
Conder	449 0 0
Colls & Son	410 0 0
Repairs to Gas-fittings.	
Richards	£71 10 0
Vaughan & Brown	59 0 0

For the erection of new schools, at Sidney-road, Hackney-wick, for the School Board for London. Mr. E. R. Robson, architect. Quantities supplied by Mr. T. Thornton Green:—

Staines & Son	£18,273 0 0
Wood, Bros.	17,912 0 0
Booth & Sons	16,414 0 0
Brass	16,257 0 0
Higgs & Hill	16,208 0 0
Braid & Co.	15,894 0 0
Hook & Oldrey	15,619 0 0
Kirk & Randall	14,940 0 0
Nightingale	14,882 0 0
Pritchard	14,726 0 0
Grover	14,433 0 0
Cox	14,430 0 0
Boyce	14,463 0 0

For the erection of seven shops in the Albany-road, five stables in Albany-mews, and building five shops on Forecourts in Camberwell-road, for Mr. A. Stedall. Mr. George Edwards, architect. Quantities supplied by Mr. Henry Lovegrove:—

		Allow for Old Materials.
Ashby, Bros.	£11,193 0 0	£30
Woodward	10,767 0 0	15
Colls & Sons	10,760 0 0	100
Nightingale	9,783 0 0	200
Downs & Co.	9,655 0 0	56
Mortar	9,608 0 0	125
Hobson	9,573 0 0	30
Scrivener & Co.	9,372 0 0	50
Lidstone & Son	9,365 0 0	50
Thompson	9,333 0 0	80
Tarrant & Sons	9,180 0 0	100
Stimpson & Co.	8,877 0 0	90
Goad	8,790 0 0	50
Cullum	8,599 0 0	60
Martin, Wells, & Co.	8,430 2 0	81
Green (accepted)	7,946 0 0	186

For alterations to Nos. 21 and 23, Newington-causeway. Mr. George Edwards, architect:—

Martin, Wells, & Co.	£435 0 0
Laidlor	419 0 0
Richardson	350 0 0
Stimpson & Co. (accepted)	321 0 0

For offices and residential chambers, Westminster, for Messrs. R. C. & J. B. Nichols. Mr. W. L. Baker, architect. Quantities supplied by Mr. T. Nixon:—

Hatton & Co.	£17,900 0 0
Foxley	17,900 0 0
Ashby, Bros.	16,940 0 0
Higgs & Hill	16,690 0 0
Conder	16,100 0 0
Chappell	15,886 0 0
Macey & Sons	15,799 0 0
Morter	15,743 0 0
McManne	15,700 0 0
Fish	15,520 0 0
Kirk & Randall	15,240 0 0

For shop and dwelling-house, for Mr. C. Hardiman, Southampton. Mr. Arthur Martin, architect. Quantities by the architect:—

Sanders	£525 0 0
Laver	459 0 0
Rowland (accepted)	420 0 0

For erection of villa residence and stabling, &c., at Steeple Claydon, Bucks, for Mr. John Cross. Mr. F. H. Barfield, architect:—

Franklin, Deddington	£1,188 0 0
Marshall & Boyce, Buckingham	1,029 0 0
Cooper, Aylesbury (accepted)	806 10 0

For the erection of four shops at Loughborough Junction. Mr. A. Large, architect:—

Head	£1,730 0 0
Scutt	1,680 0 0
Woodhouse	1,675 4 0
Hobern	1,595 0 0
Pictor	1,599 0 0
Baxter (accepted)	1,554 0 0

For drainage works to eleven houses, Union-road, Clapham-road. Mr. K. D. Young, surveyor:—

R. & E. Smith	£335 0 0
Catchpole	324 0 0

For addition to workhouse, for Kensington Board of Guardians:—

Johnson	£175 0 0
Lorden	168 10 0
Tye & Bartlett	168 10 0
Maton	139 0 0
Angood	133 0 0
Mille	105 0 0

For pulling down and rebuilding No. 1, Queen-street, Spitalfields, for Mr. Edward Tilney. Mr. Edward Brown, architect:—

Hawkins	£375 0 0
Skipper	333 0 0
Belcher & Ullmer (accepted)	284 0 0

For alterations at the Prince Albert, Maps-street, Bethnal-green, for Mr. R. Hillier. Mr. Edward Brown, architect:—

Salt	£1,145 0 0
Marr	1,113 0 0
Skipper (accepted)	1,015 0 0
Gasfitters' Work.	
Steadman	£125 0 0

For alterations to the Hampshire Hog, Berwick-street, Soho, for Mr. Stanton. Mr. Edward Brown, architect:—

Gritton	£855 0 0
Marr	777 0 0
Wood	692 0 0
Jenkins, Reading (accepted)	482 0 0
Pewterers' Work.	
Davis	£96 0 0
Phillips	86 6 0
Rogers (accepted)	74 15 0
Gasfitters' Work.	
Winn	£155 0 0
Christian	97 0 0
Steadman (accepted)	78 0 0

Richmond Vestry.—The Tender of Messrs. E. Downe, Kennedy, & Company, contractors and lightermen, &c., of 70, New Corn Exchange, Mark-lane, was accepted for Kent Flints.

TO CORRESPONDENTS.

H. J. & Co. (we cannot usefully reply on *ex parte* statements. Still, as the matter is stated in letter, carving is not included in the contract)—Llandudno (several letters on the subject of our statement should have consideration).—Beta (to take the overflow pipe from the soft-water tank into the fresh-water well is decidedly objectionable and the arrangement should be altered).—J. F. (the elevation should follow the plan, not the plan the elevation. "Commodity" comes before "Delight").—W. N. (simply because it was not in the list sent to us).—H. C. S. (send address).—O. H. L.—G. B. T. & Co.—H & J.—S. H.—J. M. Y.—U. & G.—F. & D.—H. S.—T. T. M.—E. G.—T. T. G W. G. S.—F. E.—T. M.—G. P.—A. G.—M. S. & M.—C. R.—G. C.—A. S.—E. A. H.—S. H.—W. C. T.—M. D.—J. R. F.—A. M.—J. T. C. H. S. G.—T. R.—J. B.—J. A. H. & Son.—S.—J. S. H.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

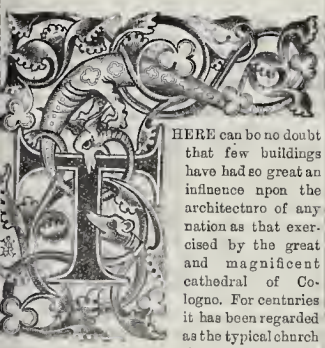
The Builder.

Vol. XXXIX. No. 1979. Saturday, November 6, 1880.

ILLUSTRATIONS.

CONTENTS.

Cologne Cathedral, and its Influence upon German Architecture.



HERE can be no doubt that few buildings have had so great an influence upon the architecture of any nation as that exercised by the great and magnificent cathedral of Cologne. For centuries it has been regarded as the typical church of the German people, and the masterpiece of German architecture. The belief that Cologne Cathedral is the most perfect realisation of the Gothic style is so deeply implanted in the German mind that nothing will ever eradicate it. That a people should feel something akin to veneration for their greatest sacred structure is a sentiment worthy of the greatest respect, and we sincerely trust that we shall in no way wound the susceptibilities of our German readers when we point out certain facts which lead us to believe that the influence exercised upon German architecture by this vast and noble church has not been altogether a healthy one; and even if we suggest that before the erection of the choir of Cologne German architecture had given promise of developing into a nobler and more dignified style than it did after the achievement of that great work.

Perhaps it may be advanced that we are indulging in "insular prejudices," and that we judge Cologne Cathedral too much from an English standpoint; that our minds and tastes are too much influenced by the study of English churches and cathedrals; and that we do not take sufficient allowance for Continental architectural peculiarities.

Now we do not pretend, for a moment, that we are not influenced by a love for the noble examples of Gothic architecture bequeathed to us by our own English forefathers; on the contrary, we say boldly we firmly believe that the Continent can show no greater glories than the stately minsters of our native land. Lincoln, Canterbury, Ely, Westminster, and Durham will, we think, compare favourably with five great cathedrals taken from any country on the Continent. But in order that we may not be led astray by our preference for English Gothic, we shall not compare Cologne Cathedral with any English church, but shall make use of French and German churches where we find comparison necessary. The history of the cathedral of Cologne has been previously related in this journal, but for fear that the dates of its various parts may have escaped the recollection of our readers, we repeat them.

The foundation-stone for the choir was laid in the year 1248, but the choir was not completed until 1322. The nave was commenced about the latter period, and the greater portion of the aisles, together with the south-west tower, was probably erected between 1322 and 1400; for although the works were not entirely given up until 1499, yet the only portions which showed the peculiarities of the German Gothic of the fifteenth century were the buttresses between the north tower and north aisle, which have been now removed or altered.

The name Gerhard von Rile has been given as that of the probable or possible architect. Unfortunately, however, nothing is known about Gerhard von Rile; nor have we anything to guide us as to how far his work extended. An architect called Meister Johann is stated by Kügler to have commenced the nave.

Now the first thing which strikes us in studying Cologne Cathedral is the undoubted fact that the plan of the choir is a direct copy of that of the cathedral of Amiens; both consist of a nave with double aisles of five bays, closed by an apse of seven bays, with a chevet and seven radiating chapels, each forming an apse of five sides. The vaulting is identical in arrangement, and the only differences perceptible in the two plans are (1) that at Amiens the lady-chapel is prolonged one bay [it is by no means improbable that this was a subsequent alteration], and (2) the most western bays of the apse at Cologne are slightly wider in proportion than those at Amiens. Now, as the choir of Amiens was commenced before the year 1240, and Cologne not until eight years after that date, it is evident that Amiens was the original, and Cologne the copy. In 1258 a fire consumed the wooden roofs of the apsidal chapels at Amiens, and Viollet-le-Duc says that the triforium was commenced in 1258, the clerestory windows glazed in 1269, and the vaulting completed in 1288; that is, thirty-four years before the completion of the choir of Cologne. German writers tell us that although Cologne is later in date than Amiens, it is a higher development of Gothic than the French cathedral. In this, however, we must beg leave to differ from them. We do not regard the cathedral of Cologne as an improvement upon Amiens, and cannot help thinking that the attempt which was evidently made by the German builders to out-do the French cathedral resulted in a comparative failure. The extra height at Cologne, the increased stilting of the arches, and the lengthening the clearstory windows, are defects,* and the excessive richness and complication of the external buttresses rob the design of quietness and dignity. The apse at Amiens just misses looking wiry inside and confused externally, but the builders of Cologne fell into both faults. The English builders at Westminster saw the danger, and most carefully avoided it, for while making use of a French plan, like the Cologne builders, they did away with the stilting of the arches, simplified the buttresses, and decreased the proportionate height.

The apse at Amiens is such a splendid composition, and so thoroughly satisfactory in general effect, that it is ungracious to criticise it. However, if it possesses any defects, they are the stilting of the arches internally, and the breaking through the external cornices by the triangular canopies of the clearstory windows. Both features, however, are managed with skill and delicacy. But at Cologne both of these defects are so exaggerated as to become absolute faults in the design. Nor is the reduction of the triforium at Cologne any improvement upon Amiens; and we must say that we prefer the simple treatment of the piers at Amiens to the reedy appearance of those at Cologne, and although the statues, with their rich canopies and pedestals attached to the vaulting-shafts at Cologne, are beautiful features when taken alone, it may be doubted whether they do not disturb the harmony of the general design.

If the choir, which is by far the best portion of Cologne, falls short in beauty of its great French prototype, the nave bears no comparison with the corresponding portion of the French church; and the addition of a bay to the length of each transept is certainly no improvement; in fact, it is another of those exaggerations which injured the design of the great cathedral, and, throughout, German architecture in general. We fear it is impossible to avoid the conclusion that the wiry, drawn-out effect which became so marked a characteristic of German Gothic during the fourteenth century, was the result of the influence of Cologne Cathedral, and we have shown that that defect came about by exaggerating the peculiarities of the French architecture of the thirteenth century. We are led to this belief also by the fact that the Gothic churches in Germany which were erected before the choir of Cologne are entirely devoid of this defect, and that we shall find nothing to prepare the way for such a development either in the old Romanesque churches, in the Transitional churches, or in those few which show the more perfected Gothic. For instance, nothing of the kind is to be observed in such churches as Worms, Spiers, Mainz, or in the Transitional churches of Andernach, Bamberg,† Werden, Limberg,† Bonn, &c.; whereas the fully-developed Gothic churches are entirely devoid of this defect, and seem to give promise of a style singularly free from exaggeration or wiryness.

For instance, the splendid nave of the cathedral of Paderborn is singularly free from any kind of reediness. So also is the cathedral at Marberg, 1235-1283. In both of these cases the nave and aisles are of the same height; but the observation holds good of churches possessing clearstories; for instance, the exquisite Liebfrauenkirch at Trèves, 1227-1243, which is, to our mind, the most beautiful example of Gothic architecture in the whole of Germany, and a building which shows that Gothic architecture in Germany was in a much better road to produce a really grand and impressive style than it was able to effect after the work at Cologne had influenced its development and character. The choir and south transept of the cathedral at Wetzlar,‡ which were undoubtedly erected before the

* The treatment of the stained glass in the apse at Cologne shows that this defect was felt at the time, and the strong architectural lines introduced into the glass at about one-third the height of the windows was a clever attempt to remedy the evil.

* Illustrated in the *Builder* for 1879 (vol. xxxvii.), p. 179.

† Ibid., vol. xxxi. (1873), p. 287; vol. xxxv. (1877), p. 1225; and vol. xxxvii. (1879), p. 916.

‡ Ibid., vol. xxxi. (1873), p. 46; vol. xxxii. (1874), p. 969.

choir of Cologne, may be compared with the nave and north transept of the same church,—the latter, commenced in 1336, showing in a marked manner the influence of the work at Cologne,—in order to judge whether German Gothic had profited by the example of Cologne. The clearstory of the Abbey of Ecternach; the Dominican church at Coblentz, 1235-1239; the Cistercian churches at Marienstadt and Gnidenthal (1245); the western choir of the cathedral of Naumberg; the cloisters of the cathedral at Erfurth,—all serve to show the freedom of early German Gothic from wiryness and exaggeration.

The first church in which we trace distinctly the Cologne influence is the abbey church of Altenberg, commenced in 1255. There is a tradition that this beautiful building is a work of the same architect as the cathedral, and there is much to favour the supposition. The two buildings were evidently being carried out at the same time, and as they are only fifteen miles apart the greater church undoubtedly exercised much influence upon the design of the smaller though not less beautiful one. But the great influence of Cologne Cathedral upon German church architecture was not felt until after the first quarter of the fourteenth century, when we find its very marked peculiarities, both as to proportion and detail, copied over and over again, and imitated more or less exactly in a host of churches.

We have already alluded to the north transept of the church at Wetzlar, which is almost a reproduction of a part of the nave of Cologne. The nave of the church of St. Catherine, at Oppenheim on the Rhine, is a very remarkable example of the Cologne influence. Here we find the excessive complication of buttresses, the stilted arches, the lofty pierced angular canopies, or gables, over the windows, and all the peculiarities of the tracery of Cologne Cathedral almost exactly reproduced, and, as is generally the case, exaggerated in the copying. We also find here the large and somewhat clumsy finials, which are such marked features of the later portions of Cologne Cathedral.

The choir of the cathedral of Aix-la-Chapelle (1353) is another building which shows strong indications of the influence of Cologne, though chiefly as regards matters of detail.*

The chapel of St. Werner, at Bacharach, is so similar in much of its detail and treatment to the clearstory of Cologne that it is in all probability the work of the same architect. This beautiful chapel is said by Kügler to have been completed in 1293! and if this date is correct,—a matter which we feel some doubt about,—this chapel must have been in course of construction at the same time that the choir of Cologne was being erected, though finished twenty-nine years before it.

Amongst many other buildings of the fourteenth century which exhibit strongly the influence of Cologne, we will mention the cross at Goddesberg (1333); the Liebfrauenkirch, Oberwesel; the nave of the church at Xanten; the nave and choir clearstory at Magdeburg (c.1300); the exterior of the nave (south side) of the cathedral of Vienna (1359), St. Maria Stiegen, Vienna; and the two great Bohemian copies of Cologne,—the cathedral of Prague and the church of St. Barbara, Küttenberg. The resemblance of the two last-named churches to their great prototype is very remarkable. The cathedral of Prague, like that of Cologne, was left unfinished by its Mediæval builders, the choir alone being complete. Like Cologne also, the transepts were partly constructed, and one great tower, which is said formerly to have been covered with a spire of great height [as this spire was burnt down in 1541 it was probably of wood]. The cathedral of Prague was commenced in the year 1344, and consists of a noble choir, 157 ft. long, 144 ft. broad, and 116 ft. high to the crown of the vaulting. The plan of the choir is almost identical with Cologne. There are four bays in the length, closed by an apse of seven bays, with an aisle surrounding it, and seven radiating chapels. The only variations from the Cologne plan are that the two most western sides of the apse are nearly, if not quite, in a line with the side walls,—that is to say, they do not in plan form sides of the apse, but an extra bay of the nave portion; and the outer side aisles are sub-divided into chapels. The lower portion of the choir, as high as the great pier arches, is fair fourteenth-century work, though the columns are singularly reedy and the mouldings wiry; the window tracery is decidedly good. This portion of the building was erected from the designs of an architect called Matthias of Arras. The upper portion of the structure is the work of another architect, Peter Arler, of Gmünd, the supposed architect of the cathedral of Milan. The choir clearstory was completed, together with the vaulting, in 1386, and the tower in 1392. The walls of the transept, as far as they go, are probably of the same date. A singular feature in the church deserves notice: it is a chapel which forms the lower part of the south transept, so that had the transept ever been completed it would have been divided into two stories. This remarkable chapel is dedicated to St. Wenzel, king of Bohemia, and was completed in 1347, probably on the site of an older chapel, which will account for its somewhat singular position; it is rich fourteenth-century work, and the external walls are adorned with *pictures in mosaic*,—the only example, so far as we know, north of the Alps. The interior is adorned with ancient frescos, which are divided from each other by wide bands composed of coloured crystals.

The general appearance of the cathedral at Prague from the east reminds one singularly of Cologne (before its completion). There is the same treatment of the flying buttresses, doubled each way, giving the whole a wonderful effect of intricacy and richness; but, as is also the case at Cologne, at the expense of simplicity and dignity. Like Cologne, after having been left unfinished for many centuries, the cathedral at Prague is being completed by the addition of a nave and the completion of the transepts.

The other great Bohemian church which bears such a strong resemblance to Cologne is that of St. Barbara, at Küttenberg. Of this stately building the choir alone has been erected. In plan it is almost identical with Prague; but, if we recollect rightly, is a bay longer. Kügler, in his "Kunst Geschichte," says that the church of St. Barbara was commenced in 1380, but that the works were several times suspended. After remaining a long time *in statu quo* the building was taken in hand by an architect called "Meister Johann" (not the same Meister Johann who designed the nave for Cologne) in the year 1483, and the choir was vaulted in under the direction of Matthias Raisek in the year 1499. The tracery of the windows of the clearstory, and the flying buttresses, were, according to Kügler, not completed until 1510, under an architect called Meister Benesche von Laun. The works were carried on until the year 1541, when they were finally abandoned. Allowing for difference of date and certain eccentricities of detail, this church bears a wonderful resemblance to Cologne. Here, as at Cologne, we find the complicated arrangement of flying-buttresses, the glazed triforium (a very uncommon feature in Germany), immense loftiness, and, in fact, the great cathedral with all its defects exaggerated. The general view of Küttenberg, as seen from the river, cannot fail to remind one of Cologne half a century back. The great apse of the stately church of St. Barbara is seen towering over everything else, surrounded by the steeples of the smaller churches.

We have now described a few of the churches in Germany which strike us as showing, in a remarkable way, the influence of Cologne Cathedral, and we have pointed out what seem to us to be their defects; it must not, however, be supposed that we wish to close our eyes to the great merit of most of these buildings and of their great prototype. The richness, boldness of construction, and monumental character of these churches, the magnificent scale upon which they are carried out, the vast amount of labour expended upon every part of them, deserve the highest praise. They are, of course, vastly superior to anything we can do now, or shall probably ever see done again, in the way of church architecture, and in criticising them we are only doing so relatively; we wish it to be understood that what we point out as defects are merely so as compared with other buildings of their class and date. We will now speak about churches erected in Germany after the commencement of Cologne Cathedral, which do *not* seem to us to have been influenced directly by the erection of that great building.

The first work which attracts our notice is the nave of the cathedral of Freiburg, in Breisgau, inscribed with the date 1270. [Whether the vaulting is of the same date may be doubted.] The character of this part of Freiburg Cathedral is totally unlike Cologne. The proportions are far more quiet, and the relative height not greater than an English cathedral. The flying buttresses are single and free from complication. There is no triforium, but in its place a plain blank wall. The same treatment occurs in St. Lawrence, at Nuremberg, the nave of which church greatly resembles Freiburg. Freiburg is the only Gothic cathedral which the German Mediæval builders left complete, and it possesses what the Germans always seem to have longed so much to see,—three open-work spires; one at the west end, and the other two flanking the choir. That at the west end is by far the most beautiful spire we have seen in Germany.* Its general outline is singularly graceful and pleasing, and although very rich and sumptuous, the detail is so delicate as not to interfere with the general design. The huge finials and crockets which disfigure so many of the German spires,—those, for instance, of the cathedral at Meissen and the Pfarrkirche at Rothenburg, are avoided, and the pinnacles and buttresses are less confused and complicated than usual. The two other spires are far less satisfactory, but as they are quite subservient to the large one, their defects pass unnoticed.

The nave of the cathedral of Strasburg is so thoroughly French in treatment that it is difficult to believe it to be the work of a German architect, and the far-famed west front is one of those architectural tricks which teach nothing and lead to nothing. It may be classed amongst those works which are very wonderful until one knows how they are done; but directly it is found out that all these thin bars of stone are tied together with metal rods, the wonder ceases, and there is not sufficient dignity about the design to impress the beholder with any higher feeling than wonder. Nothing could possibly be less suited to the solemn grandeur of the interior of this great cathedral than the tiny and cut-up west front.

The cathedral at Metz is also purely French. But the church of St. Thomas at Strasburg is a charming example of Early German work, as is also the church of Hagenau. The church of Thann, in Alsace, is also purely German in design; it possesses a rather graceful spire, dated 1455.

Another group of churches which show little or no direct influence of the Cologne works are the Early Decorated churches in the neighbourhood of Dresden. The church of Haina is a beautiful example,—simple, graceful, and dignified,—but yet quite free from either heaviness or reediness.

The Westphalian churches, also, seem as a rule to have been little affected by the work at Cologne, if we except the Weisekirche at Zoest, which does certainly exhibit Cologne influences, especially about its west front. The spires have recently been added, we believe, upon the authority of an ancient design. We cannot admire this front; it seems to overpower the church, and is, moreover, hard and unpicturesque. The other churches of Zoest are remarkably interesting, as exhibiting good types of simple Geometrical Decorated work. The cathedral at Minden, a noble building, with three aisles of equal height, fine solid piers, and noble Decorated windows, of a type peculiar to Westphalia, is an excellent example of the early treatment of a "Hall-church," and is very local in character. It is evidently a later and more fully developed edition of the nave of Paderborn. It was in its turn taken as the model for many of the Westphalian churches.

The hall-churches ("*Hallenkirchen*") of Bavaria and Swabia do not exhibit the influence of Cologne, as far as their general plan and arrangements go; though in the tracery of their windows, doorways, &c., we can often discover traces of the Cologne style. There were evidently three schools, if not four, at work in Germany during the fourteenth century. There was, first of all, the Cologne school; secondly, the Westphalian school; thirdly, the Nuremberg school (which, however, only became influential towards the end of the century); and, last of all, the old Romanesque school, which lingered on in out-of-the-way places, especially in Austria and Hungary. We find Romanesque churches in these districts dating from quite the close of the fourteenth century; and even in the north, the style and peculiarities of Romanesque architecture are occasionally to be met with. The curious Pilgrimage Church at Ecternach is an example. Now it is difficult to point out what influences were at work in any building without

* See engraving in the *Builder*, vol. xxx. (1872), p. 867.

* See engraving in the *Builder*, vol. xxviii. (1870), p. 647.

careful examination, as it frequently happens that features of each school may be discovered in the same building; but we think the hall-churches of Southern Germany may be traced to a school which had its rise either in Nuremberg or in the neighbourhood. The finest examples are the choirs of St. Lawrence's and St. Sebald's, the nave of St. Mary's in Nuremberg, the three churches at Amberg; St. Martin's, Landshut; the great church at Ingoldstadt, the cathedral at Munich; St. Mary's at Würzburg, St. George's at Freising, Holy Cross at Gmünd, the two churches at Nördlingen, Ochsenfurth, St. Mary's at Etzlingen, Iphoven,* Kitzingen, and St. Stephen's, Vienna.†

The great minster at Ulm shows little Cologne influence except as to the details of some of the windows; its plan is purely German, and although nearly 400 ft. long, with a nave of 47 ft. span and 133 ft. high to the crown of the vault, its plan is remarkably simple, consisting only of a nave and aisles, with a single choir and a western tower. The aisles of the nave are double. The interior, though immensely lofty, looks bald and bare, from the entire absence of strings, and the great unbroken wall between the pier arches and the clearstory windows. This bald, ugly space is a great defect in many of the German churches, and certainly the Cologne architects deserve credit for getting rid of it.

We must now speak of a church which strikes us as uniting in a singular way the best features of the Cologne school, with elements of design purely German in origin. It is the beautiful cathedral of Ratisbon;‡ though less important as regards dimensions than Cologne, Ulm, or Strasburg, it seems, to our mind, to be a more perfect design. It consists of a nave and aisles, with shallow transepts, which do not break through the line formed by the aisle walls. There is a choir with aisles, terminating in three apses, the centre one divided into two tiers of windows, after the plan of Marburg and the Liebfrauenkirche at Trèves. The west front is the most striking in Germany, and the spires, which have been recently completed, seem to us to be rather better in proportion than those of Cologne. The height to the vaulting is 120 ft., but as the bays of the nave are very wide, and the span of the nave 50 ft., the whole looks good in proportion. The defect of elongating the clearstory windows, which is the fault of Cologne, is carefully avoided, and the great defect of Ulm, the bare wall above the pier-arches, here gives place to a triforium arcade. The window-traceries are well designed, and the mouldings and piers are free from wiryness. The great apse is a particularly beautiful composition; the triforium gallery is carried round it, supported upon arches, the spandrels of which are pierced, so that it forms a kind of double tracery arrangement. The arches are mostly equilateral, and there is throughout the building an entire absence of that stilting, which is to our minds one of the defects of German architecture. The whole design of this church bespeaks a master-mind,—unfortunately the name of its architect is unknown. Some people suppose that this noble church was designed by Albertus Magnus, who was bishop of Ratisbon when it was commenced in 1275. Whoever he was, we believe him to have been a greater genius than any of the architects employed at Cologne. The proportions of Ratisbon are far more pleasing than those of Cologne; it is elegant without that look of attenuation which is, to our minds, a defect in the larger cathedral, and, externally, it is rich without confusion. The buttresses are simpler and are better arranged than those at Cologne, and the west front is a far more powerful and infinitely more picturesque composition. In fact, out of France, we have seen no west front equal to it. The triangular porch is a remarkably splendid piece of design, and there is just variety enough about the details of the two towers to make them interesting. The kind of terrace or basement which surrounds this church is also a very fine feature, and we cannot help regretting that the modern builders of Cologne did not treat their terrace in a somewhat similar way. Altogether, we must say that we are of opinion that it is Ratisbon cathedral, rather than Cologne, which deserves to be considered the masterpiece of German architecture, and it seems singular that it should not have exercised greater influence upon German architecture. It is true we have the noble churches of the Minorites and Dominicans in the same town, which may be considered as belonging to the same school, and perhaps also the west front of St. George's, at Ansbach, and the churches at Nahburg, Sobenburg, Haahach, Sulzbach, and Abensberg seem to exhibit traces of the same style.*

We cannot help regretting that Ratisbon did not become the model for German builders to follow, because, as we have pointed out, it is really a far more national building in point of style, inasmuch as it retains nearly all the peculiar features of purely German Gothic, and avoids those exaggerations of the features peculiar to French churches which we cannot help regarding as the defects of Cologne. We must repeat that we do not wish it to be understood that we are finding fault with the great German cathedral, or with German architecture generally: on the contrary, we consider that the defects of Cologne arose from the architects copying and adopting French features instead of developing the Gothic which was already introduced into Germany into a purely national style. It may be said that, after all, the Cologne architects merely did what the architects at Trèves and Marburg had done, *i.e.*, they copied French works of their time. That may be true, but the earlier German architects, when they copied French works, never exaggerated them; on the contrary, they instilled into them a certain element of solidity, which was derived from their own Romanesque. This is distinctly noticeable at Paderhorn, Marburg, and the Liebfrauenkirche at Trèves, and we cannot help regretting that the Cologne architects ignored all that had been done up to their time, and went to France for inspiration, instead of continuing what, if fully developed, would have become a purely national and most magnificent style of Gothic architecture,—a style which, if we judge from the examples of its earliest efforts, would have been far more characteristic of German thought and German feeling than that introduced by the Cologne builders,—a more solid, severe, and dignified style,—a style exhibiting rather the breadth and sobriety of design than its intricacy and elaboration. If Marburg, Paderhorn, Trèves, and Ratishon had been taken as models, we should have found the German Gothic far more in accord with the German character than it became after the Galicisms introduced into it by the Cologne builders.

THE INSTITUTE AND PRACTICAL ARCHITECTURE.

We have much pleasure in noticing, and giving our cordial support to, the sensible and practical remarks on the present position and practice of architecture embodied in the opening address of the President of the Institute of Architects on Monday evening, and the pith of which will be found in another portion of our columns. It is to be hoped that the decisive tone taken by Mr. Whichcord in favour of the practical side of the profession of architecture is one among other indications of a reaction from the purely *dilettante* view of the profession which has been far too much emphasised by some of our most successful and popular architects of late, and which has done a great deal to create that distrust of the profession on the part of a considerable portion of the public, the existence of which we cannot ignore, however we may regret it, and however we may regard it as to a considerable extent prejudiced and exaggerated. That it is so we believe to be the case to a great extent. We believe there are really as many architects now as there have been in other apparently more practical days, who are fully qualified in the practical side of their profession. But it must be remembered that outsiders naturally judge of a profession by the character and utterances of that portion of its practitioners who are most prominent and irrepressible in public speech and action. Considering how very dull and prosaic the architectural taste of the country was in an earlier part of the century, it was both natural and desirable that there should be a reaction in favour of developing the artistic side of architecture. Reactions, however, are nearly always one-sided; and the art reaction has developed a small school of architects who have distinguished themselves more or less as draughtsmen and ornamentists, but have almost ostentatiously ignored and under-rated the practical side of the profession, and have in some cases even openly and in so many words expressed their indifference to it. They have reduced architecture to a mere indulgence in æsthetic sentiment, displayed in the adoption of special favoured forms of decorative building, followed out without very much regard to logic or principle even as far as design is concerned, and in the pursuit of which the practical suitability of buildings for their purposes, and the provision for the best schemes of ventilation, drainage, and other matters of sanitation or of convenience, of the first importance, have been very much left to take care of themselves. The novelty of a reaction always insures a considerable following, and the art-architects have for some time been exceedingly popular with the more cultured of the public. But sentimental fashions in building are never of very permanent interest, and already it must be evident to those who listen to conversation on the subject of architecture in general society, that the art-architect is becoming an object of distrust, and sometimes, as we can testify from observation, almost of derision. The President of the Institute has acted in every sense wisely in taking the opportunity of the opening address to prominently connect the aims of the Institute with the promotion of practical architecture.

The difficulty of uniting the two sides of architecture in the same person, of "combining the graphic with the scientific departments of the art," referred to in the President's quotation from Cockerell's address in former years, is, perhaps, over-rated. There have been tolerably numerous examples of the successful combination of the two elements, and the French architects are unquestionably able to furnish a higher average of men of this all-round training than we can show. The deficiency arises in great measure from the want of properly-directed study in this country, and from the want of judgment as to the objects of their profession which induces so many architects to take a one-sided view of what is required of them, and either to devote themselves to practical considerations and regard the picturesque as a mere gew-gaw, or to devote themselves to making picturesque buildings, and treat sanitation and construction as prosaic matters beneath their notice. There is, we honestly think, very little systematic effort to combine the two classes of study, and we really hardly know how much may be done by well-directed efforts to attain the intellectual equipment which should belong to a complete architect. As we have before pointed out, a very disproportionate amount of time is spent, by those students who are really most in earnest and wish to work, in the sketching of the details of ancient buildings. This is a most valuable and most fascinating phase of architectural education in its right place, but an over-indulgence in it to the exclusion of more practical studies leads to producing a class of architects who are exceedingly competent to produce beautiful drawings of new buildings which look like old ones, and to give detail drawings for their erection in accordance with the most admired models,—perhaps with some touches of modern or original detail founded on the old, but who are very inadequately trained in providing for the practical works of their own time. The pride of the young architect is to bring home his sketch-book full of charming sketches (and the average of "sketching-power" is probably higher now than ever it was) representing the prettiest bits of grouping and of detail which he has seen in his tours in search of the picturesque. If he would show equal interest in observing and making notes of what is wanted, or what is being introduced, in the way of practical improvements in modern buildings, in construction, in the use of new materials, in sanitary provisions and planning, well and good; the two classes of study would then fall into their right places. But the latter is mostly left to take care of itself. Draughtsmanship and sketching are the fashion, and carry the day; and as very few young men have independence enough to think for themselves and take a course of their own, the hard workers,—those who mean to get on,—throw their work into the accepted groove. The consequence is that the art-architect rises to the top, and that many of our greatest and most important buildings are erected by men of

* Illustrated in the *Builder*, vol. xxix, (1871), pp. 566, 568.

† Ibid., vol. xxxi. (1873), p. 866.

‡ Ibid., vol. xxv. (1867), pp. 491, 609; vol. xxxii. (1874), p. 11.

* The cathedral of Famagosta, in Cyprus, also bears a striking resemblance to that of Ratisbon, especially with regard to its apse and eastern end. It is, we believe, the only church in Cyprus which shows *German* influences. The great cathedral at Nicosea is thoroughly French in feeling and design. The abbey church of Delapais purely English, and St. Nikolaus, Nicosea, is evidently a Greek work.

great talent, no doubt, but who are simply the exponents and practitioners of a revived form of imitative architectural design. The more thoughtful part of the public are beginning to find this out now, and to see that they have spent great sums in the erection of pieces of architectural sentiment which are already beginning to pall on their taste as art-work, and which have never really fulfilled their practical demands.

One difficulty in the way of combining the functions of art-architect and practical architect arises really from the false view which is taken of what constitutes the art of architecture. The idea fostered by some persons that an architect is to be builder, sculptor, and painter in one, is almost entirely Utopian. Occasionally there may arise a very exceptional genius, such as Da Vinci, who seems capable of grasping everything; but taking the average capacities of even the more gifted of mankind, such an idea as to the requirements of an architect can only result in disappointment. The mastery of sculpture or of painting is enough, in itself, for the whole energies of most men who achieve real success in these arts; the attempt to combine them with the proper knowledge of the practical part of building can only result either in the erection of badly planned and constructed buildings, or in the execution of bad sculpture and painting. But it is not sufficiently recognised that the real and special art of architecture consists in expressive and decorative building. There is art even in a plan; one man will make a plan which answers its purpose, but which is entirely ineffective in its interior aspects; another will make one equally convenient, which provides an interior full of interesting and picturesque points of effect which arise naturally out of the requirements of the plan. Such a man is an artist in planning, and is much more truly an "art-architect" than one who merely covers a building with pretty details copied from old buildings, or cuts up its roofs into a confused and unmeaning assemblage of gables and spirelets. The decorative treatment of a building, in direct reference to the expression of its construction, carries this art of expressive building much further, and is a form of artistic expression quite worth special attention on its own account, without attempting to invade the province of the sculptor and painter. That it is so, and that it demands special study and a special organisation, is indicated by the fact that sculptors and painters who are their own architects invariably fail both in planning and in giving true expression to their plans; nor do painters and sculptors in general by any means understand decorative design. The large and interesting field presented by this class of artistic design may be entirely and fairly in the architect's province; and quite enough, too, for any man's time and thought, in combination with the practical side of building. This is the view of architectural art which the whole of Viollet-le-Duc's life-work embodies, and any man might be proud of such a repute as he has left behind him.

Two other practical points may be mentioned in connexion with the presidential address. Mr. Whichcord has decidedly repudiated what some people have called the trade-union theory of the Institute, as an institution for securing proper remuneration to the profession. Those who held this view were not, we imagine, numerous; and certainly nothing could be more at variance with the first object propounded in the Institute charter, "the advancement of the art of architecture." We draw attention to the fact that the President of the Institute has affirmed that the scale of charges sanctioned by the Institute simply represents the custom of the profession,—what a member of it is justified in standing up for and what the Institute will support him in,—but that it does not pretend to attach a stigma of unprofessional conduct to any man who chooses to work for less. So much the better. Such a pretence would have been a solecism, and is of course an exact parallel to some of the action of trade unions which is constantly complained of as hampering the liberty of individual members. Equally of course, the Institute does not pretend to discourage any architect from charging higher than its scale if his services are so much valued that he can command higher terms. It recognises a usual custom to which appeal may be made in case of dispute, and that is all it can reasonably and logically do. The other point we wish to touch on is the desirability of all architects of respectable standing, and who are desirous of raising the *status* of the profession, joining hands with the Institute. One statement made in Mr. Whichcord's address furnishes an exceedingly practical argument in favour of this. He mentions, in the first place, that while there are 1,300 professional architects in the kingdom, only 716 are members or associates of the Institute; and we have observed, in conversation with architects who are not members, that they usually give as a reason against joining,—"What are we to get by it, when every one knows that some of the most clever and successful architects are not members?" But there is the further statement that there are "nearly 3,000 persons professing to be engaged, in some form or other, in the practice of architecture," many of whom, probably, have a very shadowy claim to the title. But it is the good men who refuse to join the Institute who give the status to these pretenders. If all the properly-qualified architects would join the ranks of the representative body as members, and make it really representative, they would at once throw into discredit all those pretenders, who would have no chance of acceptance in the Institute. Let them say, if they like, that they do not care about the papers at the Institute meetings, that the proceedings are dull (sometimes they are); but for all that, if they want to stop the quack architect from practising, let them, in the name of common sense, strengthen the hands of the only body which, if properly supported, can effectually do so. To weaken the hands of the representative body by standing aloof and saying, "Oh, the Institute does nothing for us!" when the general joining of the whole profession in its ranks is exactly what is wanted to give it the power of being useful, is a most illogical mode of acting.

THE OCTOBER FÊTES IN MUNICH.

There is much in Munich to remind one of Italy. It is not because there are so many cold imitations of its noble architecture,—not only because we see engaged on its new buildings the skilful masons and plasterers of the other side of the Alps, and hear the not unfrequent sound of the Southern tongue; but just at present Munich is in the midst of its October rejoicings, which strongly remind one of the *Ottobrate* of Rome,—rejoicings not classic, as is the case in the Eternal City, at the more or less successful termination of the vintage, but rejoicings that coincide with the close of the business part of that enormous commercial interest in Germany, the in-gathering of the hops. The huge high-pitched warehouses of Nuremberg, and many other famous towns in the more southern districts of Bavaria, so little changed since the days of their world-wide fame, have been filled with their bulky stock, and busy, passing through the city gates, have been the wagons lightly laden with their bursting sacks of produce. In the country the hop-poles are stacked for the winter, and the season's work is done.

Not that the Munich fair, picturesque as it is, situated on the banks of the Iser, "rolling rapidly," and outside the old Isarthor, can compare in any way with the beauty of the Roman October *fêtes* in the gardens of the Borghese villa and on the banks of the Tiber; nor can the boisterous, ungraceful enjoyments of the Germans stand comparison with the good-natured and more genial merriment of the Romans. Even the *Ottobrate*, however, have lost their character, familiar to old residents of Rome of thirty years ago, when a traditional costume and a certain ceremony lent a classic charm to the rejoicing. The year 1848 is marked in the history of the *Ottobrate* as it is in that of Rome herself; for, in that autumn the costumes were worn for the last time,—costumes consisting alike for men and women in the familiar theatrical "brigand's hat," bedecked with artificial roses, and worn by a chosen number of handsome girls and young men perched high on wagons which bore them triumphantly on their merry *gita* outside the gates of Rome.

In Rome at one time, as we remember, every one seemed to rejoice alike in the October *fêtes*. In the year 1848, to which we have referred, owing to the early period, the grand people,—the earls and marquises of Great Britain, the barons of Europe, and the millionaires of America,—were conspicuous by their absence, owing to its not being "the thing" to arrive in Rome until considerably later in the year; but we can recall the familiar faces of more than one Roman notoriety, John Gibson, Wyatt, De Soulevy, George Mason,—whose brother served as a volunteer in the '48 war,—Father Prout, Charles Barry the elder, Waring, Penry Williams, poor George Thomas, Overbeck and his German admirers, and we know not how many other artists whose names are not so familiar. At that time Rome boasted of no regularly-organised English club; men were not afraid to be seen in the smoky cavern of the now practically defunct Café Greco, where many an *habitué* remembered where Thackeray sat and smoked the wretched Torlonia tobacco of the Papal Government, and when the massive seventeenth-century silver Roman lamps graced the counters of the famous old establishment.

Here in Munich the fair is a fair without the attendant pleasures, as they are termed, of the *Kermesse* of more Northern countries, but a genuine fair, such as explains the importance attached to these gatherings in the past, commencing during the first days with a display of agricultural products and a cattle-show, such as would recall to old Londoners the beginnings, forty years ago, in the late Baker-street Bazaar, of the huge Agricultural Hall shows of to-day; later on in the month succeeded by merchants and dealers collected from far and near, each with the wares peculiar to his district, but mostly predominating in crockery, hardware, and clothing, to satisfy the varied needs of daily existence such as have been supplied for centuries at this and similar fairs,—a national exhibition on a small scale, and arranged, too, in sections,—an assemblage of wares eagerly bargained for by the thrifty Munich housewives, who may be met streaming into town from the suburbs where the fair is held, bearers of heavy burdens of crockery, the rudely decorated pottery which fascinates so surely every artist and connoisseur who travels abroad. Happy hunting-grounds, too, for the bric-à-brac collector are the numerous dark stalls, in which are heaped odds and ends of every possible description, again reminding one of Italy.

Italy will soon be brought in even closer contact with us Northerners by the new means of communication through the St. Gothard Tunnel, of which recently such unsatisfactory accounts have been circulating. But the modern engineer's dictionary knows not the word "impossible," and so we hear that by next spring the tunnel will be completed. To more than one Italian and German workman here in Munich, at these October fêtes, and in many another part of Europe, will the termination of this great work recall the old Hospice which will disappear with the piercing of the tunnel. To how many thousands of industrious but poor artisans has not this charitable and venerable institution, during its five centuries of existence, afforded the succour so sorely needed when work was being sought? To how many a travelling apprentice has not this old Hospice formed a bright point of recollection in his hard-won career? What help must have been given in this difficult and always lengthy passage over the Alps may be judged when one learns that no fewer than from 18,000 to 20,000 needy travellers are annually received and obtain warm food and sleeping accommodation, and that often a hundred and more beds are occupied in a night. Such institutions are noble relics of the past, and it is with pain that one sees them disappear, but disappear they must; when, however, the old Alp passes have at length been doomed to be abandoned, there will probably remain no more interesting historical memorial of their existence than the noble line-engraving by John Landseer from the equally noble picture of the "Dogs of St. Bernard," by his son Sir Edwin.

But the necessity for the St. Gothard Hospice has passed, or will pass, rather, in a few months. There is little travelling now-a-days except by rail, and the times for the happy, even if obligatory, wanderings of the *Handwerksburschen*, the German travelling apprentices, who all know St. Gothard well, are drawing to a close. Here in Germany, as everywhere else, apprenticeship, its trials, its patient teachings, and its lessons, is not what it was in the past, a fact which perhaps may account far more than is generally acknowledged for the undoubted inferiority of too much work which is done in the present day, a fact of which one is characteristically reminded in a fair such as is at present being held in Munich, where it is difficult for the fastidious purchaser to find anything but what is old to please him.

Munich.

FRENCH ART PROGRESS AND ENGLISH EXAMPLE.

One of the most wholesome symptoms of progress among our neighbours is the awakening sentiment of self-reliance. It is felt, at last, that the State is not responsible for everything; that the people must watch over their own improvement, and seek themselves to supply what they most need. So far as arts applied to industry are concerned, the example of South Kensington has more than anything else at once alarmed and stimulated the French. It seemed extraordinary that so vast an institution should spring from private initiative, and that Government assistance should only follow and confirm the success already achieved by associations of private individuals. On a smaller scale, but equally emphatic in its moral lessons, the example given by the Belgian people was impressive; and now the words self-help, independent action, private initiative, are on the lips of all who in artistic circles of Parisian society discuss, how France shall hold her own against foreign competition. It is understood that the triumphs of the past have somewhat crippled the energies of the present; France has been resting too long on her laurels. She possesses, it is true, an admirable series of antique sculptures. The Museum of the Renaissance, the Sauvageot collection, the portfolios of drawings of the Louvre, the Cluny Museum, the Conservatory of Arts and Crafts (*Arts et Métiers*), the collections of models of the École des Beaux Arts, the stamp galleries of the Bibliothèque Nationale, and the collections of porcelain at Sèvres, afford elements of study, but these are scattered and disorganised: admirable in their way, but scarcely suited for a national school. Again, so far back as the eighteenth century, Bachelier and Descamps founded gratuitous schools throughout France, where young apprentices could acquire some knowledge of art. Then such men as Étienne Delaune, Cercean, Woeiriot, Légaré, Lepautre, Marot, Berain, Toro, Oppenord, Meissonier, Cauvet, Delafosse, and many others, published series of designs and models, which fed for several generations the imagination, not only of French, but of European artisans. This same country that produced Bernard Palissy, Leonard Limousin, Briot, Larmino, Nicolas de Lafage, Le Nôtre, Keller, Lefèvre, Jans, Audran, Cozette, Boule, Massé, Balin, Montarsy, Germain, Caffieri, &c., can hardly be suspected of falling behind the age, and allowing other nations to excel her in art decorations. Nevertheless, it is urged that the more looking backwards at former achievements and the mere mention of names that were great when foreign competition was less keen, is no sufficient guarantee for continued pre-eminence.

The collections exhibited at South Kensington are organised for a distinct purpose, and there are imitations of South Kensington all over Europe, with the exception, however, of France. There is in Paris the Museum of Cluny, but this can only be described as an archæological display; while, in the provinces, the Lyons collection is more especially devoted to the decoration of tissues, and that of Limoges to the ceramic arts. A general museum of the decorative arts which would form a central school for the study, in all its branches, of art applied to industry, is a want keenly felt in France, and this more particularly now that the competition of other countries is a force the French can no longer afford to ignore.

To meet some of these exigencies the "Union Centrale des Beaux-Arts appliqués à l'Industrie" was constituted in 1862, and, after considerable difficulties, this private body of distinguished patrons organised exhibitions which were held every two years, and consisted of objects illustrating the application of fine arts to industries. These displays attracted a great number of people, and have often been noticed in these columns. This, however, is not considered sufficient, and a second society was formed in conjunction with the first, known as the Société du Musée des Arts Décoratifs, for the purpose of creating in France a vast and special museum where the art-workmen might meet and classify in logical order the most perfect specimens attainable of the decorative arts. These choice works, or casts taken from them, should, it is also proposed, be sent round the country to local exhibitions and museums, so that the public taste of the entire nation might be further developed. This newer association, which in England we might call the museum committee, was constituted in April, 1877, and its influence is becoming daily more perceptible. Many months were spent negotiating with the Government, first with a view to the installation of the proposed museum at the Tuileries, when the palace should be reconstructed. Subsequently the Government conceived the project of converting the huge buildings where the International Exhibition of 1878 had been held into a National Industrial Museum, and the central and finest portion of the building would have been handed over to the committee for the installation of a permanent museum of fine arts applied to industry, and the creation of schools more or less founded on those of South Kensington. This project, however, fell through, and then the Government offered the Pavillon Flore, the wing of the Tuileries nearest the river, where a small exhibition was held, and many strenuous efforts were made to raise funds.

After some months, the Government took these premises back again, and gave them over to various officials connected with the Préfecture of Police, and the organisers of a national permanent museum were once more cast adrift. Ultimately the Government allowed this society to open a museum in the east wing of the Palais de l'Industrie. At the commencement of this year the Museum committee had obtained in all 10,000*l.* in subscriptions, and a great many gifts in kind, and the objects exposed, though somewhat modest and limited in number and variety, constituted nevertheless a good beginning. We are glad to note that the authorities at South Kensington lent willing help to this sister institution. All the books and catalogues that have been published, in all thirty-eight ponderous volumes and six portfolios of photographs issued at South Kensington, were offered as a free gift to the French Museum Committee of Fine Arts applied to Industry. These volumes were also accompanied by a certain number of casts of objects of art at South Kensington, and a cordial letter, promising that all works which in the future may be published will also be sent over to Paris. The letter announcing these gifts stated that the Lords of the Committee of the Council on Education had, on many occasions found cause to appreciate the assistance given by the various Paris administrations to the organisers of the South Kensington Museum, and were therefore particularly pleased to render any service to the French Museum of Decorative Arts. A hope was further held out that this might serve as the basis for international exchanges which would be of mutual profit to the two very similar institutions.

While the foundations of a permanent museum have been thus firmly laid, the Union Centrale has, on its side, continued to devote the same energy and ability in the organisation, every two years, of an Exhibition of Arts applied to Industry. These shows are now regular features of Paris life, but an outcry has recently been raised in favour of some sort of novelty. The committee felt that if they did not contrive some perpetual change, though still for the purpose of illustrating the same idea, the entire movement might be seriously compromised. The Exhibition of this year, it had been arranged, should be devoted to the glorification of metal, and it has recently been further decided that to make the Exhibition more useful and original, the raw materials required should be shown side by side with the tools the artisan employs, the model he copies, and the result he ultimately attains. The same rule will probably be observed in 1882, when the Exhibition will consist of tissues, paper, skins, and wood applied to the manufacture of furniture. In 1884, the exhibition will more especially interest our readers, as it comprises wood in its application to building and decoration, stone, and glass.

Finally, we should notice a third feature of the same movement, which is all the more welcome, as it will enable us to appreciate, in a great measure, the work that has been done without quitting our fireside. The Union Centrale and the Museum Committee have concluded an agreement with the well-known art-publisher, M. Quantin, who, at his own risk, issues a monthly publication, which is the organ of the two societies. It bears the title of the *Revue des Arts Décoratifs*, and besides publishing all the documents, minutes of meetings of the two societies, contains a number of articles by well-known critics, and three to six illustrations. Five numbers of this publication have already appeared, and contain reproductions of some of the finest objects displayed at the Museum of Decorative Arts.

THE FRENCH GALLERY.

The principal work in the Winter Exhibition of Mr. Wallis's Gallery, which opened this week, is the large painting by Luminais, "Les Énervés de Jumièges," one of the most powerful and one of the most repulsively painful pictures we have seen in the Gallery. It illustrates a story of a barbarous period; how Clovis II., having conquered the two sons who had rebelled against him, crippled them by destroying the sinews of their legs, and then placed them in a barge, and committed them in this helpless condition to the current of the Seine. The picture represents the barge with its unhappy occupants floating down midstream; it is life-size, the boat and the figures occupying the foreground. As an historical representation the picture is absurd; for it is not to be supposed that a man capable of such barbarity would have had his victims' wounds carefully bound up, and given them cushions and a mattress to make them as comfortable as possible under the circumstances; the object of the act (if it be really historical) was, of course, to ensure the death of the prisoners without taking the onus of actually giving them the death-blow. Apart from that, the power of the work consists in the manner in which the painter has succeeded in conveying the impression of utter bodily helplessness and pain combined with the indication of natural force of character in the countenances of the two princes. The figures lie like two logs on the boat, the sweat of pain and terror on their faces; with the expression, in the features of one at least of the two, of fierce passion and a strong will utterly unable to act. The swing of the boat turned sideways by the current is very well conveyed. No one who sees the picture will be likely to forget it, though most, like ourselves, would probably prefer to do so. With all the power displayed in it, it is doubtful what can be the use of painting a picture of so repulsive and cruel a subject, or who could possibly wish to possess such a work.

What struck us most in the room, after this, were the landscapes by K. Heffner, one of which, "A Flitting Gleam before the Storm," is a wonderful piece of realism in the portrayal of a transient but powerful effect in Nature: the gleam on the hill in the middle distance is like absolute light. There are three other works by the same painter, all portraying marked effects with more or less power, though none of them equal to this one. Munthe, the painter of snow scenes, has varied his materials a little in one or two works by choosing the margin of a river instead of the village roads and fields which he usually portrays, and seems better than ever. "Winter," a scene of cold twilight on the bank of an ice-bound river, is perfect in execution and feeling.

Perhaps the most satisfactory, though not the most striking work in the Gallery, is Madame Henriette Brown's "Preparations for the Festival," a young acolyte, clad in red serge, scouring a silver crucifix. The metal-work is very finely painted, and the whole has that kind of artistic interest which this artist succeeds in imparting to the representation of a mere common-place incident in the action of a single figure, simply by the force and truth with which it is represented; the painting tells no story, and yet compels the attention by its masculine power; if there were many such painters among women, we should have to say, by its "feminine" power; but Henriette Brown, fortunately for the men, has no rival that we know of among the painters of her own sex.

Priou's large picture of "A Satyr Family" contains some good painting, though it is an absurdity even as a mythological representation. He has grouped with a rough, goat-legged satyr, and his goat-legged child, a woman who looks, except as to the face, like a civilised lady with her clothes off: the utmost stretch of fancy cannot warrant such a *mésalliance* as that of this finely-turned creature with human limbs with him of the goat-shanks. A new exhibitor at the gallery is Max Todt, whose two small figures, "The Lover and his Lute," and "Can it be?" show very fine qualities of painting; they belong to the school which owes its existence to Meissonier. F. Thöne has two good boy pictures, and there is marked character, though with an awkward attitude of the figure, in Ulrich's "Retrospection."

The best known of the foreign contributors are not in force, and of the few English works there is little to be said.

THE PRESIDENT'S ADDRESS AT THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

Mr. Whichcord having first referred to the severe loss sustained by the Institute through the death of Thos. Henry Wyatt, Benjamin Ferrey, and Edward M. Barry, and remarked on some of the alterations proposed to be made in the conduct of the business of the Institute, proceeded thus:—I would not have it supposed that the purpose of the Institute is confined to the mere writing, reading, and discussion of professional communications, nor would I admit for an instant that its use is impaired because only a small minority of members attend these meetings. Many things combine at the present hour to diminish interest in the work done at them; the world is overburdened with papers, letters, lectures, discussions, and no small part of the load is sustained by this country. To carry on, at the recognised head-quarters of our profession, official duties affecting our interests as a corporate body; to promote and facilitate uniformity of professional practice; to secure, as far as possible, integrity of practice; to consolidate step by step the foundations already laid of that examination which I think will raise the character of an architect in public opinion, and debar unfit and ill-educated persons from the profitable exercise of our calling, whereby at the present moment incalculable prejudice is caused to the worthier members of a noble profession,—these form silent and efficacious work done by the Council and Committees.

The general scheme of that examination was tacitly approved by you at the annual meeting in May last; and it has since been worked out in detail by the Architectural Examination Committee. After nine sittings this committee presented an excellent report, which, with a few principally verbal amendments, has been adopted by the Council. It has consequently been proposed to devote our ordinary meeting for business, which occurs on the 3rd of January next, to this matter, in order that the general body of members may be afforded an opportunity of discussing the scheme,—the pressure of business at the last annual meeting having rendered any such discussion impossible. For this purpose, the regulations and programme of the examination under Bye-law XIV., as drawn up by the committee and approved by the Council, will be printed in the Journal of Proceedings, and thereby every member will be enabled to make himself acquainted with them before the meeting in January. Meanwhile, we have taken the necessary steps to form a Board of Examiners, and to obtain such a modification of the terms of the Ashpitel prize as will permit the prize to be awarded annually to that candidate who of all those examined during the year distinguishes himself most creditably in the examination. We have also decided to limit the voluntary examination, to be held in June next, to four days instead of six days as in previous years, but of this you have already been informed by the programme which was published some ten days ago. This, the twelfth that will have been held since their establishment, will be the final and concluding examination of a voluntary character. It consists of two sections: artistic and scientific. At the previous examinations a candidate has been permitted to pass one year in one section and another year in the other section. There are, consequently, a few gentlemen who, having passed in only one section, are not yet entitled to the usual certificate, and in order to qualify for it they must present themselves next June and pass in the other section; but all new candidates at the June examination will be required to pass in both sections. We shall thus be prepared to take our thirteenth examination,—the first under Bye-law XIV.,—in the month of March, 1882.

I may, perhaps, be permitted to revert to what I said on this subject in my address of last year. I asked whether the character of such an obligatory examination as we proposed should be general or strictly professional; I am glad that it is recommended to be one in reference to professional study and practice only. I said that the real difficulty lay in deciding upon the artistic capacity of a candidate; I am glad to know that the difficulty is reduced to a minimum. I maintained that, in my opinion, both geometrical and free-hand drawing were essential requirements for an architect; I am glad to know that not only does the programme of the proposed examination include practical tests of such requirements, but the probationary work required in the first instance from each candidate is likely to afford a very feasible means of testing a candidate's natural aptitude for the arts of invention and design. I maintained that an architect should be cognisant not only of the principles of construction, but of the nature, qualities, and value of building materials; and I am glad to know that it is proposed to devote an entire day to examination in such subjects. In fine, I have gone carefully through the suggested regulations and programme, which embrace requirements such as, I submit, every person seeking to be an architect should possess. Nor do I see in their general tenour anything Utopian, or, indeed, anything which might deter the heaven-born artist,—if artistic genius be purely and really a celestial gift,—from seeking admission to the Institute through the medium of an examination such as that we have decided upon recommending for final approval.

And here, gentlemen, I am induced to quote a passage from an address delivered from this chair by the first professional president who ever sat in it. I mean Charles Robert Cockerell. He was a man who, as the most artistic architect of the present day will admit, was, if anything, an artist. His words, uttered more than twenty years ago, when the graphic side of architecture was less understood and less followed than it is at present, merit your immediate attention. "So rare and difficult," said he, "is the union of the scientific and the graphic departments of this art in the same person, that theoretic writers are at variance as to the preference to be given to the one or the other faculty. Thus the learned Rondelet defines architecture as 'a science, the object of which is to direct the operations of every sort of building, so as to unite convenience, solidity, and beauty of forms. . . . . a vast science, the purpose of which is to provide for the security, the convenience, and the magnificence of nations, and to give them that lustre and prosperity which true civilisation implies. Most modern architects are rather decorators than constructors, aiming, like the painter and sculptor, chiefly to please,—indulging in captivating but often impracticable designs, induced by their associations with the imaginative arts of painting and sculpture, and . . . . . attracted by splendour and ostentation rather than by the graver merits of solidity, convenience, and durability.'" Now it is not I that am quoting a theoretic writer, it is the late Professor Cockerell who speaks, and who makes a pertinent quotation from a great Frenchman, the learned Rondelet,—that Rondelet who, at the very beginning of this century, described the architect of his day as a decorator rather than a constructor. Are we quite convinced in our own minds that Rondelet, if he lived at the present time, would define an architect in language more palatable to our own sense of what he should be? Are we quite sure that the cry for art, more art, in which I admit this country was long deficient, has actually provided us with what we required? Has not the tendency in England of late years been to unduly exalt the art at the expense of the science of architecture, so that architectural science is gradually becoming the specialty of men who are not, and who do not pretend to be, architects? The construction of aqueducts, roads, terraces, gardens, fortresses, bridges, seaports, viaducts, was once, and still lies, within the domain of architecture; yet few in England think of employing an architect on such works. In France, the best Parisian architects still think it within their province to edit works on the building legislative enactments of their country, and advise upon such subjects; here in this island there is a growing tendency to leave matters connected with building legislation to surveyors. In France, the planning of new thoroughfares, the laying out of public places, the daily charge of architectural monuments, the care of great estates both public and private, is retained by qualified members of our profession; here, in England, such duties are often relegated to all sorts of persons. I assert without hesitation that local governments and municipalities, indeed, many great owners of the soil, prefer to be advised by men who ostentatiously discard connexion with the picturesque and artistic elements of professional practice. We are more or less to blame for this state of things. Though thirty years ago there was plausibility in the successful efforts to stimulate the pursuit of architecture as an art, the necessity for such stimulus has now in some measure ceased, and the object of all thoughtful practitioners should be to reclaim much bonâ-fide practice diverted from its legitimate course,—to foster in younger men a regard for that scientific learning and mental excellence which Philibert Delorme preached, and which our own Sir Christopher Wren demonstrated to be worthy the pursuit of an artist.

But however limited may be the modern architect's connexion with the laying-out of cities, or even the design of new thoroughfares in this capital, he at least is afforded a doubtful satisfaction in viewing the disastrous efforts of others to accomplish work, the design of which would in earlier days have been entrusted to men of our profession. I am of course aware of the difficulties which beset all attempts at metropolitan improvements,—of the many legal and legalised impediments to public progress,—but I doubt whether the course pursued by the authorities, in facing those difficulties and removing those impediments, is either profitable or judicious. Take the West End of London, where the proposed line of new thoroughfares long-promised may be traced by half-demolished houses, empty tenements, and vacant plots of ground, and inquire whether these proposed thoroughfares are being executed in accordance with any well-considered architectural plan? There is little likelihood that the generation which is paying for them will enjoy the entire fruits of the enterprise. True, as mere thoroughfares, they may yet be made use of by living men, even of mature age; but that anything short of a miracle of accidents will render them things of beauty, or worthy of a great capital, I am constrained to doubt. Part of the system adopted, if system it may be called, is to connect a series of existing streets by removing blocks of old houses which divide them; by pulling down one side only of such existing streets, and driving a new thoroughfare along a necessary tortuous and irregular line,—a line formed by the untouched sides of streets, often of miserable dwellings originally erected without regard to either convenience or salubrity. Such is the mode in which the new street connecting Oxford-street and Old-street has been made; such is the mode in which the purlieus of Soho are about to be penetrated, with the intention of opening important thoroughfares, and I believe emphatically that this mode is dictated by financial necessity. The result will be, I venture to think, that there will remain on one side of the way for thirty and more years after the roadway of these new throughfares is completed, or at least until existing terms of lease fall in, an irregular line of disjointed blocks, huge and lofty; on the other side of the way rows of old and dingy tenements, with here and there a new building raised in the air over its squalid neighbours, and acquiring in due course prescriptive rights over the land on which such neighbours rest. Moreover, the squalid neighbours themselves, already possessing powers, acquired by similar prescriptive rights, are likely to be, in skilful hands, fertile of obstruction to individual improvement and public embellishment.

It must be admitted that the position of the Metropolitan Board of Works is one of unexampled difficulty. If even the powers vested in that body to effect improvements adequate to the scientific and artistic wants of the age were sufficiently broad, and if that system of liberal expenditure by which alone a satisfactory return is to be obtained were sufficiently understood; if even public opinion were educated enough to afford proper encouragement to the scientific re-arrangement of public places and streets in London, there would still remain the opposing complications and entanglements connected with vested interests and the abuses of the law of property. The systematic and organised obstruction which speculates upon the chances of exorbitant compensation would still issue triumphant from every fresh adventure. Moreover, there would still be found wanting, in metropolitan administration, that initiative faculty, that directing power, which sees, suggests, and plans the needed improvement,—the deficiency of which during recent years has been painfully conspicuous. Too much is England is left to chance and the happy-go-lucky encounter of conflicting interests, both personal and pecuniary. Take a recent case in the City of London, I mean the much-needed completion of the Inner Circle underground railway. There

were the two railway companies, the Corporation of London, the Metropolitan Board of Works, the various landowners and leaseholders,—all interested, but all at fault for a leader in a scheme of improvement which all admitted to be necessary. The probable cost of connecting the Aldgate station of the Metropolitan Railway with the Mansion-house station of the District Railway has been shown to be so enormous, in consequence of the value of land and tenements in the neigbbourhood, that the two railway companies dare not undertake the responsibility. It had been confidently expected that the Corporation and the Metropolitan Board would have co-operated in the scheme for the completion of the Inner Circle Railway, as it included the construction of a wide bandsome street in continuation of Cannon-street to Trinity-square. This proposed street would have given a great arterial thoroughfare in a crowded and almost impenetrable part of the city, and would have provided sites for blocks of offices and commercial buildings, for which there has long been considerable demand in the locality. But neither the new street nor the completion of the Inner Circle railway is yet a fact, though the postponement that has taken place is not due to any structural or indeed any difficulty of an insuperable nature. It is due solely to the difficulty of apportioning a just rate of contribution by the various parties interested to meet the enormous outlay involved. The railway companies, finding the cost of the land necessary to make their railway in the ordinary way would be a bar to any possibility of profit, unless the Corporation and the Metropolitan Board would undertake the construction of a new street simultaneously and incur the burden of the cost of the same, sought powers to burrow under the soil. The object of this was to avoid the obligation of constructing a new street over the railway. The companies offered to make compensation only for damage, without the necessity of acquiring the entire freehold of all the property touched by them. The Bill by which it was attempted to obtain such powers was, as might be expected, rejected by the House of Commons. It, therefore, still rests with the two railway companies and the two great governing bodies of London to make arrangements in respect to the cost of the superstructure,—that is, the new street and the new building sites,—so that the whole matter may be presented to the coming session of Parliament in a form which will enable a great and an absolutely essential public improvement to be commenced.

The educational part taken by the Institute in metropolitan business for the last twenty-five years, under the provisions of the Building Act, has recently been the subject of a communication from us to the Metropolitan Board of Works. The Council, acting on the advice of our Board of Examiners appointed by you, have taken steps to improve the character of the Examination for certificates of competency to hold the office of district surveyor in London. Instead of one sitting of four hours for the written examination there are now two sittings of three hours each, and in the latter of these the candidate's skill in making working drawings is tested. An oral examination remains as before. We have also, after consultation with the Metropolitan Board, determined to impose a fee on each candidate for examination,—a rule which will take effect at the beginning of next year.

The modern system of examination at home is closely allied to the extending fashion of international exhibitions abroad. Cousins at the Antipodes are returning the compliment which this country was the first to pay to colonial and foreign enterprise. The awards recently made to British architects at the Australian International Exhibition, held this year at Sydney, are numerous. I am indebted to Mr. Charles Barry for a book containing a list of these awards, and which is on the table for the inspection of all present. No official intimation has yet been made to the Institute on the subject of the architectural drawings exhibited at Sydney,—work with which we were immediately connected. I trust, however, that when this same exhibition is resumed next year at Melbourne, my successor will be enabled, in due course, to afford members fuller information about it than at present lies in my power respecting the Sydney gathering. The preservation of such official reports as the one to which I have alluded is part of the many functions of our corporate existence, and our library ought to contain all records of facts relating to British architects throughout the world.

The slight use made by members of our valuable library has been more than once touched upon by my predecessors, and I have sometimes asked myself whether its usefulness might not be extended, and the purposes for which it has been collected might not be advanced, by throwing it open to all *bonâ-fide* students of architecture. That this can be done without trenching upon the privileges of members is evident, for no one under the age of twenty-one can become an Associate, and practically very few gentlemen who are less than twenty-five years old offer themselves for Associateship. It therefore affords me great satisfaction to state that steps have been taken to open the library free to young men under twenty-three years of age, who are engaged in the study or even practice of architecture, and who produce satisfactory evidence of the fact. The legacy of 100*l.* bequeathed to the library by Thomas Henry Wyatt, is another instance of our deceased friend's goodwill and devotion to the Institute. A recent donation, made through the good offices of Professor Donaldson, of several original drawings by the late Owen Jones, whose portrait adorns this room, is no less welcome. The donation has been made by the two Misses Jones, sisters of our late esteemed colleague. I am further informed by Professor Donaldson that it is the intention of these two ladies to bequeath to the Institute such a sum of money as will found a studentship of the value of 50*l.* per annum, to be tenable for two years, for the purpose of assisting meritorious students to travel, in order to advance their knowledge of architecture and of colour applied to architecture. We shall, consequently, one day possess an Owen Jones Studentship,—one that will probably be not less popular among students than the medals and prizes we annually offer in connexion with the names of Soane, Pugin, Tite, Ashpitel, and others. Thus, slowly and surely, the promise of our founders is being fulfilled; and it may yet, perhaps at no distant period, become the pleasurable duty of some one in this chair to expatiate upon what has been effected, in your name, "for the general advancement of civil architecture," to quote our charter, "and for promoting and facilitating the acquirement of the knowledge of the various arts and sciences connected therewith."

It does not, however, come within the powers of the Council to do all that many well-intentioned practitioners think ought to be done. I have heard it seriously maintained that the only use of the Institute of Architects is to enforce observance of a uniform tariff of five per cent. commission to be charged by old and young, experienced and inexperienced, capable and incapable practitioners of architecture; and that nothing short of expulsion under the by-laws should await the youthful or diffident practitioner who places upon the value of his professional services a lower figure than that charged by his elder and more fortunate brethren. I cannot conceive anything more illogical or more suicidal. The clauses in the Institute paper, entitled the "Professional Practice and Charges of Architects" represent simply the custom of the profession in Great Britain and Ireland, in India and the British Colonies. Where doubts crop up as to the amount of charges due, where no previous agreement has been made and disputes occur, where death intervenes, when a Court of Law asks for information as to the custom of the profession, then the Paper of Professional Practice and Charges is rightly and necessarily cited. But no man signing the declaration of a Fellow or an Associate of the Institute, and in accepting the terms of our charter and by-laws, incurs the obligation to abide by any restraints of professional charges. All such commercial and professional restraints are opposed in more ways than one to the laws of the realm; and would, at the best, encourage action on our part not dissimilar of its kind to that of ill-advised trade-unionists. I admit that there are questions of professional practice requiring a great deal of thoughtful consideration,—questions which may very fitly be discussed this session,—particularly the complications connected with the taking-out of quantities, and the best means of obtaining a fairer adjudication in architectural competitions than appears to exist. These are matters that should occupy the serious attention of the conference to be convened in May next, when I trust that a large number of those architects who signed the memorial on competitions will do us the favour to be present. I also hope that the numerous quantity-surveyors now practising in London and some provincial cities will afford us assistance in the discussion of several important points which are likely to be raised on the subject of quantities: the division of labour connected with them, and the present mode of paying for them.

Perhaps nothing about the memorial on the subject of competitions presented to the Council by Mr. Street afforded me more astonishment than the fact that there are in the United Kingdom more than 1,300 professional architects, for at the present moment the Fellows and Associates of the Institute together only reach a total of 716. Indeed, at the close of the last session the numbers stood thus:—

	F.	A.
Australia	4	2
Colonies and abroad	4	12
English Counties	110	82
Indian Empire	3	3
Ireland	6	3
London and Suburbs	209	253
Scotland	15	4
Wales	0	6

351 Fellows, 365 Associates, making a total of 716.

But I am still more astonished to find, from a list issued every week in a professional newspaper, there are nearly 3,000 persons professing to be engaged in the practice, under some form or other, of architecture. It is there stated that in Birmingham there are 49 architects, of whom only 7 are members of the Institute; in Bradford, there are 22, of whom 2 are members; in Bristol, 25, of whom 4 are members; in Edinburgh, 41, of whom 3 are members; in Glasgow, 60, of whom 19 are members; in Liverpool, 57, of whom 13 are members; in Manchester, 113, of whom 20 are members; in Sheffield, 31, of whom 7 are members; in Wolverhampton, 11, of whom 1 is a member; in York, 10, of whom 1 is a member; in London and suburbs, more than 750, of whom only 462 are members. The cathedral towns of Chester, Lichfield, Lincoln, Peterborough, Ripon, and Salisbury are not represented in our ranks by a single Fellow or Associate. In Hull, Sunderland, and Wolverhampton, which contain together, it is said, 38 architects, and in the principality of Wales, which is also said to contain 38 architects, there does not reside even one who has formally accepted the obligations of a Fellow of the Institute. Now, I know, of course, that a vast number of the gentlemen whose names are put down in directories as architects, and are so called by their neighbours, could not and ought not to become members of our body. But when you consider that of the many memorialists on the subject of competitions less than a third are members of the Institute; when you look at the long array of architects' names printed in the last-issued number of our "Journal of Proceedings,"—architects who have memorialised the Council, and who are not members of the Institute,—the very pertinent question arises, for what reason do these practitioners stand aloof from the corporate body of the profession? Are they unable or do they fear to incur the obligations which we have accepted? Some, no doubt, are prevented from entering our ranks by the expense, slight as it is, of so doing; a few others, perhaps, by caprice. But that the majority are ostracised in consequence of conscientious reasons I cannot for one moment suppose, nor do I think that there is anything in the declaration of a Fellow or of an Associate, or anything in our charter and bye-laws, which an honourable practitioner, having at heart the good of his profession and of himself, ought to refuse to accept. Indeed, it is only due to the public, as well as to ourselves, to direct serious attention to the fact that the number of architectural practitioners who submit to no recognised professional discipline, who take no obligation designed to secure integrity of practice and eliminate all pecuniary interest in building materials or participation in the commerce of building, is Legion. It is only due to myself, as your president, to state that the published names of such practitioners in this island alone exceed, by much more than 2,000, those on the roll of the corporate body. I shall, doubtless, be reminded that those of them who are members of local societies do accept obligations and do combine to resist evils and abuses which, at the very formation of the Institute, it was the object of our founders to root out, and which they largely succeeded in abolishing; but I need no such reminder. I am aware that the constitution of two or three of the provincial Insti-

tutes and Associations does not seriously differ from the purport of our own; but are such societies endowed with the powers which the corporate body of British Architects possesses? I doubt it. I venture to maintain that the interests of the public, not less than of the honourable practitioner of architecture, are linked with the prosperity and influence of the Royal Institute of British Architects. Such interests are linked with the legitimate control the Institute exercises over the conduct of those who accept the systematic discipline it is authorised to impose.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE opening meeting of this Institute for Session 1880-81 was held on Monday evening last, Mr. John Whichcord, president, in the chair. Among the new members presented to the President as attending for the first time since their election, was his Serene Highness Count Gleichen, Honorary Associate.

The Secretary (Mr. William H. White) announced the decease of Mr. John Henry Brown, Associate, on the 18th of October; and of the Marchese Giovanni Pietro Campana, of Rome, Honorary and Corresponding Member.

Several donations to the library and collection were announced, including some drawings by the late Owen Jones, presented by his sisters, the Misses Jones. A vote of thanks was accorded to the several donors.

The following passed candidates in the Class of Proficiency of the Voluntary Architectural Examination were then presented with the Institute certificates, viz.,—Messrs. J. B. Gass, — Goldsmith, — Johnson, H. H. Kemp, P. J. Marvin, and L. G. Summers.

The following gentlemen were balloted for and declared to be duly elected, viz., as *Fellows*, Mr. C. N. Beazley, of Guildford-street, W.C., and Mr. James Allanson Picton, F.S.A., of Liverpool. As *Associates*,—Mr. G. W. Watson, of the Department of Public Works, Melbourne, Victoria; Mr. Alfred Aitchison, of Harley-street; Mr. Augustus Rovedino, Craven-street; Mr. C. W. Reeves, Guildford-street; Mr. Arthur Ashbridge, Leadenhall-street; Mr. H. L. F. Guermonprez, Beaufort-street, Fulham-road; Mr. Sydney Vacher, Stanley-crescent; Mr. J. E. Bale, Sierra Leone; and Mr. Hugh Stannus, Kennington Park-road.

The secretary gave notice of an alteration in the conditions already issued by the Council with respect to the competition for the Soane Medallion for 1881, the subject chosen being a county court for a provincial town of 30,000 inhabitants. By the alteration thus made the area of the site to be covered is limited to 10,000 square feet.

The President having delivered his opening address, which we print on other of our pages this week,

Mr. Charles Barry, in moving a vote of thanks to Mr. Whichcord, referred to the address as one of an eminently business-like character, dealing ably with professional topics of great interest to, and deserving the careful and thoughtful consideration of, every member of the Institute. The President had lucidly explained a number of what he very properly spoke of as experimental measures in the administration of the business of the Institute, all of which had received very careful and anxious consideration on the part of the Council, whose sole desire in initiating them had been to give effect to the wishes and views which they thought were held by the majority of the members. It would be for some future president to sum up and analyse the results of those experiments. That relating to the compulsory Architectural Examination was the most important experiment that had ever been attempted by the Institute. The President was very sanguine as to the great good which it would be to the public, and the still greater good it would be to the profession itself. He (Mr. Barry) was sure that all present shared the hopes of the President, but it was a very great experiment to make, and he ventured to think that the members of the Institute must not be wholly unprepared for a certain measure of ill-success, or for only a partial success of the scheme,—at any rate, in its earlier days. The measure had been most carefully debated and discussed, and had undoubtedly received the approval of the large majority of the members of the Institute. That would be an earnest, he hoped, of their not being faint-hearted if the scheme did not at once succeed. The next subject to which the President alluded was the realisation, owing to an unexpected stimulus, of a desire long expressed that the Institute, like many other professional bodies, should have a charitable fund of its own for the relief, when necessary, of unfortunate members of the profession. The President had explained the terms of the bequest left to the Institute conditionally on its having a benevolent fund of its own, and although it would in all probability be some years before the Institute inherited the bequest, that was no reason whatever why donations, and, still better, yearly subscriptions to the fund, should not be given and allowed to accumulate at interest until the time when the bequest should be received, so that the fund might become one affording means to do a great amount of good. Having feelingly acknowledged the President's reference to the late Mr. Edward Barry, the speaker went on to observe that another subject touched upon in the address was that of reducing the number of meetings at which papers should be read, and appropriating the evenings so gained to the discussion of professional questions. That was a change which might with care be made an engine of great good; but, on the other hand, it might prove to be an engine of great mischief. The Council, however, trusted that members who should meet to discuss such questions would approach them with calmness and temper, and with a due sense of the responsibility which they would incur in dealing with them. One hoped-for advantage of such discussions would be that, from time to time, the hands of the Council would be strengthened, and their responsibility in dealing with professional questions somewhat lightened. Into the very large question of the relative importance to be attached to science and art in the work of the architect he did not propose to enter. The President had quoted some interesting words by Professor Cockerell, who in his turn had quoted Rondelet, but he thought it should be borne in mind that both these authorities were speaking of times now passed away. With regard to the mode in which public improvements are effected in this country, particularly in the metropolis, he fully concurred in the remarks made by the President, but thought that there was no hope for a favourable change in that direction unless we were prepared to accept the authority of some such autocratic administration as was formerly presided over in Paris by Baron Haussmann. As to the subject of professional remuneration, he did not think that anybody who had studied the scale of charges authorised by the Institute could find fault with it on the ground that it too highly rewarded any of the duties therein specified, and he could, therefore, see no reason for reducing any of the charges sanctioned by it. The scale was of great value in promoting uniformity of practice and of preventing undue rivalry between the members of the profession. In conclusion, Mr. Barry referred to the assiduity with which Mr. Whichcord had fulfilled the duties of his office during the past year.

Mr. C. L. Eastlake said that as a former officer of the Institute, it gave him great pleasure to second the vote of thanks proposed by Mr. Barry. The President had shown great tact in dealing with the different questions to which he had called attention. He cordially echoed the wish expressed by him that many of the large number of architects who, for some reason or other, held aloof from the Institute, could be induced to join its ranks.

The President, in reply, suggested that it would be but graceful on the part of the meeting to convey to the Misses Jones, through Professor Donaldson, the thanks of the Institute for the announcement received through him of their munificent intention to bequeath a very considerable sum of money to the Institute. He therefore moved:—"That the Royal Institute of British Architects beg to express their deep and grateful acknowledgments to the Misses Jones for their kind and generous intentions in regard to endowing a scholarship in remembrance of their brother, the late Owen Jones, whose talents and personal character endeared him to his professional brethren. The members feel that at the same time such a memorial will not only be a graceful tribute to his honoured memory, but will also contribute essentially to the advancement of the study of art in those branches of architecture which he himself had illustrated so successfully in his brilliant work and publications."

Mr. Barry seconded the motion, which was carried with much applause.

A special general meeting of members only was then held for the election of an honorary secretary, in the room of the late Mr. T. H. Wyatt. Mr. John Macvicar Anderson, member of Council, was unanimously elected, and in returning thanks paid a graceful tribute to the services of his predecessors in that office,—Professors Donaldson and Hayter Lewis, and Messrs. Frederick Pepys Cockerell and Thomas Henry Wyatt.

The meeting then terminated.

INTERFERENCE WITH THE FLOW OF AIR TO BUILDINGS.

MR. JUSTICE FRY has recently decided a case,—that of Hall *v.* The Lichfield Brewery Company (49 *Law Journal* Reports, Chancery Division, p. 655),—upon the question of the right to air, which is of so much importance that it is impossible to refrain from commenting upon it in these columns. Nor can it be touched on without discussing briefly the whole question of the right to air. Now, bold though it may seem, we are unable to think that Mr. Justice Fry's decision is correct, considering the current of previous judgments in the English courts. First of all, we venture to lay down two propositions, which, if they are correct, form, without doubt, the key to the decision of disputed facts which relate to air. The first is that no man can acquire an indefeasible right to the flow of air to or into a building, and consequently that no action can be successfully maintained to prevent a person from building so as to interfere with such flow of air. But this general proposition is subject to the qualification that if the flow of air is so interfered with as to cause an actual nuisance,—as, for instance, if it is likely to cause injury to health,—then that a right of action does exist. The second proposition is that every man has a right that the air which flows to his house, or to any other building, shall be reasonably free from pollution. We say "reasonably free," because regard must be had to surrounding circumstances, and in a town like Birmingham or Wolverhampton it would be impossible to have the pure air which circulates round a Highland village. As Vice-Chancellor Knight-Bruce observed in the case of Walter *v.* Selfe, "meaning by unpolluted and untainted air, not necessarily air as fresh, free, and pure as at the time of building the plaintiff's house the atmosphere then was, but air not rendered to an important degree less compatible with the physical comfort of human existence,—a phrase to be understood of course with reference to the climate and habits of England." This last proposition we do not intend now to examine further; to do so would lead us into a long discussion of the various cases which have dealt with the pollution of air,—a distinct branch from the right to the flow of air, though the distinction is not always kept properly in mind.

To return to the case which was decided by Mr. Justice Fry. The claim was, so far as the judgment was concerned, for the obstruction of air to a slaughter-house in consequence of the erection of new buildings by the defendants. Mr. Justice Fry decided that the plaintiff had a right to the relief which he claimed. He seems to have considered that there had been a breach of an implied covenant "not to interrupt the free access of air suitable for the purposes of a slaughter-house, just as salubrious air is suitable for the occupation of a dwelling-house."

Now at this time of day it is an extraordinary thing to observe a legal fiction of so obvious a character resorted to for the purpose of forming the basis for a claim as this of an implied covenant. The slaughter-house had, it is true, been in existence for more than thirty or forty years, but it is obvious that the right cannot be one arising from any implied covenant. Air and light are more or less on the same footing, and, as the words of the Prescription Act show, length of enjoyment is what constitutes the basis of the right to light. The Prescription Act governs the question of light, and the right to air must rest, if it exists at all, on the same principle, not under statute, but by common law; and we may say that in a case decided in 1824, that of Moore *v.* Rawson (3 Barnwell & Cresswell's Reports, p. 332) there is a passage in the judgment of Mr. Justice Littledale in relation to light and air which no doubt gives some

countenance to an existence of such a right. Again, there is no analogy between the access of salubrious air to a dwelling-house and the access generally of air to a slaughter-house. As we have pointed out, if salubrious air is changed into polluted air, that is a positive nuisance, but if you stop the flow of air to a slaughter-house, though a nuisance may arise, it arises from the nature of the house, and not from anything connected with the air. A man erects and keeps his slaughter-house at his own risk, just as a man builds a house at the extremity of his land at his risk, and if he wishes to have a free stream of air he should negotiate with his neighbours for that purpose. In Mr. Goddard's work on "Easements," he states that "from the earliest times a right of action for obstruction of air, which would have entered a window, has been recognised by law if a right that the air shall be uninterrupted has been acquired." For this proposition he cites Aldred's case (9 Coke's Reports, 58) decided in the reign of James I. But when this case is examined we find that the head-note is as follows:—"An action in the case lies for erecting a hog-stye so near the house of the plaintiff that the air thereof was corrupted." And the rest of the note amplifies the statement. When we look into the case, we find also that the whole facts bear out the note. "One ought not to have so delicate a nose that he cannot bear the smell of hogs," is one ground of defence, though it does not appear to have been successful. A still older case is mentioned in the judgment, to the effect that "an action lies for stopping as well of the wholesome air as of light." But here we have the qualifying adjective "wholesome," the obvious meaning of the remark being that the air should flow unpolluted to a building. Coming down from the times of the Stuarts to our own days, we find, in 1866, a case decided by the present Lord Hatherley, namely, Dent *v.* The Auction Mart Company (Law Reports 2, Equity, p. 238). In the course of the argument, the Vice-Chancellor asked,—"Is there any authority for interference in cases of obstruction of air as distinguished from light?" To which counsel replied, "Probably not." And in the judgment we find this short but important passage: "Another part of the case is this,—there is a staircase lighted in a certain manner by windows which, when opened, admit air. The defendants are about to shut up these windows as in a box with the lid off by a wall about 8 ft. or 9 ft. distant, some 45 ft. high; and in that circumscribed space they propose to put three water-closets. There are difficulties about the case of air as distinguished from that of light, but the court has interfered to prevent the total obstruction of all circulation of the air; and the introduction into a confined space of this description is, I think, an interference with air which this court will recognise on the ground of nuisance. *This is perhaps the proper ground on which to place the interference* of the court, although in decrees the words 'light and air' are often inserted together as if the two things went *pari passu*." The passage which we have placed in italics seems to show conclusively that on the ground of nuisance, and nuisance only, will the court interfere with an obstruction of air. In the case before Mr. Justice Fry, the nuisance likely to arise came, as we have pointed out, from the nature of the plaintiff's building, not, as in the case of Dent *v.* The Auction Mart Company, from anything done by the defendant. Again, in the case of Cell *v.* Abbot (8 *Jurist*, N.S., 987), decided in 1862, the court interfered with the obstruction of air into a back kitchen, and again the judge (Vice-Chancellor Kindersley) remarks, "It was therefore such a *nuisance* as this court would protect against." The obvious result of the defendant's obstruction was to close the back kitchen entirely and leave it totally without ventilation, and this would, it is clear, be an injury to the health of the inmates of the house, and quite a different matter from the prevention of air through a window or aperture, if it did not cause an injury to health. These decisions are still further strengthened by the case of Bryant *v.* Lefevre (4 Law Reports, Common Pleas Division, p. 172), decided in the course of last year, and upon which we made some remarks after it was decided (*Builder*, vol. xxxvii. pp. 354, 678). There was in that case a claim for a free flow of air to the chimneys of a house, but much of the reasoning of the judgment is applicable to more limited claims. For example,—"When it has been said that there is a right to air, there is good ground for supposing that the wholesomeness of the air had been interfered with, or that there was some peculiarity in the land or building which made the air necessary in a definite place."

The latter part of this sentence, no doubt, might give some countenance to Mr. Justice Fry's decision, but we think it is really pointed to some such fact as a back kitchen, as in Abbot *v.* Gale, and not to an unusual construction such as a slaughter-house, which, had it been an ordinary building, would not have been interfered with by the obstruction in question. This view is borne out by another passage in the same judgment, "No doubt there is a nuisance, but it is not of the defendants' causing. They have done nothing in causing the nuisance. Their house and their timber are harmless enough. It is the plaintiff who causes the nuisance by lighting a coal fire in a place the chimney of which is placed so near the defendants' wall that the smoke does not escape, but comes into the house. Let the plaintiff cease to light his fire, let him move his chimney, let him carry it higher, and there would be no nuisance." Apply the reasoning of this passage to the case of a slaughter-house and it is clear that Mr. Justice Fry gave a wrong judgment. It does not appear, indeed, that the case of Bryant *v.* Lefevre was brought to his attention, which could hardly have failed to have influenced his judgment. The reason of such a view as we have pointed to is obvious. A man has a right to do with his own what he will, so long as he does not injure another, but each adjoining owner has to give and take, and to prevent a man from building because he obstructs the flow of air is to prevent his doing what he will with his own. When my neighbour darkens my house so as to prevent its being properly used, when he builds so close as to stop *all* circulation of air, then he causes a nuisance injurious to health; but if a man chooses to exercise a trade which requires a special amount of air, he must go and do so in a place fitted for it, and not prevent the legitimate enjoyment and use of his neighbour's property. If this idea is properly grasped, it becomes evident that,—especially having regard to the Prescription Act,—light and air stand in the eye of the law on a very different footing, and that, in spite of the judgment of Mr. Justice Fry, the obstruction of the latter element only gives a right of action when it has caused what the law calls a nuisance.

HIGHER TECHNICAL EDUCATION AND COOPER'S HILL COLLEGE.

All those of our readers who are interested in the training of young men for any branch of the great technic profession, including engineering, architecture, and survey, should pay attention to the change announced to be impending in the conditions under which pupils will henceforth enter Cooper's Hill College. At present the door of entrance is narrow. It is guarded by a competitive examination of some severity. But once inside, the future of the pupil is in his own hands. Employment in India is assured him at the close of his college course, so that he conducts himself well.

It is now proposed, we are told, at the same time to widen the gate of entrance, and to take away from the College the great privilege of certain provision for its pupils. For the competitive examination at entrance, a pass examination is to be substituted; the pupils being admitted in order of application, and the limit of age at entrance is enlarged from nineteen to twenty-one years. The effect of this will probably be to obtain more pupils from the more wealthy classes, rather than to secure the pupils most likely to distinguish themselves. The cost of the education and maintenance of a young man from nineteen to twenty-one is more than that for any other two years of his life, and those parents and guardians who can afford this additional outlay will only be found among the wealthier part of society. These "late men" will,—or may,—be of two kinds. There will be those who, having repeatedly tried, and as often failed, to pass various examinations, will come thus late in the day to Cooper's Hill. But there may also be those who desire to make sure, and who may have enjoyed even a university training. Against these men, if they have worked for their two extra years, the ordinary student will have but little chance. The public school men,—who now take their fair share of entrances,—will be distanced, and the educational character of the place will be altogether changed.

But this is not all, nor nearly all. The competitive examination is to be shifted to the close of the course. This means that the posts to be given to the pupils will be limited,—and other information leads us to anticipate narrowly limited,—in number. Indeed, it may with much probability be suggested that the fact that the college is now supplying an unusual number of engineers for whom there is really no room or need in India is the real meaning of the change. But, if so, how much better simply to announce that, in future, only a certain number of appointments would be annually given.

It may have been thought that such an honest bit of truth would have reduced the number of pupils. Very likely so; but does the college exist for the pupils, or the pupils for the college? It is very likely that the new arrangement, if carried into effect, will for a time increase the number of pupils, and the profits of the establishment. But we do not think such an increase likely to be permanent. When what we anticipate to be the necessary effects of the change become gradually patent, a revulsion will set in. What is required by the country, and what is best for its service, must, in the long run, be also best for our great educational establishments. There are certain points in which change was desirable at Cooper's Hill, and in which, in the due course of things, change has come to pass; but we seriously deprecate the present plan of turning the establishment into a trap for pupils.

EDUCATION IN SPAIN.

It is satisfactory to feel, and agreeable to be able to state in these columns,—where the interests of hygiene and sanitation have long been advocated,—that the consideration of their importance is spreading to countries where but a short time since their existence was almost ignored. A Parisian journal, the respected *Débats*, in a recently-published letter from a Madrid correspondent, has given some interesting details regarding a new educational institution opened in the Spanish capital. In the list of studies followed, hygiene finds a special place by the side of the varied branches of literature, science, and art. In many other respects, too, is this an excellent institution. One general rule regulates the whole system, the education is effected as much as possible without the aid of books, which, indeed, during the first years are almost completely absent. The book is used merely as a secondary or auxiliary means of instruction; in lieu of the old system, in which the memory of the pupil is tortured to retain what has been mechanically learned by rote, his eye and mind are made to appreciate what the book can never explain. The system, it will be seen, resembles much what in our modern art education has led to such excellent results, drawing from the round instead of from the flat; the intelligence is exercised and strengthened. But not here does this process stop in the institution to which we are referring; indeed, it may be said that it is only at this point that commences the veritable innovation. The education is completed by means of excursions made by classes, under the direction of their professors, with a view to examining and studying what cannot be learned in the institution. Extending beyond the walls of the capital, visits are often made in the provinces. In town these are made to the museums, art-collections, the Observatory, the Botanical Gardens, the various great factories, and even shops, new buildings, or engineering enterprises in progress. In the provinces the visits are made to sites interesting from an archæological, artistic, and geological point of view. From their observation, and the information they have gathered, the pupils on their return are called upon to prepare an account of what they have seen,—an account corrected by their professor. Excellent exercise for the eye, the mind, and the power of reflection and of expression, it can be understood how invaluable may be the result of this method in practically educating men for the business of life such as it is in the present day, so different to that of the past, for which the existing system of education was formed, and has been so faithfully handed down to us. How practically the system has already been set to work, may be judged from the fact that in July last considerably more than 200 excursions and visits were made under the conditions above specified. It is many centuries since the world has

looked to Spain for the initiative in the progress of culture, for the first steps towards which, in modern times, we owe so deep a debt of gratitude to the Moorish conquerors of the Peninsula, over which, after their departure, so black a night slowly fell. But again, the hope is promising that Spain may take its rank worthily with the other nations of the civilised world in the endeavour with them to advance the sum of human health, wealth, and wisdom.

THE DEATH OF SIR THOMAS BOUCH.

Those of our readers who have taken an interest in the circumstances attending the destruction of the Tay Bridge, which have been so frequently referred to in our columns, must have read the announcement of the death of Sir Thomas Bouch with a feeling of melancholy regret. Whatever view may have been taken with regard to the amount of personal responsibility which rested upon the engineer in relation to the calamity of last December, the sorrowful ending of so successful a career carries the mind beyond the range of technical fault-finding, and ought to lead us to contemplate rather the bright than the dark side of a life that has terminated so sadly. Any one who saw the late Sir Thomas Bouch moving to and fro during the inquiry into the disaster with which his name must for ever be associated, could not help seeing that he was a stricken man. The tear and wear of his professional life, mixed up as it had been for many years with ventures in which he had a deep pecuniary interest, had already begun to tell their tale. When, in addition to all this, he suddenly found himself thrust out of the position of trust and responsibility which his abilities had rendered apparently secure, and placed in an attitude of defence towards the work of his own intellect, and the anxious labour of years, the strain that was thrown on his constitution could be read by the passer-by.

The circumstances, in the mere aspect of their human interest and as a commentary on the vanity of human affairs, appear to us to afford the materials for a tragedy, the motive of which is peculiar to the times we live in. In the climax, when the fates have come with the shears, the end, instead of being a culmination of the sorrow, is rather of the nature of a kindly remedy for evils that could not longer be borne. It is very questionable if any opportunities that might have been afforded by the prolongation of life, even beyond the common span, would have so altered the aspect of what has passed as to have removed the causes of mental anxiety and suffering. We hope, that now he has gone, the lesson he has left to the living may never be taught at the expense of a kindly regard for the dead.

The curtain has fallen on a human tragedy, which we have already spoken of as having a motive peculiar to the times we live in. It is true that in its external aspect there is not much to strike the mind as different from the exigencies of an ambitious career in all ages. The successful general who, after having conquered his enemies, has himself been conquered, is a familiar subject for the dramatist. But with him each action of his life has to be judged from the individual circumstances surrounding it. If his enemies were fighting for their rights, success could never justify the object of his labours. But in this nineteenth-century tragedy we find a general in the army of labour, fighting in a noble cause, who has fallen a victim to the inexorable watchfulness of natural laws that are ever ready to revenge themselves upon mistakes. The foes with whom he fought were never encountered in support of an evil cause. Let us not, then, think of Sir Thomas Bouch as one who destroyed the Tay Bridge, as might have been done by the leader of an invading army. He did his best, in circumstances surrounded by trial and difficulty, to make it secure. In his battle with the elements, it was at least his sincere wish to succeed in the interests of progress and civilisation. Even those who were ready to quote the sad death of the sufferers from the accident as a ground for indictment are silenced by the mournful event that has followed. Sir Thomas has died of a broken heart, and gone to join the multitude of the rank and file of the army of labourers whose lives, in the great vortex of modern civilisation, have met with an untimely end. In spite of the sad termination to his career, we can still look back on his previous work, and deplore the loss of a great builder.

Requiescat is a sentiment that all men, even those who felt most keenly and spoke most loudly about his responsibilities, will now be ready to express. Rest from such afflictions appears the most merciful interpretation of death when hope has ceased to secure a hearing.

LANGNESS LIGHTHOUSE, ISLE OF MAN.

Two years ago (vol. xxxvi., p. 952) we gave an account — somewhat popular in its nature —of the Chickens Lighthouse in the Isle of Man, and the remarkable marine scenery by which it is surrounded. A comparatively short sail or steam in a northerly direction brings the mariner off Langness, a low, rocky promontory, which projects into the sea nearly three miles from the mainland. Its very lowness partly constitutes its danger to navigation, as in foggy weather a vessel may touch the rocks before they are perceptible, and even on a comparatively calm day an angry current, a continual seething and foaming of the waves, surrounds the promontory some distance from the land. Scarcely a winter passes without two or three vessels ending their days on these treacherous rocks. It is therefore none too soon that the Commissioners of Northern Lights have just completed the erection of a lighthouse on this spot. The engineers were Messrs. Stevenson, and the actual buildings are now nearly completed. The lighthouse is 59 ft. high, and is surrounded by a square enclosure, within which are comfortable houses for the keepers, whilst at the back are yards and piggeries, the whole forming an exceedingly complete set of buildings, having regard to the purpose for which they are to be used. Being on the mainland, it should be a favourite station, for it is no little addition to their actual duties for the lightkeepers to spend weeks of a lonely existence caged within a narrow structure surrounded by the sea, as are those who have charge of the Chickens and Skerryvore lighthouses. The buildings are all of greystone, and in addition to the warning which this light will give in stormy or thick weather, it will be a useful guide for the fishing-boats and trading-ships which have to enter Castletown Bay. The beacon will be lighted on the 1st of January next, and from that day it may fairly be hoped that no more wrecks will be heard of on this treacherous spot, and that Langness, from being a terror to the passing sailor, will become a guide to those who have to navigate these northern but frequented seas.

CONVERSION OF COOK'S BUILDINGS, LUDGATE-CIRCUS.

A NEW CITY CLUB.

The extensive new buildings forming the north-west side of Ludgate-circus, which, a few years ago, were erected by Mr. John Cook, at an outlay of about 60,000*l.*, are to a great extent about to be utilised as a new City club on a very comprehensive principle. The ground and mezzanine floors will still be occupied by Messrs. Thomas Cook & Sons, the well-known excursionists, but the upper portions, which have hitherto chiefly been used as the offices of London representatives of several of the leading provincial daily newspapers, are henceforward to be appropriated to club purposes, and are at present undergoing the necessary alterations. There will be altogether upwards of twenty rooms forming the club, several spacious rooms on the first floor consisting of a library and reading-room, well supplied with newspapers and periodicals. The second and third floors will be set apart for *restaurant* and dining purposes, whilst the floor above will be fitted as billiard-rooms, with provision also for other games. There will also be smoking-rooms, whilst some of the apartments are intended to be used for conversational purposes by members of the club. The *cuisine* department will be at the top of the building, with lifts communicating with the several floors, and the manager's apartment will likewise be on this floor. Special accommodation is intended to be provided for members of the press who may choose to connect themselves with the club. A room will be set apart for their exclusive use in preparing manuscript for the several newspapers with which they are connected, and this room will be open the whole of the night under the care of an attendant. The club is to be conducted on strictly temperance principles, no alcoholic drinks being permitted.

The alterations in the interior are being carried out under the superintendence of Mr. Cundry, the architect of the building.

DECORATIVE SUGGESTIONS FROM NATIONAL FORMS.—No. 5.

The plant figured in this number, *Solanum jasminoides*, is remarkable, not only for its great elegance and grace of form, but for the fact that it combines two forms of leaf, a one-lobed and a three-lobed form, the latter being (in the specimens we have observed) mostly developed in the upper portion of its growth. The blossom has five white petals very symmetrically arranged, to which the stamens form a yellow centre. It is a climbing plant, having some resemblance, as its specific name implies, to the jasmine, but not found in northern latitudes of Europe. This combination of the single and triple leaf is one point observed in the designs here based upon it, for a wrought-iron grille, a wall-diaper, and a decorative tile. The lines of the natural plant, both in its general growth and in the form of the leaf, are so clean and precise that they are susceptible of being applied in ornamental design with much less conventionalism than is necessary with many natural types. The iron grille is perhaps more naturalistic than is usually desirable in such a material, the character of the plant forming the excuse for such a treatment. The slightly waved or serpentine line of the main uprights is directly derived from the manner of growth of the stalk, which shows a prevalence of slightly sinuous lines. Such a treatment is in keeping with the ductile nature of wrought iron, and aids, in fact, in expressing the character of the material; in cast iron it would be out of place.

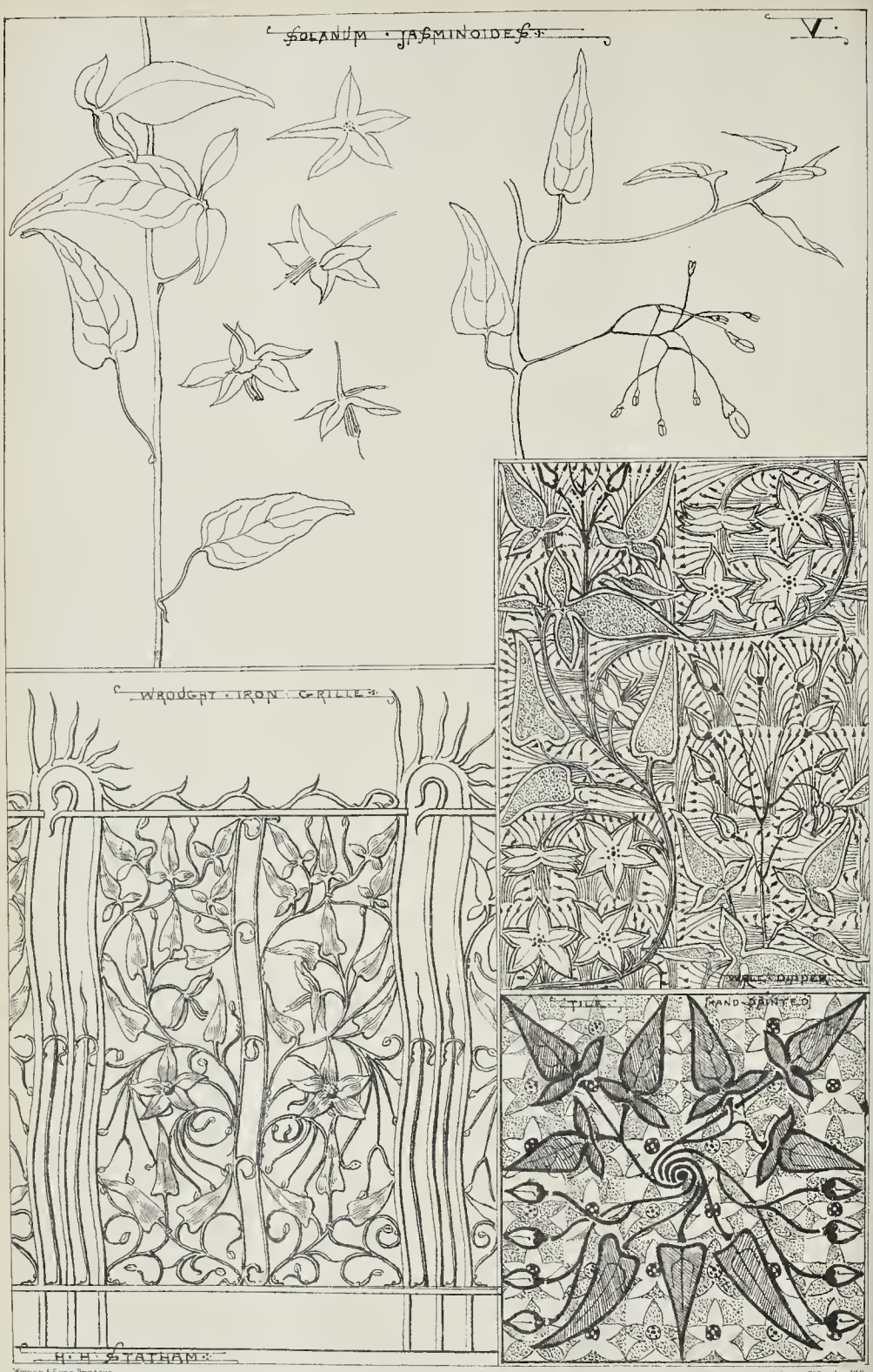
TRIUMPHAL MONUMENT, FREIBURG, BADEN.

Breisgau, which for 200 years formed the extreme south-west frontier of Germany towards Elsass, from the time the latter was taken by the French, was in great danger in January, 1871, of being overrun by Bourbaki's army. The struggle which was maintained for several days by a German force against an enemy who outnumbered it more than three times, has been compared with that of Thermopylæ, with this difference, however, that the modern Spartans successfully resisted the equally modern Persians, and thus saved their frontier-land from being ravaged by an exasperated foe. This glorious fight, with their back to the wall, determined to conquer or to die, was sustained by the Fourteenth German Army Corps, under their able leader, General von Werder. The three days' battle on the Lisaine, on the 15th, 16th, and 17th of January, which completed the defeat of Bourbaki's army, saved Baden, and in the first place Breisgau, from threatened devastation and ruin. In thankful remembrance of the conspicuous bravery displayed by the troops engaged, the principal city of Breisgau, Freiburg, has erected a monument to her saviours, which was unveiled in the presence of the German Emperor and Crown Prince, members of the reigning house of Baden, General von Werder, and many deputations from the Fourteenth Army Corps. The monument (of which we give a view), certainly one of the most imposing of the many trophies lately erected in Germany, has been executed by Professor Moest, of Karlsruhe, after his prize design; it is erected on the Kaiser-Wilhelms-Platz, formerly Casernenplatz; and bears four inscriptions. The principal one may be thus Englished:—

TO THE
XIVth GERMAN ARMY CORPS
AND ITS LEADER,
GENERAL VON WERDER,
THE GRATEFUL BADEN PEOPLE.

The artist has, in an appropriate manner, expressed the principal characteristics of that great struggle by the defensive attitude of the four soldiers placed on the projections at the four corners of the base. Their duty was, not to act offensively, like their opponent, but to defend the open gate of their unprotected fatherland to the last man.

Thus three German men of eminence have been honoured in Freiburg by monuments, viz., Rotteck, the liberal historian; Berthold Schwarz, the inventor of gunpowder; and Werder, a veritable modern Bayard.



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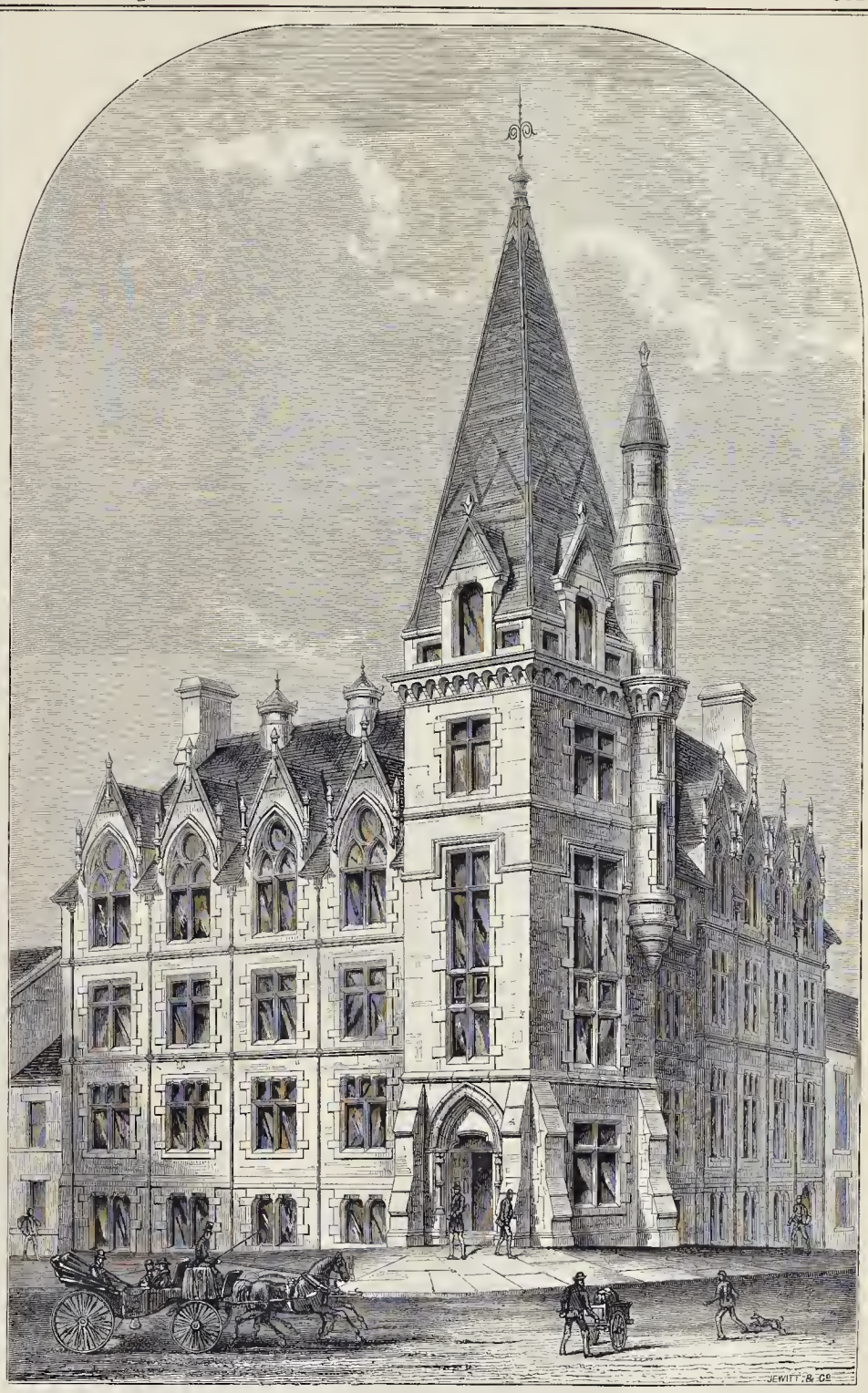
DECORATIVE SUGGESTIONS FROM NATURAL FORMS. — No. 5.

THE TROPHY, FREIBURG IN BREISGAU.—Professor Moest, Karlsruhe, Sculptor.



PUDSEY MECHANICS' INSTITUTE.—Messrs. Hope & Jardine, Architects.

Whiteman & Bale Photo Lith. 256 High Holborn

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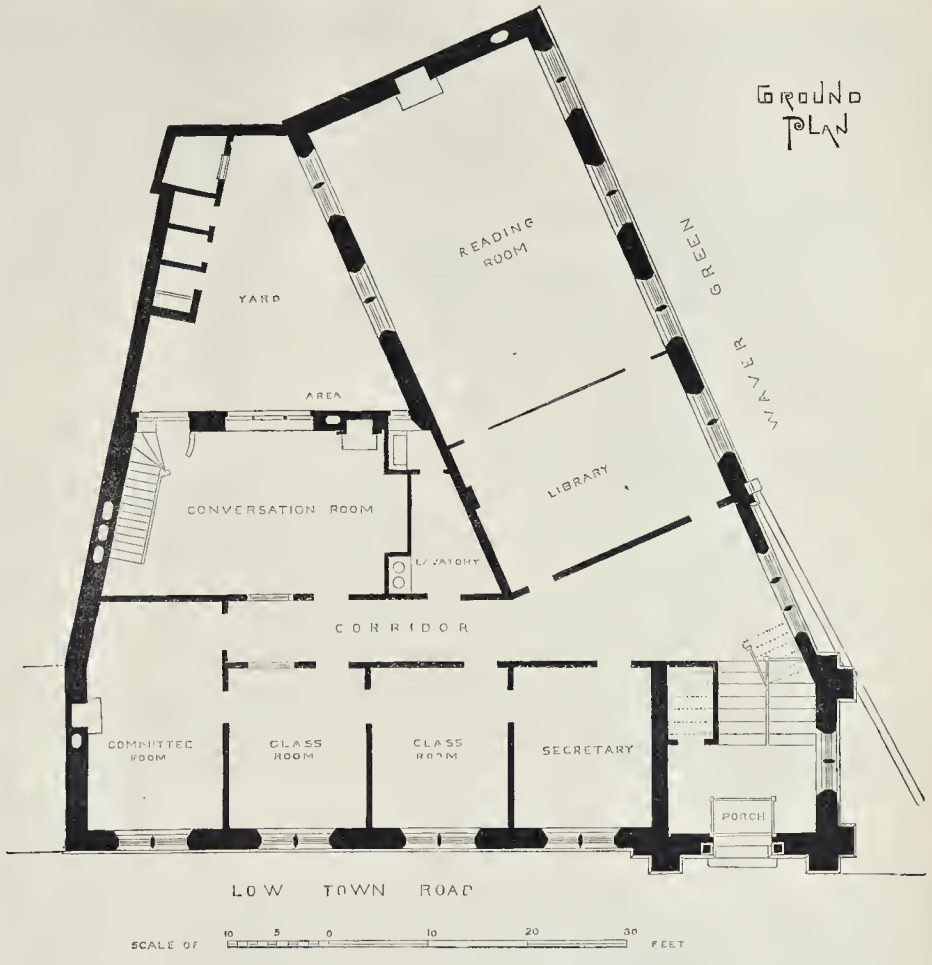
RESIDENCE AT BLUNDELLSANDS, NEAR LIVERPOOL.—Mr. T. Mellard Reade, Architect.



MECHANICS' INSTITUTE, PUDSEY, NEAR LEEDS.—*Plan of Ground Floor.* [For View see p. 561.

MECHANICS' INSTITUTE, PUDSEY, NEAR LEEDS.

About the middle of last year the committee of the Pudsey Mechanics' Institute invited architects to submit designs in competition for a new building. In response to the invitation, several sets of plans were received, and after these had been examined, the design of Messrs. Hope & Jardine, architects, Bradford, was selected as first in order of merit, and consequently these gentlemen were engaged to carry out the works.

The new institute, which is now about to be opened, occupies one of the best sites in the town, being at the junction of Low Town-road and Waver-green, two of the principal streets. It contains on the basement-floor a large room, intended to be used for public tea-parties, or similar gatherings, with the necessary kitchen accommodation adjoining, a number of class-rooms, lavatory, &c. These rooms are all well lighted, and the staircase arrangement is such that this floor can be used without interfering in any way with the upper ones.

On the ground-floor are a spacious reading-room and library, a conversation-room, a committee-room, two class-rooms, a secretary's room, and a lavatory.

On the first floor, which is reached by a staircase, are a large public hall, situate on the Low Town-road side of the building, capable of seating 600 persons,—a ladies' cloak-room, and a smaller lecture-hall, to be used for science-lectures, &c.

The public hall has a gallery round three sides, which is entered from the second-floor level, and it has also connected with it two ante-rooms for the use of the lecturers or those engaging the hall.

On the second-floor,—over that part of the building which fronts Waver-green,—are large, well-lighted rooms, for the use of the art classes connected with the Institute.

A good stone obtained from the quarries in the neighbourhood was used in the erection of the building, and the different works were let as follows:—

Mason's work, Mr. James Smith, of Bradford; joiner's work (including library-fittings and seats to the public hall), Messrs. A. & J. Briggs, Bradford; plumbers and glazier's work, Mr. J. Wilcock, of Pudsey; plasterer's work, Mr. Wm. Tattersall, Bradford; slater's work, Mr. Jas. Smithers, Great Horton; painter's work, Mr. Wm. Simms, Pudsey; ironwork and heating apparatus, Messrs. Taylor & Parsons, Bradford. Mr. J. T. Boothman was clerk of works.

The total amount of these contracts is about 3,200*l.*, and will not be exceeded. The amount allowed to be spent, according to the instructions to competing architects, was 3,000*l.*

RESIDENCE, BLUNDELLSANDS, NEAR LIVERPOOL.

The subject of our illustration is a residence built for Mr. Joseph Gardner on the Blundellsands estate, situated on the coast about seven miles from Liverpool by the Liverpool, Crosby, and Southport Railway.

The west front faces the sea, having views, over the entrance to the river Mersey, of the Cheshire and Welsh coasts as far as the Great Orme's Head. The Crosby Channel, by which most of the numerous ocean steamers and large sailing-vessels enter and leave Liverpool, lies just outside, and at high water the sea presents a very fine aspect.

The materials of the walls are local grey brick, with moulded Ruabon red brick quoins and other dressings. The upper part of the house is half-timber work filled in with cement. The outside timber is all Baltic fir; the inside joiners' work is of pitch-pine. The contractors were Messrs. Wells & Son, of Bootle, and the architect is Mr. T. Mellard Reade, of Liverpool.

The cost has been about 2,500*l.*

The Case of Mr. Strachan.—In addition to the sums mentioned last week, we have received 10*s.* 6*d.* from Mr. William H. Pipe, of Tottenham, and 1*l.* 1*s.* from Mr. Robert J. Johnson, of Saville-place, Newcastle-on-Tyne.

"DRINKING-WATER AND ENTERIC FEVER AT LLANDUDNO."

With reference to a paragraph under this heading, in a previous number of our journal (p. 513, *ante*), we have received letters from, *inter alia*, the engineer and clerk to the Llandudno Improvement Commissioners, Mr. T. T. Marks; from a member of the Board, and the solicitor of the Board, Mr. Chamberlain. It will be sufficient to print the last-named:—

Sir,—I am instructed by the Llandudno Improvement Commissioners to call your attention to a paragraph in your paper of the 23rd inst., headed "Drinking Water and Enteric Fever at Llandudno," in which it is stated that fever was due to the drinking of polluted water at Llandudno. A statement of this kind going the round of the newspapers is very injurious to a health-resort like Llandudno. The medical gentlemen practising here, and the occupiers of houses, are under statutory obligation to give notice to the commissioners of any case of infectious disease, and are subject to heavy penalties for not doing so. (See Sect. 14, Llandudno Improvement Act, 1879.)

Now, the commissioners know of no case of enteric fever occurring here during the present year, and they are quite ignorant of the facts (if facts they are) contained in the paragraph in question.

Under these circumstances I am instructed to *demand* of you the name and address of the author of the paragraph. I may add that our water is peculiarly pure, as the copy of an analysis, by an eminent chemist, sent by this post shows.

You will, I am sure, appreciate the importance of supplying my clients with all the information in your power, as, if the statement is untrue, proper publicity should be given to a refutation of it, or should there be any doubt about its truth, no one is more interested than my clients in thoroughly investigating the matter.

R. S. Chamberlain.

Llandudno, 29th October.

Of course, Mr. Chamberlain may "*demand*" (the italics are his), if instructed to do so, but we are not bound to comply. We should be quite willing to aid the Board in making the desired investigation,—anxious, indeed, to do so; but we cannot subject a family scarcely recovered from serious illness to the correspondence which would follow. It will be seen, on referring to the paragraph, that no slur was cast on the water as supplied from the waterworks; for we do not even know if the house occupied was supplied from the waterworks, or by a well, or rain-water cistern. We merely stated what we know to be a fact, namely, that three of the family who drank water while at Llandudno were attacked with enteric fever within a few days of their return home. The object of the paragraph was to put the sanitary authorities of Llandudno on the alert. Since the paragraph appeared, moreover, we have received letters from two other persons whose families have fallen ill after a visit to Llandudno, and as the writer of one of them desires that his name should be given, we print it:—

Sir,—Having had your paragraph in the *Builder* forwarded to me respecting the water and enteric fever at Llandudno, I lose no time in adding my testimony to that of your correspondent. I and my niece were staying at the above place for a month; she during her visit being a "water-drinker." On returning home she complained of illness, which in due course developed itself into a decided case of "enteric fever." Her medical man is convinced the poison was contracted away from home, and, of course, could only be traced to Llandudno. She is now slowly recovering, after nearly two months' illness, and I think, with your correspondent, that no time should be lost in having the matter thoroughly investigated by the sanitary authority, or else people seeking health and strength may unsuspectingly find their graves.

Thos. Harding.

P.S.—Kindly insert this in your next issue.

Fair Lawn, Weston, Bath, 29th October.

Sir,—The local authority of Llandudno may imagine that they supply pure drinking-water, and analyses of samples in bulk may warrant the opinion; but if water-drinkers who have been resident in Llandudno suffer from enteric fever, and medical men give it as their opinion that the fever must have arisen from the water drunk, neither indignation nor official threats will alter the facts. The wisest thing the local authorities can do will be to cause a house-to-house investigation to be made in the manner now described. Ascertain if or not the domestic supply is drawn from cisterns situate within the house. Are these over water-closets or middens, or near to them? Are the cisterns open or covered? Are they ventilated? Is the over-flow pipe severed from the house-drain? Water may be rendered impure and poisonous by sewer-gas passing from a drain up the overflow-pipe, if the tank or cistern is covered and unventilated. Cisterns over or near water-closets or middens may become tainted by the water absorbing sewage-gases. Dirty cisterns may render water impure.

The Llandudno officials had better set their inspector of nuisances to work rather than their solicitor. They may depend upon it that the old proverb will prove true in their case,—namely, where there is smoke fire may be strongly suspected. So, where there is enteric fever amongst water-drinkers there must be a strong suspicion of impure water, and it is the duty of the Local Authority, and the interest of the ratepayer, that this suspicion should be removed.

Civil Engineer.

THE OPENING *CONVERSAZIONE* OF THE ARCHITECTURAL ASSOCIATION.

The thirty-ninth session of the Architectural Association was opened with the usual *conversazione* on Friday, the 29th ult., in the galleries in Conduit-street. Owing to the galleries being occupied by the exhibits of the Institute of Art, the Association was unable to make its usual display of drawings, &c., with the exception of a few laid on the tables in the large gallery, among them being some good water-colour drawings of architectural subjects in France and Italy by Mr. Aston Webb and Mr. F. T. Baggallay. We must also make mention of a large and noteworthy view of St. Alban's Abbey as it now stands, with the new high-pitched roofs over the nave and part of the south aisle,—as seen from the rising ground on the south of the river. This, a boldly-executed water-colour drawing in grey and white, was lent by the artist, Mr. Wyndham Hughes, and is likely to prove of interest and value on various grounds as time wears on. The drawings submitted for prizes offered by or through the Association were exhibited in the meeting-room of the Royal Institute of British Architects, kindly placed at the disposal of the Association for the evening by the Council. During the evening the band of the Royal Engineers performed a selection of music in the large gallery, and the Museum of Building Appliances was, by permission of Mr. D. V. Boyd, open to the inspection of the company.

Shortly after nine o'clock, the President, Mr. Ernest C. Lee, took the chair in the meeting-room of the Institute, and before proceeding with the distribution of prizes, mentioned that letters from several architects of eminence apologising for their inability to attend the meeting had been received, including one from Mr. Decimus Burton, who expressed regret that in consequence of age and infirmity he was precluded from being present, and enclosed a cheque for ten guineas to be added to the prize fund. The President announced that the *Essay Prize* would not be awarded this year, only one essay having been sent in,—a production which was not considered by the judges to be worthy of the prize. With regard to the *Architectural Union Company's prizes* for measured drawings, those sent in under the motto "Gipsy" had been adjudged the best, but it was doubtful whether the first prize could be awarded to them, they having been submitted elsewhere on some other occasion. The decision, therefore, remained in abeyance until the question raised had been settled. The second prize in the same competition was awarded to Mr. J. L. Houston. The *Architectural Association's Silver Medal* and a sum of 5*l.*, were taken by Mr. Vaughan. In the *Class of Design*, the first prize was carried off by Mr. M. J. Lansdell, and the second prize by Mr. R. J. Lovell, honourable mention being made of Mr. Burrows. The *Elementary Class of Design* prizes were awarded as follows:—First, to Mr. H. C. Stock; second, to Mr. G. Blizard; the work of Mr. C. C. Bradley being mentioned with honour. The first prize offered to members of the *Class of Construction* went to Mr. Sbilcock, the second prize to Mr. Clifton, and honourable mention was made of the work done in the class by Mr. Yetts. In the *Class for Colour Decoration*, the first and only prize was taken by Mr. S. R. Smith.

The President then delivered a brief address, the first part of which reviewed the early history of the Association, and contrasted its at one time languishing condition with the prosperity and usefulness that have of late years distinguished its operations. It has now upwards of 800 members, and an attempt is being made to institute an annual prize, worthy of the Association's position as an educational body, in the shape of a travelling studentship for the younger members of the profession. The sub-committee charged with the consideration of the matter have resolved to recommend to the general body of the Association that a scheme he set on foot for raising the sum of 400*l.* to endow a travelling studentship named after the Association, and that this sum be raised among the members, past and present, of the Association. To avoid apparent competition with other travelling studentships, it is recommended that the age of candidates be fixed at twenty-three. Secondly, it is proposed to nominate a special prize fund committee with the view of raising funds to increase the value of the existing annual prizes. Having dwelt on some of the vagaries of fashion in architecture and internal decoration, Mr. Lee concluded by remarking that the great exponent of art in its domesticity is woman; to her we look to provide us with those externals which are pleasing to the eye and soothing to the artistic sense. It is she who holds the power of making the house a garish waste or an abode of pleasure. It is to her we trust to inculcate the lesson that extravagance is not art; that the simplest materials may, by means of thought and discretion, be transformed into objects far more satisfactory to the sight than the costliest if handled by the unwise. To woman, again, we look to point out the way to the young idea. Let good taste be cultivated in the nursery; let the receptive eye of childhood have its lesson in colour and in form; give it the advantage of becoming familiar with the works of such genial masters as Caldecott, Miss Greenaway, and Walter Crane. We all know a "Philistine" when we meet him: the rising generation should be saved from becoming such as he. We do not want prigs, Postlethwaites and Cimabüé Browns; but we do like an appreciative and discriminating audience, and we desire something more,—we want a public who by their outside pressure will eventually bring England to the first place in art, as in most other matters she already is, and to that end we ask the continued co-operation of the ladies.

Mr. Roger Smith congratulated the president on his occupancy of the chair of the Association, and further congratulated the members of the Association on the fact that they were then assembled in the meeting-room of the Institute. It was gratifying and an augury of good for the future that the two societies which might be said to have architecture in their keeping, while distinct,—and long might they remain so,—could yet heartily co-operate with and encourage one another. He was very glad to see that the anticipations upon which he and others ventured some years ago with regard to the question of a diploma for architects were being justified by the examinations established by the Institute, and he reminded the young members of the profession that in 1882 admission to the Associateship of the Institute could only be by examination, which would then be compulsory instead of voluntary as at present. He trusted that the result would be, before very long, that those entering the architectural profession would generally avail themselves of the opportunity of obtaining what would be to them something like the real and authoritative diplomas without which the members of some other professions could not practise. He thought that the Institute and the profession at large were to be heartily congratulated on having arrived at so important a point, and the Association, by carrying on with unabated vigour its classes and other work as an educational body, was capable of doing much to ensure the success of the compulsory examination, in which its members would now have an additional stimulus in the pursuit of their studies.

Mr. Chatfeild Clarke also addressed the meeting, observing that the question which lay at the root of the work of the Association was how best to fit its members for entering and remaining in the architectural profession with honour to themselves and satisfaction to the public under the conditions of competition and depression amidst which it had now been for some time carried on. The architectural practitioner, young or old, should, he need hardly say, maintain a high sense of honour and professional honesty, both towards his clients and his brother practitioners; and not the least of the claims of the late T. H. Wyatt and Benjamin Ferrey on the remembrance of the profession was that they had always conformed to a high

standard of honour. Not long ago he (Mr. Clarke) had ventured in that room to protest against some dangerous advice given to the younger men of the profession by an able and eminent member of another profession, the tendency of which was that individual architects should think of themselves only and not of the welfare of their profession. They might depend upon it that they would best consult their own interests in the end by pursuing an undeviating course of honourable conduct towards their professional *confrères*. The times of depression which had operated so disastrously to the profession were, he hoped and believed, passing away, and he thought he could discern good prospects in the future for all who would pursue their work with energy and high integrity. All such might hope to reap in due time the rewards of a profession which was not only highly honourable in itself, but the pursuit of which offered everything that could gratify the artistic taste of a cultivated mind.

Mr. Phené Spiers having made a few observations, the formal part of the evening's proceedings was brought to a close.

THE TOPOGRAPHICAL SOCIETY OF LONDON.

The inaugural meeting of this Society was held in the Long Parlour of the Mansion House on Thursday afternoon, October 28th, when Mr. Robert Harrison, librarian of the London Library, presided, in the unavoidable absence of the Lord Mayor. Letters expressing interest in the Society were read from Mr. Lowell, the American Minister; Lord George Hamilton, M.P.; Mr. Fawcett, Postmaster-General; Mr. Alderman and Sheriff Fowler, M.P.; Sir John Lubbock, M.P.; the Right Hon. J. G. Hubbard, M.P.; the Earl of Rosebery, Alderman Sir Sydney Waterlow, Mr. J. A. Froude, Mr. W. Morris, and other gentlemen.

Mr. H. B. Wheatley, F.S.A., said the want of some general organisation by means of which the constantly changing phases of "the world of London" should be registered as they passed away had long been felt; and, in fact, in a country like England, where materials were abundant in almost all departments of knowledge, the great want was a centre to which the different atoms might gravitate. Every day landmarks were swept away, often with little present notice, and generally with total forgetfulness on the morrow, so that the society was not formed a day too soon. The points to be taken up by the society were numerous, but the following were, perhaps, some of the most important, viz., the collection of documents, deeds, &c. (original and copied), and of extracts relating to the history of and associations connected with places in and around London, arranged in an accessible form; the collection of information relating to the etymology of London place-names, and preparation of a record of changes in London nomenclature; the preparation of maps and plans showing the position of public buildings, streets, &c., at various periods; the preparation and publication of a bibliography of London topography; the preparation and publication of an index of London drawings, prints, antiquities, tokens, &c., in various collections; the publication of copies of old London engravings, and also of unpublished drawings. In order to keep the members informed as to the work of the society, it would be necessary to prepare a full annual report; and as one means of obtaining trustworthy information it was proposed to appoint local committees to watch over the topographical changes and demolitions in the several districts. The scope of the Society's work would, as he had said, be very large, for it would include the preparation of maps and views of London during the Roman, Saxon, Norman, and Plantagenet periods; the publication of interesting records from the State papers, and monographs of buildings about to be swept away. There was reason to believe that many of the ancient institutions of the city had much valuable topographical information in their possession, which they would be willing to impart to the Society. Mr. Wheatley added that the committee had discussed the advisability of uniting with one or another of existing and kindred societies, but had decided that it would be better to found a new organisation, though one that would be on the most friendly footing with other institutions.

A letter was read from the London and Middlesex Archæological Society, protesting against the formation of the Topographical Society on the ground that all their objects were already undertaken by that institution.

Major-General Baillie moved that the objects of the Topographical Society were worthy of the support of all those interested in the present and past of the metropolis.

Mr. E. Solly, F.R.S., in seconding the resolution, regretted the tendency of the age to destroy everything.

Mr. Winkley suggested that much valuable information could be culled from the old parish registers of the City; and

Mr. Furnivall described how the City teemed with reminiscences of Chaucer, Spenser, Shakspeare, Hogarth, Johnson, and others.

The resolution was carried; and the meeting separated after deciding as to the amount of the annual subscription and other details, and after passing a vote of thanks to the Lord Mayor for his courtesy in placing the Mansion House at their disposal.

ARCHITECTURAL ASSOCIATION: LIST OF PAPERS.

The following is the syllabus of papers for the ensuing session:—

November 5.—Address from the President (Mr. Ernest C. Lee).
November 19.—The Use of Cements. Mr. Gilbert R. Redgrave.
December 3.—Furniture. Mr. C. G. Vinall.
,, 17.—The Architectural Treatment of small Staircases. Mr. Aston Webb.
January 7 (1881).—A Week in Norfolk. Mr. C. R. Pink (Hon. Sec. Excursion Sub. Com.).
January 21.—Parsonages. Mr. Lacy W. Ridge.
February 4.—The Sanitary Work of an Architect. Mr. Ernest Turner.
February 18.—In Lombardy with the Architectural Association. Mr. Edward J. Tarver.
March 4.—Cheap Churches. Mr. William White, F.S.A.
,, 18.—Holland. Mr. R. Phené Spiers.
April 1.—Swimming Baths. Mr. L. C. Riddett.
,, 29.—Members' *Soirée*.
May 13.—Queen Anne Architecture. Mr. W. Burges.
,, 27.—The Use of Marble and similar Materials in English Architecture. Mr. T. G. Jackson, M.A.
June 10.—Colour Decoration as applied to Architecture, from a Painter's Point of View. Mr. R. Corbett.

EDINBURGH.

The department of the new medical class-rooms devoted to the study of anatomy in the new University Buildings, has been completed, and is now in use. This department occupies the east side of the south quadrangle, the class-room, measuring 58 ft. by 42 ft., with a height of 46 ft. 6 in., is seated for 500 students, the desks being formed of iron. There is a workroom, 29 ft. by 20 ft.; a house-room, 39 ft. by 38 ft.; and a retiring-room for the professors, 14 ft. by 20 ft. The upper floor of the south side of the quadrangle is occupied by a dissecting-room, 108 ft. in length, by 39 ft. wide, and 27 ft. high. The roof of this department is formed in ridges, and glazed towards the north, so as to afford a steady light; but there are also six large windows which augment the light at certain points, and are useful for ventilation. The room is fitted up with a number of wash-stands which will be supplied with hot and cold water, and there is other necessary accommodation attached, comprising cloak-room, &c. There is also a demonstration-room, 21 ft. by 10 ft., with an ante-room, and a smaller dissecting-room, 39 ft. by 20 ft. Adjoining the anatomy class-room is one 40 ft. by 17 ft. for microscopic observations, a laboratory, &c. The lighting and ventilation of these apartments has received special attention.

The great ventilating-shaft and chimney, regarding which so many disparaging remarks were made, when it was in course of erection, is now, when completed, generally acknowledged to be a picturesque and ornamental addition to the architectural features of the city. It consists of an outer cone of white brick, and within this is placed an iron tube, which is used as the smoke-flue. There is a space between these which will receive the heated and vitiated air and carry it upwards. This structure is about 180 ft. high, 18 ft. in diameter at the base, decreasing to about 12 ft. About 30 ft. from the summit are a series of narrow openings, with slender pilasters between, rising from an ornamental base, and capped by a cornice; it is surmounted by an elongated bell-shaped summit, with an opening at the top, which receives the termination of the inner iron tube.

Attached to the new infirmary was a class-room fitted to accommodate 120 students; but this has been found to be quite inadequate, and it has been resolved to extend the buildings so as to accommodate 300 students. Operations are being actively pushed on, and the building will be ready for the roof in a short time. The original plan of a semicircular auditorium has been adhered to, and the external elevations partake of the same character as the rest of the infirmary. The rebuilding of the class-room will entail a cost of about 1,300*l*.

St. Stephen's Parish Church, the exterior of which is considered one of the most successful efforts of the late Mr. Playfair, has undergone several important alterations in the interior. This interior was extremely bald and uninteresting, and the acoustic qualities were wretched. The latter defect will, it is expected, be modified by the alterations, and the harmonies of the interior enlivened. To make room for a new organ, by Willis, of London, the pulpit has been brought forward, and the choir platform entirely remodelled. Mr. David Rhind, architect, has carried out the new arrangements.

The new churches in course of erection at Morningside, Dumbiedikes, Canon Mills, and Gilmore-place, are progressing rapidly towards completion, and that at Rosehall is almost ready for occupation; in regard to all of which more hereafter.

At a meeting of the Guildry to elect a dean, more than usual interest was taken in the proceedings in consequence of the office being contested, a most unusual occurrence. The Council of the Guildry had, it appears, nominated Mr. William Macgregor, a well-known builder, for the office, but it was objected to him that, being engaged in active business, and, as he had often had cases before the court over which he would have to preside, it would scarcely be expected that he could perform the duties with the same impartiality as a gentleman not engaged in business. Mr. Robert Hutchison, of Hillwood, a retired builder, was accordingly brought forward, and, in spite of strenuous opposition, was elected over the nominee of the Council by a majority of eleven. This result is nothing short of a revolution in the proceedings of the Guildry; and a final blow is aimed at the old system of nomination by a motion of Mr. Stevenson, a member of the Corporation, to frame a code of rules for future guidance, embracing amongst these the election of office-bearers by a popular vote.

NEW BUILDINGS IN GLASGOW.

The new Theatre Royal, opened by Miss Marie Litton, is the third that has been built in Glasgow in as many years. It is not more than twenty months since the old Royal succumbed to the flames, and as another theatre, the Royalty, sprang up in the interval, it was doubtful for some time whether the building would be restored. About a year ago, however, the matter was set about in a practical way, the result being that Mr. C. J. Phipps, of London, was engaged to prepare plans. The new building is on the site of the old one, and the chief external alteration is the main entrance being changed from Cowcaddens-street to Hope-street. Quite close to each other are four entrances,—one for the dress-circle, one for the stalls, a third for the upper-circle, and the fourth as an extra opening to the stalls and boxes. The old main entrance is made available for the pit and amphitheatre, while the gallery door is that formerly used for the amphitheatre. Besides these, there are other means of exit from all parts of the house which can easily be brought into requisition in case of emergency. The stalls are laid out in five rows, affording accommodation for 100 persons; while immediately behind is the pit, capable of accommodating about a thousand. Overhanging the pit, at a judicious height, is the dress-circle, reached by a double flight of steps. This part of the house is seated for 312. At the back nine boxes, each for six persons, are curtained off, and behind these again are the ladies' and gentlemen's cloak-rooms and lavatories. The upper-circle rises above the dress-circle, while the uppermost parts of the house are, as usual, devoted to amphitheatre and gallery. The upper-circle accommodates 300, the amphitheatre 366, and the gallery from 900 to 1,000,—the whole available auditorium being thus capable of seating over 3,000 persons. The stalls and dress circles are fitted up with the folding chairs invented by the architect, and made by Mr. Wadman, of Bath. All the floors and passages are of concrete, while the inner

walls are of brick and Portland cement. The proscenium is 31 ft. wide by 36 ft. high, and behind the act-drop the stage measures 72 ft. in width, and from the foot-lights to the back wall 58 ft. The internal decorations are being carried out on an elaborate scale. The general character of the architecture of the interior is that of the French Renaissance, the roof terminating in a coved ceiling with a sun-light in the centre. An allegorical study representing the various arts allied to the drama is painted by Hartford, of London, over the proscenium. The decoration and gilding are being carried out by Mr. Edward Bell, of London, while Messrs. Jackson & Co., London, are constructing the box-fronts, proscenium, and ceiling with their patent fibrous plaster. Messrs. Burke & Salviati, of London and Venice, have laid out the vestibule in marble mosaic. The following Glasgow tradesmen have also been employed in the reconstruction of the building:—Stevenson & Sons, masons and bricklayers; Ross & Son, carpenters and joiners; Morrison & Son, slaters and concrete builders; McGregor, Gilmour & Co., and Stevens, ironworkers; Bremner, plasterer; Rae, plumber; Chalmers & Tosh, gasfitters. Mr. Wm. Browne acted as clerk of works.

In the course of a few days a new public building just erected in Adelaide-place, Bath-street, will be opened for the joint accommodation of the Glasgow Philosophical Society, and the Engineers and Shipbuilders of Scotland, who hitherto had suites of rooms from the Glasgow Corporation in Sauchiehall-street. The architects of the new building were Mr. T. L. Watson and Mr. W. J. Millar, C.E.; and the total cost does not exceed 6,000*l.* The architecture is of the Classic style, in harmony with the other buildings in the street. Of four stories, the basement will be occupied by the curator's house, museum, and heating apparatus. The street floor consists of library and reading-room, the first floor is set apart as a hall seated for 300 persons, with council-room adjoining. On the upper flat are two large rooms, to be used for sectional and other meetings. The Geological and Natural History societies of Glasgow intend to take rooms in the building.

A number of churches are in course of erection in Glasgow at the present time. The most important of these are the Woodside Established Church in Great Western-road, for the Rev. David Watson, which is to cost 9,000*l.*; a new Free Church at Dowanhill, Partick (the estimates for each are about 5,500*l.*); a Wesleyan church at the junction of West Nile and Sauchiehall streets to supplant the church in John-street, bought by the Corporation for the site of the new municipal buildings; and a new Evangelical Union church at Govan. Mr. Henry Higgins, jun., is architect of the Woodside church; and the designers of the Wesleyan building are Messrs. J. McKissack and W. G. Rowan. The architect of the Dowanhill church is Mr. Petrie, and the contractors for the work are:—Masons, Messrs. Gordon & Hamilton; joiner, Robert Carmichael; slaters, John Morrieon & Sons; plumber and gasfitter, Robert Russell; plasterers, Regali & Tonner; glazier, Messrs. Keir; heating, Combe & Son; brackets, Wm. Ramsay & Son.

LIVERPOOL ENGINEERING SOCIETY.

The usual fortnightly meeting of this society was held at the Royal Institution, Colquitt-street, on Wednesday in last week, Mr. A. Ross, president, in the chair. A paper entitled "The Combination of the Block and Interlocking Systems on Railways" was read by Mr. H. A. Dibbin, M. Inst. C.E. The author commenced with a brief review of the progress of railway signalling from its first introduction on railways, and thence the various improved methods in use at present were considered, chiefly in respect to the block system, and its vital relations to modern railway traffic-working. Diagrams were exhibited illustrating the main argument of the paper, to the effect that although the block and interlocking systems are in themselves pushed to every possible degree of perfection, they are as yet uncombined, and can, therefore, be actuated in antagonism to each other, through the fallible human agent who works them, and thus permit of disaster. Many methods, more or less successful, had been devised to overcome this great defect in railway working, but in order to effect a thoroughly safe and correct combination of the diverse elements, viz., the train, and the electric and out-door signals and the pointsman, they should each actuate but one electric current. This circuit should be so devised that its closing and unclosing permit no adverse element to intrude, and the train itself thus rule the road.

SANITARY RULES FOR PUBLIC BUILDINGS.

The following rules, to be observed in the construction of all buildings erected under her Majesty's Office of Works, have been prepared and issued by the Secretary to the Office of Works:—

1. All water-closets and urinals shall be constructed so that one wall at least of such closets and urinals shall be an outer wall of the building.
2. All soil-pipes shall be carried outside the building, and ventilated by means of pipes leading the foul gases above the highest point of the building. Such pipes to be carried to points removed from chimney-stacks.
3. Separate cisterns shall be constructed for the water-closets and for the general purposes of the building. No tap or "draw off" shall be affixed to any pipe communicating with a cistern supplying a water-closet or urinal.
4. All waste-pipes and overflow-pipes of cisterns shall terminate in the open air, and be cut off from all direct communication with drains.
5. Great attention shall be paid to insuring through ventilation in all rooms. Rooms so high that their ceilings shall be more than 2 ft. above the top of the windows, corridors, staircases, and other open spaces shall be specially ventilated so as to prevent the accumulation of stagnant air.
6. All main drains should, where practicable, be formed outside the building. In the event of its being necessary to carry a main drain underneath a building, it must be trapped immediately outside the main wall, and a ventilating-pipe must be carried from that point to the highest part of the roof, as under Rule 2.

THE PHOSPHATES IN WHEAT AND FLOUR.

Attention is being once more drawn to the impoverished condition of the finest end whitest flour, and to the superior nutritious power of "whole" or "entire" meal. These views have, for many years, received the warmest support and advocacy from the highest chemical and physiological authorities. But, notwithstanding these recommendations, the general public make only the most sparing use of whole meal bread, while the entire meal is, we believe, almost unusable for all other purposes. We have, therefore, no hesitation in recommending to the attention of our readers a process which has recently come under our notice, both theoretically and practically, and which presents two conspicuous advantages. It consists in restoring to the fine white flower, which the public so universally demand, those very important nutritious constituents,—the phosphates. Three-fourths of these salts contained in the wheat grain are rejected with the bran in the ordinary milling processes, yet they enter largely into the composition of the blood, brain, &c., while phosphate of lime forms eighty per cent. of the bony frame. The second advantage of this flour is that the phosphates are restored in such a form that the flour is "self-raising." Hence, for those who prefer the flavour of unfermented bread, yeast, &c., can be dispensed with, and the entire nutriment of the flour retained; while the pastry, cakes, and puddings, made with the flower are exceptionally light and digestible, and an economy is effected in butter, eggs, lard, and similar adjuncts.

An interesting pamphlet on this subject, which is issued by Messrs. McDougall Bros., of 10, Mark lane, informs us that the process is the joint invention of Mr. McDougall, well known in connexion with disinfectant preparations, and Professor Horsford, an equally well-known American chemist.

NEW MARKETS, ST. HELIER'S.

Extensive new markets are about to be built at St. Helier's, Jersey, on the site of the present Meat Markets, the old building and stalls of which are about to be swept away. Temporary stalls have been erected for the butchers in the Vegetable Markets, St. Helier's, and the contracts for the new markets have been let:—Masons' and excavators' work to Messrs. Fallaize & Tostevin, of Jersey; ironwork and painting to Mr. Dyson, of Elland, Yorkshire; carpenter's and joiner's work, plumber's and glazier's work, slater's and plasterer's work, and cement flooring, to Mr. David Nichols, of Leeds; and the roof is to be executed on Helliwell's patent system, of Brighouse, Yorkshire.

The total amount of the contracts is about 12,000*l.*

WATER SUPPLY FOR COLLIERY VILLAGES.

The Hexham Union Rural Sanitary Authority is now considering the question of providing a supply of water for a large section of its district, including Prudhoe, West Wylam, Mickley, and other villages. Plans and report have been received from Mr. John S. Hodgson, C.E., Hexham, showing the total estimated cost of a gravitation scheme by which water can be supplied from Minsteracres to a total population of 5,000, to be 11,216*l.* This scheme involves a total length of 12¾ miles of piping, of which twelve miles would be cast-iron pressure mains. A separate scheme having been suggested for the supply of Prudhoe village independently, the estimated cost of this project is stated to be 1,588*l.* The source in this instance would consist of two springs at a sufficient altitude. The want of water in the district is becoming urgent, owing chiefly to the drainage operations of the extensive coal workings.

PUBLIC BUILDINGS IN INDIA.

An inhabitant of Bombay thus writes to us:—"I take the liberty of forwarding to you a Bombay paper containing a criticism on one of our Bombay buildings in particular. The subject of architecture in India is one that is not sufficiently thought of at home, although we are crowded yearly by engineers from England, both in the Public Works Department and railways, as well as a few private men who are the minority; and, as I need not tell you, more than merely outward design is needful in a building. This fearful overdone Gothic architecture in our Bombay buildings should be a warning to all architects; the unsuitableness of such a style for India is apparent to all who study the question. Mr. Stevens was the architect for the Sailors' Home,—the building in question. He is in the Public Works Department."

The paper sent (the *Bombay Review*) contains part of a correspondence criticising the arrangements and architecture of the Sailors' Home in that city. The critic, after commenting on various points of a reply which had been given to previous strictures, says:—

"The building in question looks handsome; but a sailors' home needs to be something more than what an ornamental sugar-top is to a bride-cake. An architect is no architect if he cannot utilise his space, and still have ornament,—beauty without common sense is only skin deep. It is not likely that Jack will complain to his superiors, and he is not competent to articulate on architectural and financial waste. But I have no doubt he feels rebellious at being hemmed in on all sides by spike railings, so as to make him feel as if he were in a prison, and not in a 'home.' In conclusion, to go back to the point, let it be asked whether or not a building costing 2½ lakhs of rupees should not have been a complete building? Had it been turned into a hospital, as was once proposed, it would have simply been a species of misappropriation to have used the public contributions (by subscription and a fancy bazaar), for the purpose of putting in stairs, floors, windows, and a roof, into a building that had already cost over 2 lakhs of rupees. It does seem a little ridiculous that a structure costing so much, and with walls sufficiently strong to keep out a bombarding enemy, should seldom have more than eight or ten sailors in it. Happy Thought! These useless thick walls must have added to the cost; but it is so easy to play ducks and drakes with public money.

P.S.—Is it too late to overhaul the design of the new railway-station? That also abounds with turrets, and greater and lesser domes and minarets, overdone altogether. His Excellency the Governor should step in and curtail what may be found unnecessary and inappropriate, not to say anything that will be waste of money."

The editor of the *Review* adds:—"We are sorry if these criticisms of our architectural correspondent have caused undue annoyance to those concerned; but it must be remembered that this is an important public question, and increasingly so in India. With the ever-distressing spectacle of the New High Court before us, we are bound to lose no suitable opportunity of drawing public attention to architectural experiments unsuited to the climate and the purpose for which buildings are intended. Above all, there is in this matter one popular fallacy which needs to be rooted out, namely, that when the architect has produced a handsome elevation and designed the outward form of a building, his work is as good as done. Fitness, proportion, and, if there be funds to spare, beauty, also, we must have; but the final test of an architect's skill lies in the adaptation of inner arrangements to the purposes of a building, and with these, its outward presentment must harmonise. If this essential condition be wanting, towers, turrets, and pinnacles are but a vain show, and even if there be added 'storied windows richly dight,' these will not make an architect of the designer

of an incongruous building in which usefulness and fitness have been sacrificed to outward effect."

SOUTH NORWOOD DRAINAGE.

For a number of years past the sewage of South Norwood has been utilised upon a sewage farm of 60 acres of clay land located in the parish of Beckenham. The lease of the larger portion of the land have expired, and as the leases of the remaining portion will shortly terminate, and the district is increasing at a rapid rate, some permanent provision is necessary for dealing with the sewage. In order to determine what was best to be done, the Croydon Local Board, who are the Sanitary Authority of the district, in June last, invited Messrs. Bailey Denton & Co., Mr. E. Eachus, Mr. Baldwin Latham, and Mr. Lundie, to submit schemes for disposing of the sewage of the district.

After careful investigation, by various committees, of the schemes submitted, the Local Board, on Friday, the 29th ult., determined to adopt the scheme prepared by Mr. Baldwin Latham, C.E., which consists of a gravitation outfall sewer conveying the sewage from Norwood on to the sewage farm at Beddington, and the lifting the sewage from the small area which cannot be dealt with by gravitation, into the gravitation outfall sewer, by means of a pair of gas-engines, the estimated cost of the undertaking being 26,000*l*. The Croydon Local Board have recently acquired the freehold of the sewage farm at Beddington, where they have upwards of 500 acres of land capable of dealing, by filtration, with the sewage of 500 people to the acre. The population of the district of the Croydon Local Board is estimated at the present time at about 70,000, so that they have a large margin provided at Beddington for dealing with the future sewage of the district.

THE DANGER OF PLASTER CEILINGS.

Sir,—In your valuable article in last week's *Builder*, on "A Sanitary Aspect of Construction," you speak with some force on the disadvantages of heavy ornamental plaster ceilings, and I feel it to be a duty to draw the attention of your readers to the risks which are often run by individuals and the public generally, to obtain them.

Having been called in to advise in the case of Bedford Chapel, I have had the opportunity of making a critical examination of one of the last-century ornamental flat ceilings, which were so common prior to the introduction of open timber roofs in church and chapel construction, and during the prevalence of classic taste in architecture. I am quite at a loss to imagine how the ceiling at Bedford Chapel lasted so long, and I cannot but think that many other ceilings must be in an equally dangerous condition. The facts are these:—

The general thickness of the plaster was just upon 2 in., and the well-designed floriated ornamentation was worked on this base with the setting coat, and was not otherwise sustained than by the cohesiveness of the material, except that in places where cherub faces, or heavy mouldings were run, some nails were introduced into the body of the plaster, but no bracketing of any sort existed, and the whole weight of the ceiling, viz., about twenty-five tons (each square yard weighing over a hundredweight), was sustained by the plaster key which was squeezed through the laths. The laths were single laths, very thin, the ends lapping each other, and being secured by one nail.

The roof is sustained by double queen-post trusses, very well designed, and in good condition, situated 10 ft. apart; the tie-beams are 12 in. by 9 in., between which 8 in. by 6 in. binders are fixed 6 ft. apart. The ceiling-joists, 3 in. wide and 12 in. apart, come between the binders, the under side of the tie-beams, the binders, and the ceiling-joists being all flush with one another. The laths were secured by cast nails, about ⅞ in., but never more than ¼ in. entered the beams to which they were attached. But no fillets intervened to keep the laths a little free of the timbers, so that the laths were laid flat against the under-side of the beams, thus reducing the area by at least one-fifth, over which it was possible to secure a key for the plaster, and consequently about five tons of the weight was unsupported by any key.

This was alarming enough, but having hung so long, it might have held longer if the remaining key was sound. To ascertain this, the dust was brushed away with a light hair-brush, and with it came much of the key which had perished, and on further examination it appeared that nearly half of the key had gone, and that from twelve to fifteen tons of the plaster ceiling had no apparent support.

The plaster which fell was under the centre of one of the trusses, but the laths were, with few exceptions, left behind, and no key was visible above them.

I had, therefore, no hesitation in condemning the whole ceiling as most dangerous, and that the first fall was in all probability the precursor of many more, which the vibration of the moving multitudes who thronged the church might at any moment bring down upon the heads of the people.

On removing the ceiling to put a new one of canvas and paper for temporary continuance, my judgment was confirmed in a remarkable manner, for it came down in large pieces with little or no trouble on the workmen's part except where, at some distant time, it had been slung up to bearers laid upon the ceiling-joists by iron rods, $\frac{3}{16}$ in. diameter, passed up through the plaster from below, a piece of thin metal about 6 in. long by 1 in. wide being secured to the lower end, and a nut being fixed to the screw end of the upper part of the rod, by which means the bagging ceiling had been held up when it was ready to fall from want of key. The fine coat had been scraped away to admit the metal and finished flush, so that no indication of the presence of these ingenious suspenders was visible from below.

I think these facts are sufficiently alarming to be a warning to others, and to cause the investigation of similar ceilings to be made by competent persons in the interest of the public.

Edward C. Robins.

THE SCULPTURE ON BLACKFRIARS BRIDGE.

Sir,—It would appear that the proposed decoration of Blackfriars Bridge is of a magnitude and of an importance unfortunately of rare occurrence in this country, both as regards scale and remuneration, for the groups must necessarily be colossal, and their cost thousands. It is an opportunity of a kind which ought to occur oftener in a great country, and in a city the greatest commercial centre in the world. The means for obtaining an artist equal to the occasion ought not to be a matter of difficulty. As such an opportunity,—to the shame of these realms,—seldom does occur, it would, perhaps, be ungracious to too severely criticise the proceedings of a committee uninitiated in such affairs, or to overhaul and pull to pieces their *naïve* advertisement, in which they have attempted to enumerate every mode of drawing, some of which no artist would ever think of availing himself of in such a competition.

The most hopeful feature in the advertisement is the announcement that the President of the Royal Academy has consented to guide the committee in the selection of an artist; that is, if, after selecting so competent a guide, they will be guided. The time has, perhaps, come for the whole profession to repudiate the decisions of non-professional committees in such competitions. The writer would be content to accept Sir Frederick's decision in the matter without any intervention on the part of the committee. But were a frequency of such competitions imminent, it would not be wise to tax, in every case, the kind offices of one competent judge. It would, therefore, be well at this juncture to advocate the institution of a professional committee of taste, whose function it should be either to adjudicate in all art competitions, or to select artists for employment on public works. It would be an institution far preferable to that sometimes proposed, viz., a *dilettante* Minister of the Fine Arts, who would only afflict the metropolis with evidences of his individual artwhims. It would, in reality, be a Ministry of the Fine Arts without the drawback of that so frequently proposed. Each member of such a committee ought, of course, to be selected for his freedom from bias, for his catholicity of judgment; or it might again happen, as it often has in art competitions, that even professional judges, having some decided bias, have selected those designs which would best perpetuate their own vagaries, setting aside the most suitable and best calculated to elevate art.

There is yet another matter in which the uninitiated are liable to be led astray. It has been possible for men of ingenious tact, and without having the slightest claim to be considered artists, to pass themselves off, by means of hired labour, for sculptors. With a professional committee, such deceits would be useless.

W. Cave Thomas.

THE MATERIALS OF THE FLOORS AT BRADING.

Sir,—A visit to the recently-unearthed Roman villa at Brading suggests numerous questions, of much interest to persons at all versed in building matters.

The tesseræ composing the chief pavement are very thin, barely ½ in., which would suggest that they must have been well laid on a prepared and hard cement floor, and cement run in between them. But this does not appear to have been the case, for within 1 in. from the surface of the tile is the soil of the country; and the cement, now quite white, and with all the nature gone, appears to have been the common white chalk lime of the district.

But this same lime mortar must at the time of its use,—at the very least fourteen or fifteen centuries since,—have been very good, and set very hard, for close by this principal hall, wherein the most perfect pavement lies, is the heating chamber for the whole house, and in which stand a number of small columns to support the arched or groined floor, covering the flues or fire; and they are constructed alternately of about 3 in. of concrete mortar (now crumbling) to one 1-in. red tile. As at present, they could not possibly carry the weight of the floor, which must have been great, judging by the arched stones of which it was constructed.

And again, the shaped stones used as roof-tiles are from Purbeck, where in the immediate neighbourhood are *concrete* remains, wherein the cement from the local cement-stone is as hard as the shingle that is held together by it, and we may fairly conclude that this would come under the notice of the builders of this villa, who must have considered the chalk cement which they made at Brading *superior*, at that time, to the cement of the blue lias near Purbeck; for obviously no consideration of expenses nor trouble has weighed in the construction of these buildings.

Thus the cement which was presumably the strongest at the period of these villas being erected, has proved the least durable when exposed to the test of time. And how far is this to hold with regard to the artificial hydraulic limes, having chalk lime as their basis, which the past thirty or forty years have brought into such very extensive use, in very important works?

It appeared to me something of a puzzle, how the tesseræ were formed, so remarkably uniform in size, and out of varying stones of widely-varying density. Blake's stone-crusher was probably unknown and undreamt of in the fourth century, and the use of only such appliances as we are aware of, or can fancy, as being within the reach of quarriers of those days appears scarcely sufficient for producing such good results. If "Flint Jack" were living he might throw some light on the matter. An archæological friend,—one of the committee of the archæological society which has these remains in charge,—suggests the splitting-up of the stone into lengths, which were then cross-cut into tesseræ, similarly to the method adopted in the modern and beautiful Italian glass mosaics. This would not apply all round, however, for we cannot conceive flint, or, at all events, "chert," being thus treated.

Possibly some of the readers of the *Builder* may throw light on these questions.

Feldspar.

Stratford.—St. John's Church, Stratford, which has been closed for some weeks, for repairs, was re-opened on the 3rd ult. The walls have been cleaned and re-coloured in neutral tint. The windows have been filled with stained glass of different colours, and the old system of gas-lighting has been superseded by coronæ suspended from the crown of the arches. The work has been carried out by Messrs. T. Norton & Sons. The repairs to the tower, which are not yet completed, are being carried out by Mr. J. Morter.

PIOUS (?) FRAUDS.

SIR,—In wandering round the world, by making use of something more than our eyes, we constantly stumble upon, and are mentally hurt by, examples of shams which are something more than may be understood by the term "pious frauds." I could mention several, but will content myself with one.

Last week, wandering into our grand old church dedicated to St. Paul, Peter, and Swithin, in the historic city of Winchester, the feeling came uppermost that whatever might be the "professional" opinion as to the appropriateness of the Gothic or the Classic form for church architecture, there is always something inexpressibly soothing to the mind in passing from the bustling world outside into the cool, solemn, and generally beautiful interiors of our Gothic cathedrals; a spare hour is never lost in wandering around and about them, and on this particular occasion an intelligent verger incited a desire to wander over it. Up a corkscrew staircase to the gallery below the clearstory, from which fellow mortals in the nave below looked like wandering bottle-stoppers, up again to the leads, and into the space between the external leaden roof and the stone vaulting, where it is a sight to see the great tie-beams, one of which spans the entire width, probably 50 ft. or more without a splice, all cut many a year ago from giant trees in the New Forest, before the railway lent a helping hand, and when the roads were simply shocking; into the lantern-tower which, with its thirty-two richly-carved Norman headed windows, has been turned into a belfry, and then again over the choir with its great stone r——. Hullo! Am I awake or dreaming? Has the fiery glass of sherry at the pastrycook's disagreed with me? No! it is all right. "Be careful how you tread, sir," pipes out the thin voice of the elderly guide, "that ain't stone" nor plaster, but it is beautifully done in wood. A certain mythical, happy, and easily-satisfied gentleman, named Toots, would have overcome the sensation this "pious fraud" had evoked, by a remark the public may endorse, "It's of no consequence whatever"; but sitting beneath the great patched window of many but harmonious colours, gazing along the glorious vista of the nave, listening to the swelling anthem, the eye will surely hereafter rest upon a shady spot upon the arched and gilded roof, where Heaven's light should flood the choir and God's service instead of being clean shut out, and the lantern darkened with a wooden lie.

WILL WATCH.

LONDON WATER SUPPLY.

SIR,—Referring to the remarks in last week's *Builder*, on the London Water Supply, mention is made of supplies from the chalk.

From beds of chalk, intermingled with gravel and sand, about sixteen miles from London, in the parish of Stone, Kent, there is an enormous quantity of water. It may be seen rising out of the ground and running in streams to the Thames, on the estate of the Stone Court Chalk Company, situate a short distance from Dartford. It has been computed that 18,000,000 gallons run through this ground daily,—waste, into the river. This water has been pronounced to be pure and excellent.

This quantity would greatly augment the present supplies for the south-eastern district of London, and could be utilised at no very extravagant outlay. J. M. B.

HARD WATER.

SIR,—Can you or any of your numerous corrospondents tell me how to make my spring-water less hard and corroding? I have a circulating boiler by which hot water is conveyed to the top of the house; but the water is not only comparatively useless for cooking or washing purposes, but is a constant expense. The taps are invariably leaking, the pipes are continually choking with a hard rocky substance, and the boiler, in spite of a periodical cleaning, burns out on account of the same rocking. Can anything be done to improve the water without discolouring or spoiling it for any purposes? The water is pumped into a large slate cistern at the top of the house, and this cistern fills the supply cistern for the boiler by means of a ball tap. I shall be very grateful for any suggestions.

F. MEADE KING.

*** Inquire what could be done by the Porter-Clark process.

Mr. J. T. Newton, of George-street, Westminster, has been selected from amongst various candidates for the post of architect and surveyor to the Incorporated Society of Licensed Victuallers.

A NORMAN KEEP.

MR. J. H. PARKER has drawn attention in the *Times* to what is called St. Leonard's Tower, at Malling, in Kent, and which he pronounces to be the earliest Norman keep in existence, and in all probability "the earliest that ever was built, the construction of the walls being of earlier character than any Norman keep in Normandy itself or in Britain." The manor on which it stands was given by William the Conqueror to one of his Norman followers, Gundulfus or Gundulph; he found himself placed in the position of a settler in a hostile country, the king of which had given him a donation of a large tract of land, but he must get possession of it in the best way he could. His first object was naturally to secure an abode for himself, in which, with a small band of followers, he could be safe against any number of assailants. He was a brave man and a clever man, and an architect, and, not daunted by the danger of his position, he saw how he could secure this object. This was by building a house on an entirely new plan; the walls were built of rubble-stone, found on the spot or near at hand; the lower part was built solid, so that no battering-ram could have any effect upon it, and the doorway was 10 ft. from the ground, with a short ladder, which could be easily drawn up. This was exactly such a house as was wanted by all the Norman settlers in Britain; it was very soon copied in all directions. The fame of Gundulph spread far and wide, and a few years afterwards he was employed by the Conqueror to build the Tower of London, a Norman keep on the same principle, only on a much larger scale, and built of good ashlar masonry, instead of rubble. Mr. Parker goes on to say, "the popular notion that the Normans brought their keeps with them from Normandy, as things well known and long in use there, is entirely a delusion"; and states that M. de Caumont, the leader of the Archæological Society of Normandy, and others, made a tour to the sites of all the castles of the Norman barons who had gone over to England with William the Conqueror. Their object was to ascertain the character of the construction of stone walls of the first half of the eleventh century as distingnished from that of a later period. "To their amazement and annoyance they found no masonry of that period in any one of them. Magnificent earthworks, enormous fossæ or trenches, and lofty earthen mounds, were found everywhere; the additional defences had been wooden palisades only and no stone walls." Mr. Parker adds that when he showed M. de Caumont a careful engraving of St. Leonard's Tower, De Caumont acknowledged at once that this construction was of earlier character than any keep in Normandy.

This statement puzzles us considerably. In hot youth we tramped Normandy (had some pleasant interviews, by the way, with the venerable De Caumont), and have very distinct recollections of the castle at Falaise, visited more than once. We have before us now a rough sketch made at that time of the stone-room, in that stone castle, in which William, the so-called Conqueror, was born; and can see with the mind's eye the printed statement of the fact hanging on the wall. From the window of an adjoining room it was, as every one is told, that Robert, William's father, saw Arlette, the tanner's daughter, afterwards William's mother. Well, all this, of course, happened years before the followers of the Conqueror began to build keeps in England. Mr. Parker knows all about this as well as we do, or better, and we will not venture to say he has made a mistake, but we shall be very glad to have a little explanation, and to know if we are henceforth to pronounce Falaise *fallacy*.

A SANITARY ASSURANCE ASSOCIATION.

A MEETING was held on Monday, November 1st, at the Langham Hotel, to consider the desirability of forming a Sanitary Assurance Association "for the purpose of securing to its members at a minimum cost those advantages which the progress of Sanitary Science has made available." The chair was taken by Sir Joseph Fayrer, K.C.S.I., and the proceedings were opened by Mr. Mark H. Judge, who said that this was an attempt to bring medical men and architects together on the great question of house ventilation. Letters strongly approving the formation of the association were read from Dr. Andrew Clark, Mr. Spottiswoode, president Royal Society, Dr. Playfair, Mr. Arthur Cates, F.R.I.B.A., Dr. Lauder Brunton, Dr. Ferrier, and others.

The Chairman said he recognised in such an association as that proposed the fulfilment of a great want in respect to house sanitation. The richer classes undoubtedly had facilities for rendering their houses healthy which were not possessed by those beneath them; but there was, on the part of the great mass of the public, a general want of faith in sanitary science and sanitary law. He believed, however, that the idea was growing that improved sanitation meant additional value to life, and certainly an increase of the domestic comfort and well-being of the people.

After a discussion, in which Mr. Edgecombe Venning, F.R.C.S.; Mr. Chatfeild Clarke, F.R.I.B.A.; Mr. Edwin Chadwick, C.B.; Dr. Longstaff, and Professor Corfield took part, the following resolution was unanimously passed:—

"That we cordially approve the formation of the Sanitary Assurance Association; that Professor de Chaumont, F.R.S.; Professor Hayter Lewis, F.R.I.B.A.; Mr. H. Rutherfurd; Professor W. H. Corfield, M.D.; Mr. George Aitchison, F.R.I.B.A.; and Mr. Mark H. Judge, be appointed a Provisional Council, with Professor Corfield as chief sanitary officer, and Mr. Judge as surveyor, *pro tem.*; and that they be requested to organise the Association on the basis of the prospectus which had been issued, and to report to a future meeting."

THE RIGHT OF SUPPORT FROM ADJOINING HOUSES.

WOOD *v.* GILBERT.

THE plaintiff in this case (Common Pleas Division, before Lord Coleridge and Justices Lindley and Lopes) had kept a coffee and eating house in the neighbourhood of Oxford-street, and the defendant had an adjoining house. Both houses were upon the estate of the Duke of Portland, and they were about 100 years old. The defendant pulled down his house, leaving the party-wall between the two, however, standing. He shored this wall up, but it gave way and came down. The plaintiff claimed damages for the loss which he had thus sustained, and at the trial before Lord Coleridge the jury found that the plaintiff's house came down in consequence of being deprived of the support of the defendant's house, and that there was negligence in the way in which the defendant had taken down the house. Upon this finding the verdict was for the plaintiff for 545*l*.

Mr. Talfourd Salter, Q.C., now moved for a rule to enter judgment for the defendant, contending that the plaintiff had no right to lateral support from the three walls of the defendant's house, which were taken down. It was also contended that the verdict was against the weight of evidence, and that, in fact, the wall probably came down in consequence of the lower part of the wall having been burnt to powder upon the plaintiff's own side of it by an oven which had been there.

Mr. Justice Lindley said that these houses were probably originally so constructed that one could not stand without the other, and therefore there was no ground for saying that the plaintiff had no right to lateral support from the defendant's house. He also thought that the verdict was not against the weight of the evidence.

Rule refused.

CASES UNDER THE METROPOLITAN BUILDING ACT.

MOATAB.

AT Wandsworth, Mr. John Synnett, a builder, was summoned by Mr. Woodward, district surveyor, for using mortar composed of earthy matter in the building of houses in Rollo-street, Battersea Park-road. The complainant said that after receiving notice of the building of the houses, he inspected the mortar, and found an absence of sand. He wrote a letter to the defendant giving him notice that the mortar must not be made with earthy matter. He inspected the mortar again, and found it very bad, no alteration having been made. In cross-examination, the witness said there was lime in the mortar, but it contained a large proportion of earthy matter.

Mr. Hanson, the district surveyor of North Battersea, produced samples of the mortar which he had taken from the buildings. He said he had dried one sample, which he found contained one portion of lime, and the remainder earthy matter and grit. Better mortar was used outside in the pointing of the walls, but the mortar used inside had not any sand in it.

Other evidence was given to the effect that proper mortar should contain two-thirds of sand and one of lime.

Mr. Haynes, who defended, said the witnesses were mistaken. He should be able to show that the mortar used contained half lime and half grit and and sharp sand.

A witness for the defence said road grit was quite equal to sharp sand.

Mr. Paget said it was shown by the defence that the mortar used was composed of mud. He imposed a penalty of 3*l*., with 2*l*. costs.

THE RIGHT TO WORK OVERTIME.

At Marlborough-street, Mr. Mansfield has given judgment in a case, Squires, a journeyman painter and house-decorator against Mr. Pontis, a house-decorator, of Euston-road. Mr. Mansfield said the question was whether a workman who was sent by his employer to work in the country was entitled to work overtime, and be paid for so doing, as of right. The question narrowed itself down to a point of law—namely, whether a custom had been established in favour of the complainant's claim. In his opinion, no custom had been established sufficient in point of law. It appeared that the gentleman for whom the work was done objected to the men working overtime, and he (Mr. Mansfield) regarded the employer as a middleman between the customer on the one hand and the workmen on the other. As it was clear Mr. Pontis could not have charged his customer with the overtime, and the men could not look to Mr. Pontis, as their employer, for it, he dismissed the summons; but, as he considered it a very fair question to have been discussed, he should not give any costs against the complainant.

Mr. Lewis asked to have an appeal.

Mr. Mansfield asked whether the proper course would not be for Mr. Lewis to ask him to state a case for the opinion of the Court?

A long and technical argument ensued, and Mr. Mansfield said, instead of dismissing the summons, he would adjourn the case for a fortnight to enable Mr. Lewis to consider what course he would pursue.

CHURCH-BUILDING NEWS.

Southport.—On the 14th ult. the Bishop of Liverpool consecrated the chancel and transept of All Saints' Church, Churchtown, Southport. Originally the church was erected as a chapel of ease to St. Cuthbert's, the parish church for Churchtown, and was consecrated in May, 1877. The population of the district, however, increased so rapidly that it was ultimately deemed necessary to constitute All Saints a parish by itself, and to enlarge it to supply the requred accommodation. The architects engaged in this work were Messrs. Garside & Johnson, of Lord-street, Southport. Previously to the addition of the chancel and transept the church would seat 400 people, now 1,050 can be accommodated. The total cost of the work is 5,000*l.*

Frant.—The parish church of Frant has been re-opened, after restoration. Externally the roof has been new leaded, and other repairs have been effected. In the interior the windows, with the exception of that over the Marquess of Abergavenny's pew, and in the chancel, fresh glass has been put, which has lately been found in some lofts and stables in close proximity to the church. The glass is of English make, and is said to date from the thirteenth to the sixteenth centuries. The church has been redecorated from drawings by Mr. John O. Scott, architect, and the work has been carried out by Mr. Milner Allen, of Fulham-road, London. The church has been re-pewed by Mr. H. Bond, from special designs by Mr. Scott.

Watford.—The new church of St. Matthew, South Watford, was consecrated on the 12th ult. by the Bishop of St. Alban's. The building is 104 ft. in length, and consists of a nave 67 ft. in length, in four bays, north and south aisles with western entrances, the tower and spire rising to a height of 120 ft., and placed at the north-west corner of the building. The chancel is of apsidal form, and is lighted by five windows. The architect is Mr. W. H. Syme, and Messrs. Waterman were the contractors. The new church will accommodate 500 persons.

Stratford-on-Avon.—The vicar of Stratford-on-Avon, in responding for "The Clergy," at a banquet given by the mayor of Stratford the other day, intimated that he was about to engage in the work of restoring the ancient parish church, for which work thousands of pounds would be required.

Plaistow.—On the 16th ult. the memorial-stone of a new chancel for St. Mary's Church, Plaistow, Kent, was laid by Lady Scott, of Sundridge Park. The work of constructing the new chancel has been entrusted to Mr. J. C. Arnaud, builder, of Bromley, and the contract price is 1,792*l.* The architect is Mr. W. R. Mallett.

Southburgh. — The church of St. Andrew, Southburgh, was re-opened by the bishop of the diocese on the 7th ult. after restoration. Prior to the restoration, nothing but a heap of rubbish remained of the tower, which had fallen, apparently, from 100 to 150 years previously, the two bells, together with the solid oak framework which supported them, having been first removed and placed under a thatched shed in the churchyard. The church itself was in a deplorable condition, and so insecure that when the old lead roof was removed the walls began to show signs of falling, in spite of every precaution having been taken to shore them up with strong timber supports. It was, therefore, found necessary to remove at once the stone tracery of the windows, and to rebuild the church throughout, with the exception of a small portion of the west wall, which had been made secure. The total cost of the work so far has amounted to little short of 4,000*l.* Of this the Gurdon family, who are the chief owners of the soil, have contributed the greater part. The rebuilding of the church has been carried out on the old lines under the supervision of the architect, Mr. J. A. Reeve, of London. The contractor was Mr. John Goss, of Shipdham. The objects of interest found during the restoration included a mural painting of St. Christopher bearing the infant Christ, on the north wall of the nave, and another painting on the north side of the chancel, of which the design was not clear.

Bradley. — St. Martin's Church, Bradley, Bilston, was re-opened on the 26th ult., after restoration and renovation (rendered necessary by a serious gas explosion in April last), at a cost of about 750*l.* The chancel windows, three in number, again represent the Nativity, Crucifixion, and Ascension, by the same artists (Messrs. Gardner, St. Helen's, Lancashire). The chancel floor has been re-laid with tesselated tiles, by Messrs. Craven, Dunnill, & Co., and the choir-stalls have been altered and improved by Mr. Sansome, Bilston. The whole interior of the church has been renovated and coloured. The old organ has been replaced by a larger one, purchased from St. Paul's Church, Balsall Heath, at a cost, including reconstruction, of 260*l.* A series of slate tablets have been placed between the chancel windows. The tablets (the gift of Mr. Edward Pugh, of Wolverhampton) contain the Twelve Commandments, the Lord's Prayer, and the Apostles' Creed, written in Old English characters, with illuminated capitals.

Abbot's Bromley.—The chapel in connexion with St. Anne's Middle-class School for Girls, Abbot's Bromley, which at present consists only of the choir, is to be enlarged, and the foundation-stone of the new buildings has been laid by the Hon. Mrs. Maclagan. The Provost (Canon Lowe) said that to complete the chapel 1,500*l.* was wanted.

Wynyard Park.—On the 3rd ult., the new private chapel at Wynyard Park, one of the seats of the Marquess of Londonderry, was opened by the Lord Bishop of the diocese. The chapel is built adjoining the Monumental-room, is 86 ft. in length by 24 ft. in width, and is described as being of the "Roman-Corinthian style" of architecture, in keeping with the rest of the mansion. The plans have, however, not yet been carried out in their entirety, and many of the decorations remain to be added. The principal feature of the building is the chancel arch, of various rich marbles. At the entrance to the chancel is a dwarf screen of red Devonshire marble, inlaid with mosaics, panels of Mexican onyx being on the reverse side. This, as well as the organ, is the gift of the Marchioness. The chancel steps are of Derbyshire fossil marble; the paving throughout of Italian mosaic, in patterns designed by the architect (Mr. James Brooks), and executed by Minton, of Stoke-upon-Trent. The choir-stalls and benches are of oak, relieved by shafts and panels of walnut-wood.

Bedford.—Holy Trinity Church, Bedford, has been re-opened, after redecoration. The pulpit has been cut down some 14 in. or 18 in., and the old panels removed, leaving the tracery only. The font has been removed and refixed near the south door. The whole of the works have been carried out under the direction and personal supervision of Mr. John Day, architect. The painting and decorative works were carried out by Messrs. Clarke & Carling, of Bedford; the gasfitting and re-lighting by Messrs. Kilpin & Billson, of Bedford; paving, by Maw & Co., of Broseley, Salop; the prayer-desk, lectern, and other woodwork, by Mr. John Hull, of Bedford. The cost will be something over 300*l.*

Hungerford.—The parish church of Hungerford was re-opened on the 12th ult., after undergoing renovation. The old-fashioned pews have given place to open seats. New arcades, clearstory walls and windows, have been built, the latter being filled with foreign glass. The new gas-fittings and iron-work on doors are by Mr. C. Leaver, of Maidenhead. The vestry fittings have been supplied by Mr. Frnen. A new organ has been erected by the well-known makers Messrs. Forster & Andrews, of Hull, at a cost of 510*l.* The alterations and improvements have been carried out by Messrs. Morris & Stallwood, architects, of Reading, Messrs. Wooldridge & Son, of Hungerford, being the contractors. The total estimated expenditure, including the cost of the organ, is 2,917*l.*

Dorchester. — The restored chancel of the parish church of Piddletrenthide, near here, has been formally reopened; Mr. Ewan Christian, of London, is the architect for the Ecclesiastical Commissioners. The work of restoring the church has been in process off and on for twenty-seven years.

DISSENTING CHURCH BUILDING NEWS.

Swanwick.—The memorial stones of a new Primitive Methodist Chapel at Swanwick, near Alfreton, Derbyshire, were laid on the 5th ult. The cost of the new building will be 750*l.* There will be accommodation for 300 persons. The architect is Mr. J. Wills, of Derby, and the contractors are Messrs. Brown & Simpkin, Eastwood.

Shifnal.—On Sept. 29th the new Wesleyan chapel which has been erected at Shifnal from designs by Mr. J. H. Fleeming, architect, Wolverhampton, at a cost of about 3,000*l.*, and giving accommodation for 350 sittings, was opened. The new building is Geometric Gothic in style. The walls are of red brick, relieved with Grinshill stone and red terra-cotta dressings, and the roof is covered with Broseley tiles. Internally the chapel is 62 ft. 6 in. long, by 38 ft. wide, and will accommodate 350 adults on the ground floor. An end gallery yet to be constructed, over the entrance-lobbies, will give accommodation for 100 more. The building is roofed over in one span, the main front, facing New-street, consisting of a central gable, with a large tracery-headed window and moulded and gabled doorway. A stone turret, 80 ft. high, is placed on the western side of the main gable, set back from the gable to suit the inequality of the site. The side-walls are pierced with tracery-headed windows, divided by massive buttresses. The new building is heated by hot air, the apparatus being supplied by Mr. Truswell, of Sheffield; the gasfittings are by Mr. Eaton, of Wolverhampton; and the general work has been carried out by Mr. Yates, builder, of Shifnal, under the superintendence of Mr. Fleeming.

Carron (N.B.).—On the 2nd ult. the memorial-stone of Carron United Presbyterian Church, Falkirk, was laid. The proposed building is of Early English design, and will, when completed, be seated to contain about 440 people in the area, and 100 in the gallery. It is intended to be heated by hot air. The entire cost is estimated at 1,700*l.* The architect is Mr. James Boucher, Glasgow; and the builders are Messrs. Taylor & M'Fadyen.

Nacton.—On the 6th ult. a new Congregational Chapel, in connexion with Tacket-street Chapel, Ipswich, was opened at Nacton, about five miles from that town. The new chapel replaces one which has been in existence many years, and has cost about 400*l.* Mr. Coe, of Ipswich, has built the chapel, from designs by Mr. A. Conder, of London. Sittings are provided for 170 persons.

Ipswich.—On the 7th ult. the memorial-stone of a new Wesleyan Chapel, in Alan-road, Ipswich, was laid. Mr. Hubert is the architect, and Mr. A. Coe is the builder, the amount of the contract being 1,077*l.* The chapel will be of red brick, with white brick and stone dressings, and will provide sittings for 400 persons.

Welshpool.—A new Congregational Church has been opened at Welshpool. The architect of the building is Mr. H. Rider, of Welshpool.

Birkenhead.—On the 12th ult. the memorial-stone of a new chapel, in connexion with the United Methodist Free Church, which is in course of erection in Claughton-road, Birkenhead, was laid by Mr. Arthur J. Williams. Mr. Edward Legge, of Birkenhead, is the contractor, and the architect is Mr. R. H. Roberts, of Everton. The building will accommodate about 500 worshippers, and there will be large school-rooms and vestry underneath. The cost of the land has been about 500*l.*, and that of the building will be upwards of 2,000*l.*

Broxburn (N.B.).—The foundation-stone of a new United Presbyterian Church, at Broxburn, has been laid with Masonic honours. The buildings have been designed by M. Hippolyte J. Blanc, architect, Edinburgh, and consist of a church of parallelogram plan, measuring about 62 ft. by 30 ft., with a gallery at one end, affording accommodation for upwards of 400 sitters;

a hall capable of accommodating about 100 persons, a vestry, ladies' waiting-room, and minor apartments. Externally the church presents a gable-front to the main road, a gabled projection with pointed and richly-moulded arch forms the principal entrance, the main gable being pierced by a large wheel-window filled with cusped tracery, besides twin-pointed arched lights on each side of the doorway. On one side the gable is flanked by a tower and spire, the former containing the stair to the gallery. The accepted tender for the works amounts to about 3,000*l.*, which includes the erection of a manse.

Conway. — The memorial-stones of a new English Wesleyan Chapel have been laid at Conway. The site is in Rosehill-street, in close proximity to the old parish church. The style is Gothic, the external materials used being freestone from the Bryncoraeb quarries, with random-work. Accommodation will be provided for some 150 worshippers, but the schoolroom is so constructed as to be opened out to form a transept, to be utilised during the summer months, when there is a large influx of visitors. This will afford accommodation for another fifty. The approximate cost is about 1,000*l.*, and the contract is being carried out by Messrs. Hugh Thomas & Ellis Hughes, Mr. Fraser acting as clerk of the works. Mr. Curwen, jun., is the architect.

Llansamlet.—The new Bethel Chapel here was opened on the 9th inst. Its architect is Mr. J. Thomas, of Mumbles, Swansea, and the contract was given to Mr. R. Llewellyn, Birchgrove, for 2,400*l.* The chapel has sitting accommodation for 900 people. It is heated by Grundy's patent apparatus, fitted under the superintendence of Mr. George Daniel.

Newcastle-on-Tyne.—A new Congregational Church, to accommodate 500 persons, is about to be commenced at Heaton, near Newcastle. The church will, when completed, consist of a nave with double transepts, and there will be a small west-end gallery. At the east end will be a school-room, class-room, vestry, with other conveniences. The materials to be used are stone with ashlar dressings and slated roofs. It is in contemplation to eventually erect a tower and spire. Messrs. Oliver & Leeson, of Newcastle, are the architects.

Carnforth.—A new Congregational Church was opened at Carnforth on the 28th ult. The new structure seats 200 persons on the ground-floor, and a gallery is provided over the class-rooms on the south side. The mason-work has been executed by Mr. M'Farlane, and the carpenter's and joiner's work by Mr. Grime, of Settle; the remaining works have been executed by local tradesmen. The new structure is in the Gothic style, and has been designed and carried out under the superintendence of Messrs. Hetherington & Oliver, architects, Carlisle.

STAINED GLASS.

South Africa.—Messrs. Wailes & Strang, Newcastle, since fitting up the Catholic Cathedral at Durban, Natal, with stained-glass windows, have been commissioned to provide windows for three more churches in South Africa, viz., Bloemfontein, Kimberley, and Pretoria.

Dublin.—Four transept windows in Christ Church have recently been filled with stained glass, introducing figures of the four Evangelists. The windows have been executed by Heaton, Butler, & Bayne, of London, under the supervision of Mr. J. Rawson Carroll, architect, of Dublin.

Plymouth.—As a memorial of the twenty-fifth year of the episcopate of the Rev. Dr. Vaughan, R.C. bishop of Plymouth, the window at the west end of the Catholic cathedral in that town has been filled with stained glass, illustrative of incidents in the life and work of St. Boniface. The window consists of three large lights, each upwards of 23 ft. long, with tracery over. The middle light, which is the broadest of the three, contains in the centre a full-length figure of St. Boniface, vested in chasuble, mitre, maniple, and pallium, with crosier in the left hand, and in his right hand a sword, piercing a book. In the two side-lights and above and below the centre figure the story of the life and work of St. Boniface is told in a series of fifteen designs in chronological order. At the extreme top of each light are the arms of the bishop and diocese *per pale*, in the middle the arms of Mayence, and on the right the arms of Plymouth. In the tracery above are large heads of figures representing St. Willibald, bishop; St. Winibald, abbot; and Sta. Wallburga, nun, relatives and companions of the saint. The work has been entirely executed by Messrs. Fouracre & Watson.

Docklow.—Docklow Church, near Leominster, just re-opened after restoration, contains a new stained-glass window, by Mr. W. Done, of Wyle Cop, Shrewsbury. The window is in the chancel, and has three lights. The central compartment contains a representation of our Saviour on the Cross, and the side compartments contain the Virgin Mary and St. John in devotional attitudes. All the other windows in the church are filled with rolled cathedral leaded glass, by Mr. Done.

Hungerford.—A three-light stained-glass window has been placed in the parish church of Hungerford. The subject represented is the "Sermon on the Mount," our Lord occupying the centre light, with figures of His disciples in the two side lights. The upper and lower parts of the lights are filled with architectural canopies. The window was designed and executed by Messrs. Heaton, Butler, & Bayne, of London.

Wellingborough.—A stained-glass memorial window has recently been placed at the east end of the south aisle in the parish church of his native town, Wellingborough, by Mr. Henry Septimus Gill, of Tiverton, to the memory of his parents, whose remains are interred in the churchyard, just under the window. It is a window of Perpendicular tracery with five lights, and the subject is our Saviour as the Good Shepherd, holding a lamb in his arms, for the central figure; the other lights are occupied with figures of the four evangelists. The work was done by Mr. Drake, of Exeter.

Crawley, Sussex.—Mr. John Davies, of Wyle Cop, Shrewsbury, has just completed a series of stained-glass windows, intended to be placed in Crawley church, Sussex, which has recently been restored. The windows are for the aisle, and consist of thirteen compartments, each one containing some Scriptural subject. They derive some additional interest from the fact that among the individuals commemorated by them is the late Mark Lemon. Not long ago Mr. Davies executed the stained glass for the chancel window in the same church.

SCHOOL-BOARD SCHOOLS.

Plymouth.—The new girls' school, Wolsdon-street, is now occupied. The building, which is in the rear of the infants' school erected a few years ago, is for 250 girls. It includes a central schoolroom, 70 ft. by 20 ft., with spacious class-rooms, lavatories, cloak, and retiring rooms in the east and west wings, forming altogether one of the most complete suites of rooms for school purposes in the neighbourhood. The style is Early English. The walls are of tooled lime-stone with Portland stone dressings, and the roofs are all open-timbered. A dado of pitch-pine surrounds the rooms, and the fittings and furniture are generally of that material. Boyd's hygiastic ventilating-slates are used throughout, and the lavatory and closet fittings are by Macfarlane. The entrance to the new school is under an arched gateway of wrought stone. Mr. Hine, of Plymouth, has been the architect, and Mr. Blowey, of Buckland Monachorum, the contractor.

South Shields. — Two Board Schools for infants have been recently been opened by the School Board. In each case, accommodation is provided for 350 infants. It is intended shortly to erect boys' and girls' schools in extension of both these groups, and for which the preliminary arrangements have been made. The contractors were Mr. Robert Allison, of Whitburn, and Mr. John Grisdale, of Newcastle-on-Tyne. Messrs. Oliver & Leeson, of Newcastle, were the architects.

Miscellanea.

The Largest Vinery in the kingdom is being built by Mr. George Bashford, of St. Saviour's, Jersey, the eminent grape-grower. It is to be 1,100 ft. long and 30 ft. wide. It takes 42,000 ft. of glass, and is to be glazed on Helliwell's patent system of glazing without putty. This vinery is to be heated with hot water, and will take 10,000 ft. of 4-in. pipes. It is intended for the production of early grapes for the London market.

Closing a Main Thoroughfare.—At the Kensington Vestry a letter was read from the Metropolitan Board of Works sanctioning the closing of the Kensington-road for the purpose of repairing the carriageway, and stating that the Board had been surprise and regret that part of that thoroughfare had already been entirely closed without the sanction of the Board having been previously obtained, and that it is imperative on all future occasions the sanction of the Board shall be obtained before any road is closed. Mr. Campbell observed that there were extenuating circumstances. The vestry clerk wrote for permission, and received a reply from the engineer to the Metropolitan Board stating that the Board had adjourned, and he had no authority to make any order. He (Mr. Campbell) thought that when a chairman of a Board was paid 2,000*l.* per annum out of the rates, some arrangement ought to be made to answer the communications of vestries. Mr. Freeman, the member for Kensington at the Metropolitan Board, thought that the less that was said about the matter the better. The engineer to the Metropolitan Board had authority to give permission for small works, but he did not feel justified without the consent of the Board to give permission for the closing of the great western thoroughfare. The matter dropped.

South Kensington Museum.—The Director of this institution has just returned from an official visit to the museums, and to the Imperial and other collections at St. Petersburg and Moscow, undertaken by desire of the Lord President of the Council, in order to ascertain what examples of gold and silversmiths' work in these collections might be reproduced, to add to the large number of fac-similes of art treasures, both English and foreign, already existing at South Kensington. The Emperor of Russia ordered unreserved compliance with the request for permission to copy in electrotype from objects in the Imperial collections, and a selection was made of about 250 objects, ranging from goldsmiths' work of early Greek art exhumed at Kertch, through Mediæval times to English plate of the sixteenth and seventeenth centuries, and pieces of French art of the period of Louis XV. Provincial museums and local art exhibitions are largely interested in the advance of this branch of the operations of the Museum, by which fac-similes scarcely distinguishable from the unattainable originals are either lent on loan, or may be purchased, at a very moderate cost, for permanent display.

The Electric Light.—Among the electric light appliances now on view at the Glasgow Philosophical Society's Exhibition at Burnhank, is a collection of exhibits by Messrs. R. E. Crompton & Co., including a number of Mr. Crompton's regulating lamps, which have been adopted in many parts of the United Kingdom, in America, and on the Continent. On the same stand are shown instruments for measuring the electric current, as well as commutators, switches, resistance-coils, and other apparatus more interesting to the technical observer than to the general public. A complete set of portable apparatus for supplying four large lights collectively at 24,000-candle power is placed at the end of the Drill Hall. This set of apparatus is capable of lighting thoroughly and brilliantly a hall or railway station 400 ft. long by 150 ft. wide. It consists of a six-horse-power portable steam-engine, specially made for Messrs. Crompton & Co., Gainsborough. After preliminary inquiry, the directors of the North British Railway have resolved to adopt the electric light as the means of illumination for their new station at Queen-street, and within the last few days they have concluded a contract for the lighting of the station on the Crompton system.

Ventilation of Caius College, Cambridge.—The patent self-acting air-pump ventilators of Messrs. Boyle & Son having been recently applied to the chapel of Caius College, Cambridge, under the direction of Mr. Waterhouse, experiments were made to test their efficiency, and though subjected to very trying conditions, we understand they were found to be acting in a most efficient manner, the air being exhausted through each ventilator at the rate of about 700 cubic feet per minute, whilst there was not the slightest down-draught experienced during the whole time the experiments lasted. We hear that Messrs. Boyle are about to apply these ventilators extensively to another college in Cambridge. This system has been selected from competition plans submitted for the ventilation of the Town-hall, Yeovil.

The Roman Villa near Brading.—Up to the present time eighteen chambers have been thoroughly excavated, and the angles of the walls of a nineteenth have been discovered, in addition to which walls in direct connexion with the parts opened have been traced by Messrs. J. E. Price and F. G. Hilton Price (who have been conducting the operations), to extend eastwards a distance of between 60 ft. and 70 ft., and walls have been likewise observed more to the southward of the present diggings. The mosaic pavements of some of the rooms are remarkably fine, more especially the one in the largest room, which measures 40 ft. long by 18 ft. broad at the western end, and 15 ft. broad at the eastern end. Many other rooms with simple floors of concrete have been found. One of the most interesting is a large hypocaust containing fifty-four pillars of tiles 2 ft. 6 in. high; the tiles are about 8 in. square; they are cemented together with mortar in wide joints. During the excavations a quantity of plate-glass for windows has been collected. This last is a discovery of considerable interest; for although what is known in glass-making as pillar moulding was (after having been allowed a "patent" for many years) shown to be no recent invention, the fact that sheet-glass polished on one side and ground on the other was in use with the ancients appears to have been unknown until the present discoveries. The coins range from Severus Alexander (A.D. 221) up to Constantius (A.D. 337), proving that the villa was occupied as late as the fourth century.

Gas versus Electric-Light.—For a considerable time past the gas-committee of the borough of Birmingham have been experimenting with a view to the adoption of some system of gas-lighting which will compete with the electric light, for the purpose of illuminating large public squares. Trials have been made at the Windsor-street gas-works of all the improved forms of gas-lamps which have been tried at London and Paris, with the modifications suggested by their own engineer and the various lamp-makers. The aim has been to ascertain two points,—the most effective burner relatively to the gas consumed, and the form of lantern which best diffuses the light afforded. Upon the former point the committee have decided in favour of a triple cluster of Bray's flat-flame burners. The burners are fitted on to a special form of tap, designed by Mr. Hunt, the engineer at the Windsor-street Works, by whom the trials have been principally conducted.

Value of Property in the City.—The value of a piece of land upon which are two shops, one with a frontage to Gracechurch-street, and the other facing Half-Moon-passage, known as 89, Gracechurch-street, and lately in the occupation of Mr. Birrubaum, an india-rubber manufacturer, has been the subject of litigation. The sum asked was 13,842*l*. On the part of the plaintiffs, Mr. Fox, with Mr. Thorne, Mr. Andrew, and Mr. Collins, surveyors, estimated the property, which consisted of a superficial area of 786 ft., at 1*l*. per foot for the premises facing Gracechurch-street, and 10*s*. per foot for that part facing Half-Moon-passage. On the part of the Corporation, Mr. Farmer, with Mr. Vigere, valued it at an average of 12*s*. per foot, and said that 9,653*l*. was sufficient. The jury gave 11,900*l*.

Minster Church.—The Queen has contributed 50*l*., through the Hon. Charles Gore, secretary to the Commissioners of Woods and Forests, towards the fund which is being raised for the restoration of the ancient abbey church of Minster-in-Sheppey. The church is one of the most ancient in Kent, and possesses features of deep interest to the antiquary. It should receive most careful handling.

The Cabinetmakers in Paris.—The strike has ended, the masters having acceded to the request of the men, whose chief demand, it will be remembered, consisted in asking for a payment of 80 c. an hour, instead of the 60 c. they have long received.

Kelly's "English" Lamp, for streets, railway platforms, barracks, and avenues, comes to us with a good character. It burns petroleum without using a glass chimney, and gives a pure white light for eighteen hours. Its economy as against gas is said to be very considerable.

The United Asbestos Co., whose advertisement will be found in our present number, claim to possess nearly all the ascertained sources of supply of asbestos in Italy. The company has been formed to acquire the businesses of three existing firms.

Church Institute, Maidstone.—This proposed new building is to be erected on a site lately purchased in Union-street, and will have four floors. The basement will contain rooms for the caretaker, a gymnasium, 33 ft. by 29 ft. and 14 ft. high, and lavatories for the younger members. On the ground floor there will be a reading-room, 30 ft. by 20 ft., a spacious hall and vestibule, a library, 22 ft. by 18 ft. 3 in., a dining-room and recreation-room, 22 ft. 6 in. by 14 ft. each, and offices. The first floor will contain a large committee-room, 26 ft. by 20 ft., and a smaller one, 20 ft. by 12 ft., and a large assembly-room, 49 ft. by 29 ft., and 22 ft. high. On the second floor an additional committee-room for ladies, and bedrooms for the caretaker, will be provided. The building will be Gothic in style, with arcaded windows, and an entrance with clock-tower at the angle. The assembly-room will be lighted by side windows of the same style, will have a groined roof of pitch-pine, and will be fitted with a stage for lecturers or persons taking the principal part in any meeting. The general fittings inside will be arranged with due regard to comfort. The trustees have entrusted the planning of the building to Mr. E. W. Stephens, architect, Maidstone.

Birmingham Master Builders' Association.—At the annual meeting of this Association, on Wednesday last, Mr. W. H. Parton presiding, the report read by the secretary referred to the passing of the Employers' Liability Act, and stated that the Council of the National Association of Master Builders had decided to defend actions brought against members under the provisions of the Act at the expense of the Association, so far as the legal costs only were concerned, in such cases as the Council considered ought to be defended. This course would be adopted until January 23, 1881, after which the future action would be determined by the general meeting at Manchester. Members were therefore requested, if proceedings were commenced against them, at once to communicate with the secretary. At the annual dinner, held in the evening at the Great Western Hotel, Mr. G. Shelley stated that notices had been received from the carpenters and bricklayers for an increase of wages, the former asking for an additional three farthings, and the latter for one farthing per hour. He considered this action ill-timed, very injudicious, and calculated to do great injury, just as they might reasonably look for improvement in trade. The demand would be opposed by the committee to the very uttermost, and he hoped successfully.

New Banking Premises have been erected at Haltwhistle, for the Carlisle City and District Banking Company (Limited). The buildings comprise, on the ground-floor, banking-room and County-court office, &c., and above a residence for bank-manager. The contractor for mason-work was Mr. George Westgarth, the joiner-work being done by Mr. J. McAdam, both of Shotley Bridge; Mr. Ormerod was the plasterer, Messrs. Thompson & Sons were the plumbers, Messrs. Smith & Son the slaters, and the painter was Mr. Canning; all the last-named being Carlisle tradesmen. Messrs. Hetherington & Oliver were the architects, and the building has been erected under their immediate superintendence.

Hampton Court Palace.—In continuation of the restorations which of late years have been effected in and about the Royal Palace of Hampton Court, the handsome groined ceiling at the foot of the Great Hall staircase is now undergoing a process of renewal rendered necessary by the gradual decay of the old ceiling, some portions of which had become so rotten and defective as to be in danger of falling.

South London Working Men's College, Upper Kennington Lane.—Professor Tyndall will preside at a general meeting of the College, on November 8th, at eight p.m., when the prizes and certificates awarded to the students will be distributed. We are asked to say that tickets can be had at the College.

The First Stone of the Smack Boys' Home, Ramsgate, was laid by the Marchioness Conyngham on Tuesday last. The building is arranged to accommodate sixty boys. The contract is being carried out by Mr. Martin, builder, of Yalding, under the superintendence of Mr. Alfred R. Pite, architect, London.

Messrs. Baker & Sons' Premises, Lambeth.—The purchasers of the yard and four houses are Messrs. Gwynne, the well-known engineers, of the Thames Embankment.

TENDERS

For the erection of dwellings in flats, stables, &c., at Islington. Messrs. Tunley & Boyle, architects. Quantities by Mr. Henry Lovegrove:—

Kirk & Randall	£3,758 0 0
Macey & Sons	3,515 0 0
Woodward	3,493 0 0
Brass	3,396 0 0
Sabey & Son	3,314 0 0
Morter	3,161 0 0
Outhwaite & Sons	3,095 0 0

For alterations at the Lord Southampton, Southampton-road, Maitland Park, for Mr. W. J. Wetteuhall. Mr. James Robert Furniss, architect:—

Anley	£1,170 0 0
Palmer	995 0 0
Edgley	896 0 0
White	887 0 0
Bodeu (accepted)	875 0 0

For rebuilding, after fire, the Sutton Steam Flour Mills, for Messrs. F. & D. Napper. Mr. Frederic W. Ledger, architect:—

Nightingale (accepted)	£898 0 0

For building wing and alterations to the Duke of Edinburgh Tavern, Queen's-road, Bayswater, for Mr. G. Harris. Messrs. Bird & Walters, architects:—

Anley (accepted)	£1,970 0 0

For Board schools, to seat 680 children, at Newington, Hull. Mr. William Freeman, architect. Quantities supplied:—

Garbutt	£4,254 0 0
Gootes	4,181 16 0
Oxen & Bramham	4,167 0 0
Sanderson	4,165 0 0
Blackburn	4,142 3 9
Robinson	4,098 0 0
Habbershaw & Son	4,045 0 0
Morrell	4,034 6 0
Drury & Harper	4,007 0 0
Marsden & Hodgson	3,990 12 9
Sargeant	3,982 0 0
Brown	3,978 0 0
Stephenson	3,970 0 0
Beilby	3,952 17 9
Hockney & Liggins	3,930 0 0
Southern	3,884 14 3
Berry	3,865 0 0
Lison	3,831 0 0
Skinner	3 830 0 0
Wilson Bros. (accepted)	3,770 0 0

For new buildings, for the City of London School, proposed to be erected on the Thames Embankment. Contract No. 2,—Superstructure. Messrs. Davis & Emanuel, architects. Quantities supplied by Mr. F. Downing and Mr. H. P. Foster:—

		Granite Columns, &c.*
Ashby & Horner	£87,810 0 0	... £285 0 0
Ashby Bros.	86,990 0 0	... 390 0 0
Conder	86,840 0 0	... 675 0 0
Macey & Sons	86,420 0 0	... 640 0 0
Morter	86,399 0 0	... 400 0 0
Lucas Bros.	86,000 0 0	... 603 0 0
Colls & Sons	83,743 0 0	... 430 0 0
Higgs & Hill	83,459 0 0	... 624 0 0
Grover	83,288 0 0	... 580 0 0
Dove Bros.	82,345 0 0	... 650 0 0
Holland & Hannen	82,300 0 0	... 560 0 0
Trollope & Sons	81,432 0 0	... 435 0 0
Mowlem & Co	75,972 0 0	... 498 0 0
Peto Bros.	75,239 0 0	... 468 0 0

* Red Aberdeen granite columns and pilasters, in lieu of Portland stone.

For the erection of Board-room, living-rooms, stables, van lodge, forge, stores, &c., for the directors of the Crays Gas Company. Mr. G. St. Pierre Harris, architect. Quantities by Mr. Billing:—

Wiltshire	£1,329 0 0
Lowe	1,269 0 0
Wright	1,188 0 0
Eldridge & Gee	1,189 0 0
Haisman	1,172 0 0
Chafen	1,160 0 0
Taylor & Son	1,150 0 0
Watts & Davies	1,143 0 0
Brett & Son	1,120 0 0
Arnaud	1,119 0 0
Banks	1,095 0 0
G. & S. Fisher	1,095 0 0
Cox	1,040 0 0
Higgs	1,030 0 0
Beale	958 0 0

For the rebuilding of Manor Farm, St. Mary Cray, for Mr. R. B. Berens. Messrs. W. Hodsoll and G. St. Pierre Harris, architects:—

Wood	£1,610 0 0
Brett & Son	1,300 0 0
Wright	1,195 0 0
Taylor & Son	1,065 0 0
Eldridge & Gee	1,038 0 0

For the construction of new roads and drains at Pagegreen, Tottenham, under the superintendence of Mr. W. Eve:—

Palmer	£2,150 0 0
Rutty	1,875 0 0
Taylor	1,722 0 0
Potter	1,495 0 0
Irons	1,495 0 0
Porter	1,477 10 10
Hunt	1,314 0 0
Pizzey	1,277 0 0
Bell, Wood-green (accepted)	1,172 0 0

For proposed new warehouse, Cursitor-street, Chancery-lane, for Mr. Frederick Chifferiel. Mr. Joseph Lavender, architect. Quantities by Mr. J. G. Raynes:—

Macey & Sons	£3,150 0 0
Greenwood & Co.	3,130 0 0
Holland & Hannen	3,125 0 0
Perry & Co.	3,106 0 0
Brass	3,073 0 0
Colls & Co.	3,050 0 0
Langmead & Way	2,995 0 0
Patman & Fotheringham (accepted)	2,985 0 0

For raising the tower and spire of St. George's Church, Forest-hill. Mr. W. C. Banks, architect:—

Tarrant & Son	£1,635	0	0
Sharp & Everard	1,219	0	0
Taylor & Son	1,203	0	0
White	730	0	0

For the erection of new Board and Committee rooms and alterations at the Barnsley Union Workhouse. Messrs. Dixon & Moxon, architects. Quantities by the architects:—

Brailsford, Clay-cross	£2,357	19	6
Robinson & Sons, Barnsley	1,850	0	0
Bustard, Barnsley	1,836	0	0
Bycraft, Barnsley	1,784	10	0
Hinchcliffe & Moore, Barnsley	1,774	3	0
Taylor & Sons, Barnsley	1,770	0	0
Carr, Barnsley	1,725	0	0
Lawton & Schofield, Barnsley*	1,711	0	0

* Accepted.

For the erection of an additional school-room, offices, &c., at the Elementary School, West Molesey, for the West Molesey School Board. Mr. Thomas Goodchild, architect. Quantities supplied by Mr. H. P. Foster:—

Wood	£1,081	0	0
Prout	999	0	0
Havell	970	0	0
Garrud	957	0	0
Bonell	950	0	0
Seal	933	0	0
Julian	920	0	0
Harris	899	0	0
Wart	891	10	0
Angood	890	0	0
Pack Bros.	889	0	0
Wheatley	887	15	0
Sanders	837	0	0
Beale	828	0	0
Piller	827	0	0
Synelch	820	0	0
Waite	723	10	0

For alterations and extra floor at 123 and 125, Queen Victoria-street. Messrs. Gordon & Lowther, architects:—

Larter	£642	0	0
Taylor & Parfitt	497	0	0
Dyer	489	0	0
Steel Bros.	459	0	0
Richardson (accepted)	443	0	0

For stables at Kingsland-road, for Mr. Carter. Mr. Dunch, architect:—

Conder	£207	0	0
Bowden	193	0	0
Alston	185	15	0
Taylor & Parfitt (accepted)	175	0	0

For new roof, &c., at Messrs. Holt & Co.'s Brewery, Ratcliff. Mr. Dunch, architect:—

Curtis	£390	0	0
Palmer	325	0	0
Taylor & Parfitt (accepted)	319	0	0

For conservatory, &c., at Mr. Margetson's, Chipstead, Surrey. Mr. R. Shaw, architect:—

Weeks	£198	0	0
Taylor & Parfitt (accepted)	179	0	0

For alterations to shop, &c., 49, Hackney-road:—

Taylor & Parfitt (accepted)	£199	0	0

For additions, Slough-place, Cuckfield, for Captain Sugison. Mr. Holloway, architect:—

Cook	£1,375	15	3
Deacon	1,192	0	0
Knight	1,067	0	0
Clark	1,066	0	0
Hollidge & Stuart	1,029	0	0

For the erection of a warehouse at Bethnal-green, for Mr. R. Letchford. Messrs. Hammack & Lambert, architects:—

Hyatt	£1,883	0	0
Wire	1,777	0	0
Cubitt	1,645	0	0

For the erection of two dwelling-houses in the Willow-road, Hampstead, for Mr. F. D. R. Copestick. Mr. T. Milbourn, architect. Quantities not supplied:—

Linzell	£2,100	0	0
Harper	2,090	0	0
Conder	1,980	0	0
Bishop	1,910	0	0
Cross	1,855	0	0
Hambly	1,815	0	0
Reid	1,598	15	0

For a villa in the Station-road, Forest-gate, for Mr. G. Roberts. Mr. Edward Brown, architect:—

Salt	£476	0	0
Birch	408	17	0
Hawkins	388	10	0
Dyer & Son (accepted)	345	0	0

For a cow-house in the Station-road, Forest-gate, for Mr. G. Roberts. Mr. Edward Brown, architect:—

Hawkins	£196	0	0
Birch	159	0	0
Salt	150	0	0
Dyer & Son (accepted)	145	0	0

For pewterer's work at the Old George, Bethnal-green, for Mr. F. Brien. Mr. Edward Brown, architect:—

Rogers	£131	9	0
Heath	123	0	0
Thompson (accepted)	106	0	0
Gasfitter's Work.			
Garnett	178	0	0
Steadman	154	0	0
Christian (accepted)	144	0	0

For Westerham Waterworks, Kent. Mr. J. W. Grover, engineer:—

Botterill	£2,980	0	0
Julian & Co.	2,396	0	0
Painter	2,315	14	9
McKenzie & Co.	2,032	0	0
Pontifex & Wood	2,009	0	0
Bingham (accepted)	1,895	3	10
Jones	1,893	15	9

For alterations at 107 and 109, Leadenhall-street, for Mr. J. T. Morton, under the superintendence of Mr. W. Eve:—

Lascelles	£385	10	0
Hall, Beddall, & Co.	374	0	0
Heiser	275	0	0
Wilson & Exton	249	0	0
Harris & Wardrop (accepted)	248	0	0

For roads at Turnham-green:—

Martin	£1,580	0	0
Rose	1,549	0	0
Pizzey	1,535	10	0

TO CORRESPONDENTS.

H. C. S. (send address).—F. H. J. (the arrangements are entirely different).—C. F. (thanks, no).—K. (will be considered).—J. W.—P. W.—S.—J. M.—R. T.—Sir. E. L.—W. F.—T. & F.—T. & P.—J. G. R.—H. & J.—J. M. B.—J. H.—H. & O.—C. J. H.—H. B.—Messrs. F. & Son.—M. W.—W. H. S.—A. R.—A. R.—R. E. C.—D. E. D.—J. M'L.—W. P. B.—H. P. F.—H. L.—B. L.—J. A.—J. R. F.—O. & L.—P. H.—F. L.—J. H.—A. E. P.—H. P. F.—H. & L.—H. & J.

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The Builder.

VOL. XXXIX. No. 1971. SATURDAY, NOVEMBER 13, 1880.

ILLUSTRATIONS.

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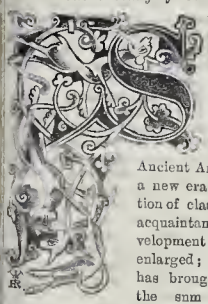
The Modern Study of Classic Archæology.



SINCE Winckelmann, justly esteemed the father of classic archæology, published, now nearly 120 years ago, his "History of Ancient Art," which marked a new era in the appreciation of classic antiquity, our acquaintance with the development of art has been enlarged; almost every year has brought its discoveries, the sum of which has seriously modified the views expressed four generations ago by the worthy German antiquary. The history of this advance within the century that separates us from the enthusiastic but strangely incorrect surmises of Winckelmann is an interesting one, and has recently been ably told by M. George Perrot in the pages of the *Revue des Deux Mondes*. M. Perrot's name has long been known to the archæological world in connexion with the exploration of Asia Minor, while to those who have attended the pleasant lectures at the classic Sorbonne, his erudition is familiar.

In reviewing the late lamented Dr. Stark's "Manual of Archæology," M. Perrot has taken an opportunity to concisely tell the story of the modern study of Classic archæology, in the development of which it is interesting to feel how appreciable a share has been taken by England. But to Germany falls the greatest share of honour. With Winckelmann, a German, archæology took its rank among the sister sciences; it is in Germany that the study of archæology has been pursued with the most consistent and methodical effort. The rest of Europe has supplied the ranks with eminent archæologists, but, remarks M. Perrot, there does not exist elsewhere, as in Germany, a school of archæology fostered by a systematic attention to the necessities of the understanding of its lessons, as afforded by the numerous collections of casts that exist in the chief universities throughout Germany.

Within a comparatively short space of time our supposed acquaintance with antique history has been disturbed and corrected by the discoveries made in Egypt, Chaldæa, and Asia Minor. The cuneiform inscriptions, those speaking records of the past, after having lain buried during centuries, were at length to see the light, and in the hands of experts be deciphered and made to deliver up their secrets. All this knowledge was undreamt of by Winckelmann and the race of archæologists who immediately succeeded him. Egypt and its still mysterious civilisation, before his death, had been but partially revealed; and since Bonaparte's disastrous expedition to the banks of the Nile, what discoveries have not been made? The later school of archæologists have lived to see recently a fresh civilisation evoked from a long sleep, when but a short time since General di Cesnola and Mr. Lang revealed to the learned world the art of Cyprus. These, and many other discoveries on the mainland of Asia Minor,—in which M. Perrot himself has taken an active part,—have strangely modified the views of modern archæologists on the history of the development of art which Winckelmann had pictured, the self-wrought creation of the land which was to see the perfection of art,—Greece. As for his knowledge of Egyptian art, it was confined to the study of the debased figures of Cardinal Albani's Museum (so well known to English visitors to Rome), of which he was long the faithful curator; while to his inquiring mind that vast field of study and research, the painted vases, still remained as they had lain for so many a century, in the cities of the dead, scattered over ancient Etruria and the Campagna. To him even the great art of the sculptor, the art which he most deeply reverenced, was but imperfectly known, and his admiration was unfortunately bestowed on copies of earlier masterpieces of that great fifth century before the birth of Christ, the age of Pericles, of Phidias, of Alcamenes, and of Polycletus, and which alone appealed to him through the pages of history, whose clearest allusions could never have possessed the suggestive meaning of the smallest fragment impressed by the artist's hand. The statues of the pediment and the friezes of the Parthenon, the temple of Ægina and many other great edifices, were still in their original places under the forbidding guardianship of the Turks. Without a knowledge of the art of this period,—the zenith of Greek refinement, how was it possible for the archæologist of that day to understand the archaic or primitive art which had slowly led up to the perfection of the age of Pericles?

The real service rendered by Winckelmann was, therefore, not so much to have thrown a lasting light on our knowledge of classic antiquity as rather to have reduced it to method. The study of his precepts was further developed by Zoega and Ennis Visconti. A mass of facts was in this manner gathered and classified, and the sketch traced by Winckelmann filled in in its outlines. This methodical system of the study of classic art was soon to be put into practice when, with the commencement of this century, numerous excavations brought to light thousands of the treasures of the classic days. The Great Unknown, so little dreamt of by the prime mover of the enthusiasm, was soon to become more familiar. As M. Perrot has figuratively put it, a curtain seemed to be suddenly drawn aside, and behind the rich and brilliant scenery of the Græco-Roman civilisation glimmered faintly the real antiquity, the East,—the father of all religions, of all useful inventions, of the alphabet, and of the plastic arts.

Champollion was to open the road to the deciphering of the long-locked hieroglyphics, and the later discoveries were to show that Egyptian art, like that of every human nation, had had its infancy, its maturity, and its old age; its periods of abeyance, of decay, and of revival. Botta and Layard were to continue these discoveries under the sand which choked the site of Nineveh, and in their hands Assyrian civilisation was to tell its tale of wonders. Babylonia, Lower Chaldæa, Susia, the ruins of Persepolis, so long known but ill-studied, were, by the efforts of Porter, Texier, and Flandrin, to aid in the general fund of information that was now pouring in on a civilisation that had long preceded that of the Greeks; artists, antiquaries, travellers, searchers, and philologists mutually assisted each other in the task. Comparison of the results led to the conclusion that two great centres existed in those distant days: the older in the venerable valley of the Nile, the other probably commencing its influence in Chaldæa, but at a date far more recent than that of Menès, the first of the sovereigns of Egypt. Through the Phœniciana these two powerful centres mutually affected each other. One obscure point in this strange development has only been settled within a few years,—the direction followed, the surroundings through which had passed these two great influences before reaching the eastern and northern shores of the Mediterranean to sow the seeds of cultivation among the still barbarous tribes, the ancestors of the Greeks and the Romans.

Phœnicia has been really known only within a few years, when M. Renan brought home the curious remains he found in Syria, and which now form some of the most interesting treasures of the Louvre, and from the study of which the part played by the Phœnicians in the transmission of the great art-traditions of Egypt and Assyria to Greece, commenced to be understood. Hamilton, Fellows, and the French traveller, Texier, had thrown out, in the early part of this century, some vague hints of the Phœnician influence in the development of Greek art; but their uncertainty became confirmed when the several exploring expeditions specially sent abroad to study the question had completed their researches. And here let a word be said of the services rendered by M. Perrot, who formed so important a member of the expedition, and whose work on the archæological exploration of Asia Minor* justly received on its appearance no small attention. The Phœnician theory received a further support when, within a short time only, the discoveries of Mr. Lang and General de Cesnola in our newly-acquired colony of Cyprus showed another of the stepping-stones in the passage of the art of Egypt and Assyria to Greece.

Together with the progress of our acquaintance with the early civilisation of the East, our knowledge of classic antiquity was receiving fresh impetus. The appearance at the British Museum, in 1816, of the Parthenaic Marbles, which bear so universally the name of their

* Exploration Archæologique de la Galatie, de la Bithynie, etc., par MM. Perrot, Guillaume, et Delbet. 2 vols., folio.

sponsor, Lord Elgin, was to work a miraculous change in the opinion of the artistic world in the merits of Greek art. A new standard of beauty, almost a new type, was suddenly held up, and the artists,—foremost among whom let us not forget the name of Haydon,—came forward in unanimous worship of the marvellous acquisition of the British Museum, which showed the art of Athens in its purest development, freed from the last traces of archaism before its very perfection, to last so short a time, was to lead it to the inevitable decline, the end of which was, it is true, long in coming. Once the attention of the artistic and archæological world was turned in this direction, discovery followed on discovery. Under the skilful guidance of our own revered Cockerell, the Eginetan marbles were, in 1811, to be dragged from the ruins of the temple they had adorned, and after passing through the hands of Thorvaldsen, be ons among the many gems of King Louis' collection in the Munich Glyptothek. The British Museum was to acquire the friezes of the Temple of Apollo Epikounios and the still more familiar Phigalian marbles, and which, as provincial productions, inferior as they might be to the works of the metropolis directed by the master-hands of Phidias and Alcamenes in person, were to show clearly the freedom and variety of Greek art at its noblest period, untrammelled by the tyranny of school or the deadening influence of formula.

M. Perrot has taken care to point out how invaluable were these discoveries in showing at this, the most prolific and most original period of Greek sculpture, how intimately that great art was connected with its sister, architecture. The early example of Stuart and Revett * was to be followed with fruits when Greece, after the memorable Battle of Navarino, was freed from the benumbing influence of the Turks. Each ruin was measured and drawn with religious care by enthusiastic artists, among whom more than one English name stands foremost; the French pupils of the Villa Medici even left their quiet home and the many inspiring subjects for study in Italy, to cross the Adriatic and seek at the fountain-head, if not at the source, the origin of Roman art.†

Studied with this minute care, the architecture of Greece was soon destined to have its secrets revealed. Every professional reader remembers how Penrose made clear the skilful artifice by which the architects of the Propylæa and the Parthenon added, by a slight curve in the lines which to the eye appear straight, a subtle and inexplicable beauty.‡

At the same moment, further discoveries were to be made. Hittorf, during his minute study of the ruins of Sicily, was to proclaim to the world the theory of polychromatic decoration in Greek architecture. Loud were the protests against this supposed heresy, but later discoveries have entirely shown Hittorf and his partisans to have been right.§

While in this manner the sister arts of sculpture and architecture were the object of such fruitful study, the companion art of painting properly so-called had received but small attention. Here all was conjecture, and the reputation of Polygnotus, of Zeuxis, and of Apelles was merely one of historical tradition. In the explorations at Pompeii and at Rome, numerous specimens of classic paintings—all purely wall decorations—were to be discovered, but these paintings were far from being satisfactory; they were Italian work, though from Greek models, and all, in spite of their beauty, were stamped as belonging to an art in its decline.‖ But Winckelmann, though he and his followers had seen the first Pompeian frescoes unearthed, was destined to remain unconscious of the finest period of the painter's art in Greece, and the knowledge of which we owe to the discovery of the thousands of painted vases,—ignorantly termed Etruscan by too many people,—which, within the last half-century have been brought to light. In 1831 Gerhard published his famous Report on the Vases of Vulci, and immediately this new and rich field of archæological research was crowded with reapers; and now, thanks to the labours of these toilers, the harvest of information is somewhat more exact than that possessed by the earliest seekers. We know now that these vases were made in a large number of places, at Athens, at Corinth, in the Greek colonies of Africa, in Sicily, in Italy; that the renown they enjoyed was such that the Greco-Scythians of the wild Crimea and the polite Etruscans of Italy eagerly sought their possession. The Etruscan even imitated the original Greek models, for the art of vase-painting was essentially Grecian,—an art, as remarks M. Perrot, born with the first dawn of its plastic genius, and which alone died out towards the second century before the Christian era, when that genius had ceased to be really prolific and creative.

By the study of these vases, it is certain that no incomplete idea may be formed of the contemporary state of the painter's art. Compared with the literary criticisms, these vases enable us to form some idea of the style of the great painters, of Polygnotus, of Zeuxis, of Apelles, and of Protagoras. But this side of the refined life of classic times remains yet, as probably it ever will, dark and unlighted. M. Perrot is expressing a widely-felt sentiment when he regrets the loss of all traces of the noble sister of the faithful trio. If there is, he remarks, in the shipwreck of antiquity a loss for which the cultivated find it most difficult to be consoled, it is the complete annihilation of the work of all those great painters whom the ancients did not hesitate to place on a par with the most famous of their sculptors and architects.

To the archæologists of the last century the existence of the interest contained in the innumerable objects which form the hook of study of the educated classic antiquary of the present day was unknown. The very number of these objects, their power of escaping the destruction which overtook more important works, has placed in the hands of the student a fund of information; and, in many cases, fragile objects have been preserved through ages, as if to show us the forms of antique art and modes of life and thought in the past, which, without their existence, would have remained ignored by us. What sources of information have been supplied by the delicate little terra-cotta figures of which every museum in Europe possesses some copies! *

In this manner, the study of classic archæology gradually extending its field of inquiry year by year, the need for methodical arrangement was again felt; and from this necessity have sprung the numerous archæological associations which exist in every country, and at the head of which stands foremost the Roman Institute of Archæological Correspondence, founded at Rome by Bunsen, Gerhard, and the Duc de Luynes, as far back as 1827.† Wisely allowing a freely international spirit to pervade its doings, in its ranks it has counted all the more eminent scholars of Europe. Its monthly bulletin has recorded for many years past all the important discoveries made in Italy, while the pages of the Annual are occupied with the description and illustration of more abstruse problems.

Each country has, through the members of its own learned societies, additionally assisted in the work; many unknown paths have still, however, to be explored, and the students of the numerous unread inscriptions that still exist have yet to reveal to us much that remains at present unexplained. Already with Boeckh and Borghesi epigraphy showed its importance, and since their time its services have been even more clearly shown. As for figured archæology, its task, as M. Perrot remarks very truly, is still heavier; the language of form is less clear than that of words, while a further difficulty arises in the very abundance and variety of the materials, which are every day increasing in number. Order is necessary in the arrangement of these scattered facts, and this difficult task it has been the endeavour of more than one patient student to carry to a successful conclusion. When the Roman Archæological Institute was formed, now fifty years ago, the necessity for making catalogues and inventories, and determining the limits of the information which then had accumulated, was clearly felt. But to carry out this vast scheme, a man of an exceptional organisation had to be found,—a student of a more than ordinarily extended course of reading,—a *savant* whose taste the toil of the workroom would not injure,—an artist and a scholar. Everything is not to be learnt in books, as observes M. Perrot very justly. If you wish to speak with any competency, commence by studying closely the productions of the plastic arts; open with them, as it were, a friendly and familiar intercourse, cultivating in yourself the sentiment of form and the love of beauty. Without this education of the eye, the fruit of long practice, how is it possible for the student to seize the slight shades which distinguish the styles and the schools?

The first half of this century saw such a man, who seemed formed for the task by a union of qualities rarely found in one individual,—Ottfried Müller. The pupil of Niebuhr and of Boeckh, none among his contemporaries made such a powerful effort to embrace in his vast researches the whole extent of antiquity, to represent it and revive it under its various aspects. A philologist, he finds a singular charm in the most minute analysis of a science which weighs words and syllables and compares the lessons of manuscripts; a poet, in his leisure hours he appreciated keenly the charm of ancient and modern letters.

With the vast learning at his disposition, he hoped to be able to trace the outline and colour the picture, into which he was to introduce the whole history of ancient Greece, and place it under our eyes in all the indivisible unity of its artistic and literary, its social and political, existence. Death, in striking him down at the early age of forty-two, shattered this noble dream, and his work was never achieved. But during the elaboration of this immense programme, his activity did not allow him to be idle, and during the years that he held his chair at Göttingen he kept in charmed expectation his numerous listeners, while the magazines were filled with his facilely-penned studies; with his contributions to current literature alone, a Berlin publisher has recently formed a large work, in five volumes. But of all his works, his "Manual of the Archæology of Art," which appeared at Breslau in 1830, was that which was destined to render the greatest service to the study of antiquity. Translated into French, into English, and Italian, the book became an indispensable guide to all those who wished to acquire a knowledge of antique art.

To those interested in the story of Classic art, Müller's handbook, for it was in this form that he judged it most convenient to publish his work, is familiar, and once its apparent intricacies are mastered, the ease with which it can be used as a book of reference cannot be too highly praised. When the reader is desirous merely to acquire a summary notion of some point, the voluminous footnotes need not disturb him; but when he is desirous to enter more fully into the matter, the footnotes will supply him with a valuable series of reference to books and other sources of information.* Want of space forbids our following M. Perrot in his analysis of the arrangement of this work, the only fault of which lies in its having been published so many years ago.

In 1835 Müller himself saw through the press a second and revised edition of his work, but since that date how many important discoveries have there not been made in the field of inquiry in which Müller was so versed? Since those days the East has yielded up secrets unguessed by Müller, and Egypt, Phœnicia and its great Libyan colony, Chaldæa, Assyria, Asia Minor, Cyprus, and Rhodes have been explored. It was three years after Müller's death that Botta commenced to unearth the monuments of Assyrian art, and since them we all know what has been learned. Müller's ideas were conceived in the

* The Antiquities of Athens Measured and Delineated. By J. Stuart and N. Revett. London, 1761, in folio.

† In 1872 the collection thus made contained no less than sixty-one restorations, comprising 691 original drawings on double-elephant paper. The publication of the fifty-two volumes, in which these drawings are bound, was commenced under the direction of M. Charles Blanc; but only four parts have appeared. Among these the most interesting is the Restoration of the Temples of Paestum, by Lahronste; the remaining studies will, unfortunately, from all appearance, be left unpublished for some time to come.

‡ F. C. Penrose, "An Investigation of the Principles of Athenian Architecture." London, 1851. Folio, with plates.

§ J. J. Hittorf, "Restitution du Temple d'Empédocle, ou l'Architecture Polychrome chez les Grecs." Paris, 1851. 4to., atlas folio.

‖ In the *Revue* of October 1, 1879, M. Gaston Boissier reviewed the learned work of Herr Wolfgang Helbig, on the wall-paintings of the Campagna, *Untersuchungen über die Campanischen Wandmalerei*. Leipzig, 1873.

* Among the seekers in this refined branch of antique art, M. Heuzey has particularly distinguished himself, and his works on the terra-cotta fragments and figures of the Louvre Museum are some of the most interesting of the recent additions to the science of archæology. M. Heuzey is at present publishing an illustrated catalogue of the terra-cotta figures of the French National Collection.

† This Institute, now the German Archæological Institute, celebrated in 1879 the fiftieth anniversary of its foundation, when a history of the Association was published by Herr Michaëlis in Italian and in German.

* The English translation of Müller's handbook, "Ancient Art and its Remains," is by John Leitch. The first edition was published in 1847, and a new edition in 1850.

early years of the century, and he is one of the warmest upholders of that now exploded theory that the Greek genius was of purely native origin. To him the part played by the Phœnicians was but vaguely pictured; the discoveries of Fellows, of Hamilton, and of Texier, were unknown; and while he was to die in his beloved Greece, these patient explorers were to call the attention of the learned world to the wondrous monuments of Asia Minor, the art displayed in which resembles so strikingly that of Upper Assyria.

With this fact borne in mind, excuses may be made for the deficiences that are so glaring in Müller's handbook; foremost among these, the author's misconception of the part played in the formation of Greek art by their Oriental predecessors, to whom, however, a few short and concise, but above all ill-placed, paragraphs are devoted.

The modern historian who would attempt a history of Greek art would be obliged to prelude his labours with the history and study of Oriental art. Egypt would necessarily be the point of departure, and in its historical succession Egyptian art in its various manifestations, according to their bearing on the art of Greece. To the people of the East a large share would have to be devoted to show how, as M. Perrot remarks, by the processes they invented and the forms they created they contributed to prepare the early rise of Greek art and its brilliant zenith. The field for the labours of the modern historian of art is somewhat vaster than that toiled in by Winckelmann and Müller. Our century is essentially, as our author truly remarks, a century of historical research. In the consideration of an individual or of a people, of a religion or of a philosophy, of a literature or of an art, we seek the earliest origins to the point where they disappear in uncertainty or are lost in the haze of a distant commencement.

In the history of Greek art, to reach its true origin we must push farther in our research, and leave far behind the narrow limits of Greek history. Greece, which has long been in "antiquity," comes in reality late in the development of civilisation which had already run a long race of centuries. In comparison with Egypt, Chaldæa, and Phœnicia, Greece is almost modern. By its geographical position it was easily open to foreign influence, and particularly to that of those ancient Asiatic countries teeming with tradition. With the first upward movement from barbarism, the neighbouring East was to furnish Greece with models and examples by which it was greedily to profit. Thus, as remarks M. Perrot, the further the progress of the study of the past is carried, the more surely we recognise the truth of the traditions and myths which speak of the influence on Greece of Egypt, of Syria, and of Asia Minor. The student, in his research, will be struck by the fact that the Greeks borrow from their predecessors all the elements of that industry which is not yet an art, but without which art cannot be formed,—the processes of metallurgy, of ceramics, weaving, the laying of building materials, all those technical secrets which appear so simple to those who have long possessed them, but the discovery of which represents the accumulated effort of how many unknown generations? To the East, Greece owes her "alphabet of art," which she applied to the expression of her own sentiments. Hence, in Greek art, even in its highest perfection, so many traditional details, whose origin can be traced to the banks of the Nile or the Tigris, and transmitted down to our days. But it is something more than the mere adaptation of the traditions of their predecessors that the Greeks were to produce. Two or three centuries elapse, and Greek art is to become original, an art superior to all that has preceded it, one which alone merits the appellation of "Classic," being able to furnish rules susceptible of being transmitted by instruction. In what this superiority consists, and the reasons of its existence, is the task of the future historian to determine; and this inquiry can alone be satisfied by a study of the art of those people who formed the art of Greece: then that art will be understood. For, as M. Perrot concisely puts it, "beyond the obelisks and the pyramids of Egypt, beyond the stepped towers of Chaldæa, the domes of Nineveh, the tall colonnades of Persepolis, the fortresses and tombs hewn in the flanks of the mountains of Phrygia and of Lycia, beyond the huge walls of the Syrian cities and the ravines where gape the yawning entries of their funerary grottos, beyond all this architecture, beyond all this strange colossal sculpture, stands clearly visible on the horizon the sacred rock of the Athenian Acropolis; and as we advance in this review of the past, we see it rising before us in the clear blue southern sky, with the dazzling whiteness of its marbles, the severe elegance of its porticos, and the majesty of its pediments, in which live and breathe the gods of Homer and of Phidias."

The story of Classic art has yet to be traced on, and if the exigencies of the study oblige the student to leave behind the Athens of Cimon, of Pericles, of Lycurgus, to cross the sea to Veii and to Clusium, to explore the Etruscan cemeteries and the strange lavishness of the decoration, if he at length reaches imperial Rome, with its gigantic edifices, how often in the midst of all this wealth of splendour will he not feel inclined to turn with regret to the memory of the past? The archæologist will still trace with curiosity the changes by which new peoples and new needs will influence the types created by Greece. The decadence continues to be interesting in the efforts made to remain faithful to the bygone traditions, but another influence more interesting is already shadowing forth the advent of another art, of Christian and modern art, which closes the study of the strictly Classic archæologist.

We have a quarrel with M. Perrot for the slight mention he has made of the remarkable achievements of Dr. Schliemann, and his omission altogether of any mention of Mr. Newton's labours in the field of Classic archæology, but we will not now pursue it.

CHURCH PLANNING AND CLERICAL CRITICISM.

When the revival of ecclesiology in this country took place, about a generation back, clerical critics had a flourishing time of it. The whole duty of the architect was to study the plans and arrangements of the pre-Reformation edifice, *donec templa refecerit*, until he could produce exact and orthodox copies of its arrangements, and what might pass for exact and orthodox copies of its architecture. The latter was the less easy task of the two; some of it involved not only the study of the facts of a style, but the imbibing of its spirit, and the discovering of workmen (if so it might be) who had also imbibed it, or into whom it could be instilled; and many examples of churches in the supposed true Mediæval style remain to attest how difficult was the accomplishment of success in such particulars. But the Mediæval plan and arrangement, and the Mediæval church furniture, and its names, could be more easily recovered, and in such matters the clergy, spurred on by their personal interest in a movement which promised to bring them into more conspicuous place and influence, were rather before than behind the architects, and assumed the position of teachers and reprovers of the latter. No practical question of the suitability of this or that form of building was at stake. It was simply the knowledge of ecclesiological precedent which was required; and under the hands of the clergy, who had most sedulously studied this knowledge, the church architect was compelled to do penance, unless he were one of the very few who had acquired even more learning on the subject than the clerical amateurs, or was able to persuade them that he had done so.

Less formal stress is laid by the clergy on this ecclesiological exactness now, partly because so many architects took it up for themselves, and it became so much a matter of course in many quarters that there was the less need for special protests and proselytising in the cause. At the same time, the extreme rigour of the ecclesiological party was somewhat abated of its pristine zeal, and there crept in a certain perception that the practical side of building did also affect churches as well as habitations; that it was desirable to have them properly warmed and ventilated; and that there was even something to be said in favour of contriving that the worshippers should be able to see and hear the clergy. The first point may be said, however, to have hardly got beyond theory, save in a few very exceptional instances. A church properly warmed and ventilated is certainly one of the rarest phenomena to be found. The latter point, the innocent desire on the part of lay members of the community to see, if not to hear, their spiritual pastors and masters when in the exercise of their office, took practical shape so far as to lead to a popular conviction sometimes acted upon, that long transepts were inconvenient features in a modern church, and to a very few attempts to reduce the side aisles to places of passage only, so as to interpose no piers between any of the congregation and the chancel, lectern, or pulpit. This latter bold innovation received the sanction of one or two of the chosen architects of the ecclesiological party, but the experiments which have been made in putting it into practice are not numerous. For any improvements in the warming and general comfort of churches that may have been made we are indebted not so much to architects, certainly not to clergymen, but mainly to heating engineers anxious to push their inventions. Even congregations make little or no stir on this point. People who would complain viciously if they had to sit shivering and with feet half-numb in a theatre or a concert-room, will put up with this in a church with hardly a murmur, beyond the customary remark after morning service in winter, "Dear! how cold the church was this morning:" a touching example of the elevation of moral sentiment and the triumph of spirit over matter which attendance at church induces, or, perhaps, of the tendency of mankind towards resignation to any evil recognised as general and unavoidable.

Our attention was drawn to the subject the other day, in connexion with the large and handsome parish church at Whitechapel, which was recently burned out (we do not say burned down, as the walls are nearly all standing), after only two or three years of existence. There has been, of course, some talk as to rebuilding it, in connexion with which a well-known clergyman of the Broad Church school, the new vicar of Greenwich, wrote the other day to one of the daily papers, protesting against the church being re-constructed on its old lines, on the ground that, as his personal experience enabled him to judge, it was so utterly bad acoustically that it was next to impossible for any preacher to make himself properly heard in it; the tone of his letter conveying a general innendo against architects for building churches in which no one could hear. This was replied to by a letter from the Rector of Whitechapel, denying that there had been any formal determination to rebuild the church as before, and admitting fully that the non-acoustical qualities of the building seemed to necessitate some departure from its original model if it were rebuilt. This clergyman also wrote in a somewhat injured tone in regard to those who designed churches, observing that it was to no purpose to tell him that the acoustic qualities of the church were bad, but that he wanted architects, or others who ought to know, to tell him why they were bad,—whether it was the height, or the materials, or the shape, or what it was.

This would be a reasonable position enough if the clergy generally really wanted churches conveniently planned and good to hear in. But the fact is that the onus of this part of the matter rests with the clergy and the clerical party themselves. If those who promote the building of churches really wanted churches constructed for the practical aim of providing comfort and promoting easy hearing, they would get them. Theatrical proprietors demand these qualities, and obtain them, not always as completely as might be, but still very fairly, even in ordinary cases, and sometimes very completely. But the fact is that a practically-designed church is the very last thing that clergymen or church-building committees really want. If an architect gave his mind to such a problem, and evolved a church which he believed to be the most practically suitable for seating a congregation so that all should hear well and to be comfortable in regard to the provision of warmth and fresh air, quite independently of architectural precedent, not one clergyman in a hundred would look at it, and in all probability the architect would be scoffed at for his pains, as a "Philistine" with no proper understanding of the orthodox proprieties of church architecture. The manner in which this has come to be the case is, of course, simply this: the great move for church-building in this century was inaugurated mainly by the zeal of the modern High Church party. They gave the impulse, and they also gave to it its characteristic direction. In their view the revival of ecclesiasticism meant a revival, as far as possible, of the privileges of the clerical caste in the pre-Reformation period, and consequently of the revival of the pre-Reformation church. The

ritual significance of the building was to be emphasised; the idea of its use as a place for preaching in was discouraged. The short chancel, which practically sufficed for the celebration of the Communion during the Low Church period, was to give way to the long Mediæval chancel with stalls on either side for the clergy apart from the lay worshippers, and this separation was eventually further emphasised by the revival of the screen separating the chancel more distinctly from the church; although in all cases at first, and in most cases still, the stalls which in the Mediæval church were occupied by the clergy are now occupied merely by choristers simulating the clerical garb. The addition of the long chancel was a definite and in one sense a logical practical result of the new view (or the old view, if they prefer to look at it so) of the clerical office, which the church revival brought up; but there was also the influence of revived Mediæval sentiment, which affected the whole architecture of the churches, and led to the idea that nothing could satisfy the revived ecclesiastic feeling but the revival of the ecclesiastical building, and the general object held before the architects was to produce churches which should represent the Mediæval church in all its architectural expression and details as completely as possible. The architects were, as has been often observed, a good deal tyrannised over at first by their clerical preceptors; but in the end they learned their lesson: they found the ecclesiological party were, after all, their best patrons, were the party most eager to build churches and most ready to spend money over them, and they adapted themselves to the circumstances; so that now "a church architect" means a man who can build an effective church on the Mediæval pattern. The idea of the proper form of church thus accepted, was soon tacitly followed even by those who had no connexion with the ecclesiological movement. If a Low Church clergyman went to an architect for a church, he got a building on the model which the High Church party had set up, and which has become *pro tem.* the accepted form of church. There would be differences in the details of internal arrangement and furnishing, no doubt, according as the building was for a High or Low Church client; but both would get the same general form of church; and, indeed, the architect, in the present state of public feeling or habit of thought on the subject, would scarcely venture to propound any other, nor probably would the clergyman, to whatever section of the Church he might belong, think of proposing anything out of the way, on practical grounds. A church is a building in the Gothic style, with three aisles and a long chancel; that is the accepted opinion: and so it comes to pass that the Rector of Whitechapel, who, we believe, is what is usually called a Low Churchman, had an absolutely Mediæval church built for him, in which neither he nor his friends could make themselves heard from the pulpit without discomfort and exertion both to preachers and listeners; and then he and his friends wish to know how it is that the church should be so "dys-acoustic" (to coin a word from Greek), and why it was built so.

The latter part of the question we have answered already: the other portion of it should be put the other way. We should not ask, why should such a church be had for hearing in, but, why should it be expected to be otherwise; and in some few cases, we might add, why should it unexpectedly turn out to be good for hearing in? For there are such cases, to our knowledge. We never were in Whitechapel parish church during service, but we knew the building: a lofty, three-aisled church, the centre aisle nearly 80 ft. to the apex of the open-timber roof, the walls internally as well as externally of brick. No such building could possibly be expected *à priori* to be good to hear in or to speak in. Two of the first conditions for a good acoustic apartment are that there should not be a superfluity of height, and that the walls should be of materials which sympathise with and reinforce sound. Brick, and other such hard substances, do the very reverse. They do not assist sound in any way, but they do reflect or echo it very sharply; consequently, instead of the voice being at all helped by the building, it is, without reinforcement, split up and confused by a number of echoes from hard surfaces at various angles. Add to this that a portion of the congregration are seated under side aisles, lower than the portion of the church from which the preacher's voice is emitted, and that all experience proves that it is very difficult to get sound to travel clearly from a more lofty into a lower and more confined space; add further, that by refusing the system employed in most other public buildings, of seating part of the audience on different levels, they are all spread out on the ground-floor over a considerable area, and that part of that area is partially shut off by stone piers which both intercept sound, and contribute further to produce confusing echoes; and that the form of open-timber roof, producing a kind of inverted trench over the building, is further calculated to lose and confuse sound. All these considerations are mere commonplaces to any one accustomed to study the acoustic properties of buildings; and no one would think of building a meeting-room, concert-room, or theatre in this way, or of these materials. But we really do not see that the architects are to blame in this, and so many similar cases. If the architect is an unprofitable servant, it is only in the Scriptural sense, that he has confined himself to doing what he was told to do. The architects may quite fairly turn round on the clergy and say,—"Reverend Sirs, you, or the most irrepressible section of your body, demand churches on the Mediæval model, as a matter of sentiment: there they are. They are not built for practical purposes, but for sentiment. If you *will* have them, you must take them with all their practical defects."

The ultimate solution of the problem, of course, depends on the judgment which the clergy and people at large ultimately arrive at, as to what they want churches for. Are they to be places for the performance of a ritual mainly, or mainly for addressing and leading a body of people? And if for the former object, is the ritual to be regarded as congregational, participated in largely by the people, or is it to be mainly clerical or priestly, witnessed only by the people? Which it ought to be we do not undertake to suggest here; we may have our own strong opinion, but we are not going to introduce theological or ritualistic discussions, of course, into these columns. We may observe, however, that if the latter, the priestly ritual, be what is wanted, then, and then only, is the strictly Mediæval form of church a practically fit type of building for the purpose. If, on the other hand, the church service is to be regarded mainly as an opportunity of addressing a number of persons collectively, then, and then only, is it necessary to regard the building in as purely practical a spirit as we employ in the case of a theatre or a lecture-room.

We desire to say that we do not ourselves go so far as this, more especially in a day when opportunities of addressing the public through the press are so multiple. Speaking generally, we are not in favour by any means of a purely utilitarian view of church-building. On the contrary, we are inclined to think that it is very desirable to preserve the idea, especially in crowded towns, that the church is the one class of large building left to us in which we may aim at effect and sentiment, at architectural beauty of interior expression, for its own sake, as a thing grateful and soothing to those especially who usually see around them only comparatively squalid buildings and murky streets. In such neighbourhoods a large church, with a fine and impressive interior, seems to afford the kind of relief to the mind suggested in the verses at the commencement of Kingsley's "Saints' Tragedy," where the child-heroine muses on the steps of the cathedral,—

> "All without is mean and small,
> All within is vast and tall;
> All without is harsh and shrill,
> All within is hush'd and still."

But it does not necessarily follow that from the Mediæval model alone can such architectural effect be obtained, or that we might not combine this with practical acoustic properties, at all events much better than the Mediæval model can usually afford. People must not, however, expect that they can get both qualities combined in a high degree. If they do they will be disappointed. No building on a large scale which is absolutely good acoustically, can, it is to be feared, rise to anything very fine architecturally, not in the most impressive and monumental style of architecture. The two things seem to be incompatible. If perfection either way is wanted, it is for the clergy to say which they want. Do they want preaching-rooms, or do they want buildings for prayer and impressive celebrations, or do they want to combine both? If either of the former, they can have them if they will make up their minds which they want; if the latter, they must be content with a compromise, securing as much architectural effect with as good acoustic properties as can be devised. They are not likely to have both together in perfection; but the combination may, no doubt, be realised much more successfully than it ever has yet been.

We may perhaps return to the consideration of the subject more in detail; in the meantime, we will make one suggestion. The Institute of Architects have shown an intention of promoting the element of discussion more at their meetings; why should they not get up a discussion as to the best form of church-building for the worship of the church of the present day, inviting a few leading clergymen or church dignitaries to state their views as to what is wanted? It would need the hand of a resolute chairman to keep down any possible ebullition of *odium theologicum*, not only on the part of the clergy, but of some of the architects; but an animated and interesting discussion might be safely promised, and perhaps some useful conclusions might be arrived at which would prevent the wasting of large sums of money on buildings which some of those who use them only complain of as unsuited for their purpose.

THE HOLYROOD FLINT-GLASS WORKS.

The tourist who chances to visit the royal palace of Holyrood in his wanderings through Scotland will observe, on his way up the south back of the Canongate of Edinburgh, a congeries of chimneys and cupolas flanked by a certain bold and rather conspicuous frontage (embellished with some curious bas-reliefs), which, his guide will tell him, with an air of mystery, is the Holyrood Glass Works. Having a dislike of all manner of mysteries, and having, moreover, always had a curiosity about the manufacture of glass in all its phases, we obtained the necessary permission to visit the works, and the few remarks which follow are the result of our observations.

How a manufactory of flint glass should be established, as it has been for upwards of a century, in the immediate vicinity of the greatest historical palace in Scotland, is beyond our province to inquire. The times, in fact, are changed. Edinburgh is full of such mutations,—a brewery here, a brass-foundry there, a Free Kirk, and a public school,—such buildings now occupy the sites of the once-celebrated town mansions of the old nobility of Scotland. In the present instance, however, the proprietor (to whom our acknowledgments are due for his courtesy) does his best to support the historical character of the neighbourhood; that is to say, he has spent a deal of money in beautifying, castellating, corbelling, and so forth, the back elevations of all the property he possesses which abuts on the Queen's Park,—one of the most romantic and beautiful public parks, we need scarcely say, in this country.

The Holyrood Flint-glass Works have, therefore, a claim on our attention, and we have no doubt that some of our readers will be glad to hear even the little we have to say. Glass is proverbially a difficult subject to handle, in more than one way; and flint-glass is the most difficult part of it. All we can just now offer are a few hurried observations, and we shall begin by asking a question.

What is flint glass? That is the first question. But this involves a second. What is flint? Very few of our readers, we suspect, will be able to answer this question satisfactorily to themselves. The geologists will tell us that nodules of flint are found embedded deep in the bowels of the limestone rocks, likewise in the coralline deposits at the bottom of the sea. The mineralogists, who are always ready with profound definitions, say that it is a variety of quartz, a sort of intermediate substance between quartz and opal. The chemists, on the other hand, who, from their analytical nature, are more precise in their determination, give us this general formula of its composition: silica, lime, oxide of iron, water, carbonic acid, and sometimes traces of organic matter. We must not, however, enter upon this very wide subject. Our best plan, perhaps, is to say that flint is flint. The mass of our readers will probably recognise and remember flint as a certain hard, obdurate substance, used by all the poets, since the days of Homer, as a metaphor indicating

obstinacy; and, long before the days of the Greek poets, by our own ancestors, who dwelt in caves, for implements and weapons; and finally by our own immediate progenitors, as a means of striking a spark of fire in a gun-lock,*

"In our hot youth,
When George the Third was King."

It may be added that flint is a species of Nature's glass,—somewhat obscure, no doubt, unless it be cut thin enough,—but still entitled to rank in this respect with opal and the gems. We need not, however, dwell any longer on flint, for the fact is that although flint-glass was originally made, as fine earthenware and porcelain are at this moment, from calcined and pounded flints, the modern method of manufacture simply employs various descriptions of fine siliceous sand; in other words, of flint that is pounded by Nature.

How this obdurate and opaque material came to be transformed into a beautiful and transparent, or it may be translucent, form of glass, carries us back at one tremendous leap to the graves of the Pharaohs. Egypt was always pre-eminent in the manufacture of glass, the sand of Alexandria being indispensable for the finest qualities. It retained this supremacy even during the Roman era; for it is a well-known historical fact that the Emperor Hadrian, on his visit to Egypt, was profoundly struck with the nature and extent of the manufacture; and he sent as a present to his friend the consul Servianus, one of those beautiful opalescent vases which the Roman writers mention with such unqualified admiration. The Romans themselves made both crown and flint glass, and knew how to make use of soda and lead as fluxes. We dare not, however, enter on the tempting field of archæology, nor even allude to the Venetian and Bohemian schools of art.† We shall just add here that flint-glass was first manufactured in England at Crutched Friars and in the Savoy about the year 1565. The Holyrood Works, to which we now invite the reader's attention, have been established, as we have said, over a century, and were the first, as they are certainly the largest, of their kind in Scotland.

The process of making flint-glass, like that of any other sort of glass, is simple enough theoretically, but in practice it is extremely difficult in every stage of the operation. The materials usually consist of the finest white siliceous sand; that is to say, the silicate of alumina; a strong alkali,—the bicarbonate of potash; a small quantity of the nitrate of soda; and lastly, the oxide of a metal by way of *flux*, which either consists of red lead or litharge,—*i.e.*, the red oxide or the vitrified protoxide of lead. To these ingredients are added a small per-centage of the protoxide of manganese, and also of arsenic, for the purpose of obliterating the action of iron in the sand (which is always present in more or less quantity). Of course, every manufacturer *differentiates* these quantities. Roughly speaking, flint-glass is composed of the same materials as every other glass,—certain silicates, certain alkalies, and certain metallic oxides. But we may add that it is possible so to vary or to adulterate these materials that a pot of good flint-glass may differ from a bad one something in the same degree and ratio (the comparison will, we are afraid, go no further!) that a specimen of Honduras bay-wood differs from a plank of fine Spanish mahogany!

In the Holyrood works the first thing we are naturally directed to after a bird's-eye glance at the singular buildings, is this raw material, which we find strewed about in great heaps on the floor of the mixing-house. The raw material we saw looked uncommonly like a heap of worthless rubbish, such as one may see emptied any day into what the Scotch call a "toom" as builders' offscourings; and is certainly not nearly so picturesque as the gravel we may see collected at the sea-beach for the purpose of adorning our garden-walks. But after the mixing comes the transformation; and in order to illustrate this, since we cannot find, in the whole range of modern manufacture, a transformation so singular, so complete, and so beautiful, we are compelled to fall back on the time-honoured comparison of the crawling caterpillar with the beautiful butterfly.

The next process, then, after admixture is what we shall term combination. After this heterogeneous material,—this mass of wretched rubbish, as one might suppose,—is properly mixed with all the necessary salts of potash, &c., and all the other ingredients, it is conveyed to the melting-house, where it is put into a pot, or rather a number of pots. But we had better explain, perhaps, what this pot signifies,—that is to say, a pot of glass.

In the centre of a large lofty, brick-built, stone-flagged, and well-ventilated melting-house, probably 140 ft. square on plan, stands a fiery furnace which roars night and day, surmounted with a cupola chimney and dome, and containing within its lurid bosom several enormous pots of a peculiar construction, made of Stourbridge fire-clay. The construction of these furnaces is a special branch of the building trade; and on some other occasion we may describe their construction. It is enough to say at present that they are so constructed as to stand the most enormous heat that it is possible by such means to produce. We have seen copper smelted at Swansea; and iron at Merthyr Tydvill; and we confess to the impression that these glass pots were more intense in their heat, until we were informed by the intelligent manager, Mr. Gilbert, that such was not the case. In point of fact, however, the heat (and glare) of the furnace is something tremendous. It is, we believe, nearly impossible to estimate the temperature of the white heat necessary to reduce this obdurate stuff to a liquid,—stiff, viscous, yet homogeneous. Even Wedgwood's pyrometer can give no really philosophical estimate of the great heat necessary to produce this liquid vitrification. But the singular thing about the process is that it is possible to overdo the heat, and actually to burn the glass, just as you might overheat an oven and burn a loaf. Indeed, it is one of the chief difficulties of the business to estimate and control the heat of the furnace. The fuel consists of good coal. But somehow all the various ingredients assist in feeding the combustion, or chemical combination, and the time required to produce this pot of liquid glass, technically termed "metal," ranges from two to three days and nights. We ought to add here that every pot of metal is not brought to maturity with invariable success. Sometimes a hitch occurs in the operations which renders the metal less workable, and sometimes spoils it altogether.

When this pot of metal is ready or "ripe," then begins the action of the "journey"-men glass-blowers. The singular and beautiful process of glass-blowing (which, thanks to the progress of our modern educational literature, is known to every schoolboy) is certainly one of the most ingenious and *dexterous* in the whole range of the useful arts. Several half-naked men, armed with long malleable iron tubes, select each an opening in the furnace, and dipping their tubes into the pot attach a definite quantum of the red hot, or rather white hot, metal; and blowing through this tube by an orifice in its upper extremity they can produce by the most surprising manipulation, actually any shape or form that is needed for the required drawing. A glass, or globe, or claret-jug, or vase, or, in short, any form of the various beautiful articles to which flint-glass may be applied, gets here its first and final form.

We made some inquiry at this stage on a subject with which we are always more or less concerned; and found to our astonishment that although glass-blowers are perhaps not the longest-lived tribe of artisans, still that their handicraft is not an abnormally unhealthy one, not nearly so much so as that of a tailor, for example, or a stonemason. Some years ago, we were informed that as a class they were notoriously intemperate in their habits; but that this feature in their character seems to have gradually disappeared as sanitary laws became better understood, we may speak to from our personal knowledge. And it is due to the British manufacturers of glass to say that they have done more to elevate the social condition of their working-men than almost any other employers of labour connected with the great staples of our national industry.

But we must hurry on. This flint-glass vase, shall we say? which has now reached its first and rudimentary stage in formative art, has next to be annealed,—"attempered," as our grandfathers used to say. Glass, we are sorry to repeat, needs "tempering," like human nature and fine steel; and many a good specimen of glass-blowing ingenuity cracks in the process, which is simply a more or less gradual reduction of the hot fragile vase to the ordinary atmospherical conditions. This is accomplished in what is termed the annealing oven; that is to say, a form of reverberatory furnace.

Hitherto we have been dealing with what we shall take leave to call the "hot" manipulators; we now come to speak of the "cold" ones,—*i.e.*, those artists who in place of using fiery furnaces and vitrified fluxes, work among cold water, emery, and putty. In this department resides the most artistic of all the processes, namely, that of glass-cutting, which is now one of the most important and highly-paid branches of art in Great Britain and the Continent, as well as the United States. The design, of course, precedes everything; and we are bound to say that we have seldom seen better designs in glass-cutting than we saw at Holyrood. After this, drawings are made on the glass (which, by the way, is first of all obscured). We now enter a long rectangular room, well lighted from the roof, in which we are almost bewildered by a congeries of lathes and wheels whirling and revolving at a great speed. All these wheels are really miniature grindstones, plentifully supplied with sand, emery, and putty-powder, and with these implements and materials the workmen engrave with astonishing rapidity on the exterior surface of the glass the requisite design. It is very like lapidary work on a large scale,—a process, in fact, of "diamond cut diamond," and the results are equally beautiful and exact. After leaving the cutting department, the flint-glass goods are carefully washed, and then removed to the packing-room, where they are carefully packed in tissue-paper, then in crates filled with straw; after which they are ready, as the signboard says, "for home use and for exportation."

We will not attempt to enter upon a catalogue of the sometimes magnificent and always beautiful articles. We have only to add that within the last five-and-twenty years no country in the world has made such progress as Great Britain in this splendid department of our national industry. Such are a few of the observations which occurred to us in connexion with the Holyrood Flint-glass Works.

CONSOLS AT PAR, AND LANDS THAT WANT HANDS.

The attainment of par by Consols, which took place on the 3rd inst., is an event of no little interest to all those engaged in building, or in any industrial investment. The quotation of 100 to 100⅛ is the highest touched by the Funds since 1853. It is only the third occurrence of such an event since our National Debt attained its present magnitude. In 1844, for the first time, Consols rose above par, and stood for a time at 101¾. The Railway Mania of 1845, almost, if not quite, unequalled in its inflation of prices and of hopes since the time of the famous Mississippi scheme of Law, closely followed. In 1852 Consols touched 102, the highest point they had ever reached. The world was then under the the influence of the golden promises of perpetual peace and brotherhood between nations, to which a sort of dream-like reality had been given by the brilliant success of the Crystal Palace of 1851. The then recent discovery of the gold-fields of California and Australia formed a powerful factor in the buoyancy of the public faith. The Russian invasion of Turkey, and the Crimean war, prevented a sequel to the fine-weather barometer-mark of 1852 such as that which occurred in 1845. Without trespassing beyond our prescribed limits, we may say that there is not, at the present moment, so unclouded a horizon as to promise an immediate era of rapidly-increasing prosperity. At the same time, the results of the late harvest,—which, whatever they have been positively, are magnificent in comparison with those of the harvest of the preceding year,—are reflected in the quotations of the Stock Exchange. Perhaps not less potent as a factor is the general absence of opportunities for investment. The prices attained by our Railway Stocks are not such as to tempt the prudent investor. London and North-Western are quoted at 157. On the 6th of November, 1879, they were 146½, and paid 4*l.* 5*s.* 9*d.* per cent. if purchased at that price. Brighton are quoted now at 145; last November they stood at 133, paying 4*l.* 3*s.* 11*d.* at that price. Midland stand at 137⅝, or 1½ higher than in 1879, when they paid 3*l.* 19*s.* on the

* Our readers who wish to pursue this subject should consult Mr. Evans's work on "The Flint Implements of the Drift."

† We may refer on this subject to the learned and beautifully illustrated work of the French antiquary, M. B. de Perthes. Fol. ed. Paris, 1852.

purchase-money. Metropolitan are only a half per cent. higher than they were a year ago. Metropolitan District are 2½ lower. Thus while it is difficult to obtain more than 4 per cent. by railway investment at the market price, there is no sign of such an inflation of the prices of these securities as to lead to anything like a repetition of the eagerness of 1845.

Some outlet, however, must form itself for the accumulating growth of capital if the terrible outlet of war is avoided. The *Builder* was, for a time, almost alone in the press in the anxious warning it raised against investment in foreign loans. "The foreign loans," says an able contemporary, "which absorbed so much of our wealth during the golden years of 1872-73 have utterly collapsed." No new opening for financial investments has occurred. We may point to the rapidly-increasing debt of our rural and urban authorities. No doubt, that is a safe investment so far as the lenders of the money are concerned; but we fear that, from the ratepayers' point of view, it will be found, to a great extent, to have been a wasteful and extravagant outlay. The luxury of some of our municipal authorities has attained a pitch that is little short of scandalous. The misery of the pauper, and the cruel pressure under which many of our crowded city populations yet live, if it may be called life, afford a grim contrast to municipal luxury. The point which will strike many of our readers is this: How is it that, while money is thus seeking for investment,—while we have so many idle hands in the United Kingdom,—while we have great towns in sore need of thorough drainage and disposal of the sewage, and while we have hundreds of thousands of acres of ground left untilled, or nourishing only furze and heath, dotted with a few pinasters, as along the course of the South-Western Railway for long miles of its course from London to Bournemouth,—no one arises to put these factors together into a remunerative sum? We have not only lands that want hands, but lands that would well repay well-directed labour. We have labour enough and to spare. We have city and urban refuse for which the land hungers, which is yet left to breed pestilence in the towns; and we have, which is the feature of the day, capital crying out for employment. The one thing which, some time ago, was the only deficient requisite, is now ready. How is it that a little of the superfluous capital, of which the accumulation is signified by the quotation of Consols at par, is not utilised in such a thoroughly remunerative manner as by taking, for example, the sewage of Guildford to fertilise some of the waste ground to the south of Woking? We cite but one example; hundreds may be found. But the great expanse of the tertiary sands of Hampshire and of Surrey seems to offer the most tempting field for improvement.

THE PICTURESQUE AND THE USEFUL.

Every man of taste feels a pang at any invasion of the romantic scenery of England by any of the disfiguring works of the industrial pioneer. To a very great extent, owing to geological reasons, the heaven-defying chimneys of the factory, and the smoke and flame vomiting mouths of the furnace, have been reared amid scenes that were, before the introduction of the industry of the mines, bleak and desolate. The sudden contrasts between crowded city and bleak moor, to which the attention of the traveller over such lines of railway as the Manchester and Sheffield is so often called, are of a nature that was only to be witnessed in dreams before the pathway was laid for the iron horse. But that portion of our scenery which is at once bold and rich, where the heights are wooded with timber of secular growth, and the valleys laugh with corn or rich meadow pasture, is, for the most part, at present safe from conversion into streets or brickfields.

Thus it is with a ready sympathy that the cry of distress of a resident in the lovely neighbourhood of Derwentwater Lake will be heard by many of those to whom our home Alpine scenery is dear. He writes to lament the completion of a survey for the construction of a tramway from the Honister Crag Quarries, above Borrowdale, to Braithwaite, on the Cockermouth, Keswick, and Penrith Railway. Commencing in the wild vale of Borrowdale, the line skirts the western side of Derwentwater Lake; and, descending by the lesser Cat Bel, crosses the opening of the famous vale of Newlands. The objection of the resident to this line is, that it is sought only to enrich the pockets of the promoters; and he holds that it should be resisted by all those who wish to preserve inviolate the beauty of the lake scenery.

In reply, one of the proprietors of the Honister quarries refers to their vast extent and excellence, tested by working for centuries. The facility for expediting the slates which they yield that it is now sought to provide is a small-gauge tramway, 27 in. wide, on which a small locomotive will draw a train of small wagons twice each way daily, with the exception of Sundays. And it is to be observed that this mode of communication will free the narrow winding roads, or rather lanes, that now conduct the wayfarer or the tourist along these valleys (in many of which it is only here and there that two carriages can cross) from the intolerable nuisance of the slate-carts. Twenty horses and carts are now employed; and it is in the prospect of the employment of four or five times that number for the transfer of slates that the construction of the tramway is proposed.

When the issue is fairly joined between the taste and the pocket, the latter is doomed to win, as a general rule. Without going into any nice details, we may take it that the conveyance of the slate by the proposed tramway will be effected at one-third the cost of conveyance by road. And as building *will* go on, and houses *must* be roofed, and Honister may fairly claim to be the source of the local slate supply, we cannot regard the completion of the tramway as anything but a question of time. Instead, therefore, of commencing a warfare of which the upshot is foredoomed, why do not the residents of the vicinity lend their energies to secure a picturesque, or, at all events, a not hideous, set of designs for the works? There is no reason why a tramway, *per se*, should be more ugly than a road. There is no reason why any bridges or other buildings needed for its use should not possess some architectural claims to admiration. Some of our quaint old road and river bridges are among the most picturesque features of many an English county. Who does not know the river-bridges at Maidenhead and at Chester? The fact is, that we ought to learn the true lesson conveyed by the triumphs, first of Brindley and of Telford, and then of Stephenson and his contemporaries, over the peculiarly opposition of landowners and corporations. The consent of the then Earl of Essex to the passage of the Grand Junction Canal through Cassiobury Park was not obtained without a long and costly struggle. But in truth the canal is now, in portions, a great ornament both to this and to the adjoining park, the Grove, the seat of the Earl of Clarendon. What is truly lamentable, no doubt, is the miserable squalor and unsightliness of Telford's canal bridges. And many of Stephenson's railway bridges are little better. But why should these things be so? Why should not the counsel of an architect, of sufficient eminence to give weight to his opinion, be sought by the landowner?

At but slightly increased cost, public works may be rendered ornaments, instead of disfigurements, to a neighbourhood. If there is, then, to be fighting,—and we confess to some sympathy with the invaded party,—let it take the form of an appeal to taste, rather than a flat negative to the demands of commerce. Let the Derwentwater residentiary proprietors choose a man of admitted taste, whether an architect in practice or otherwise, and make their opposition to the Bill depend, or at least make their withdrawal of opposition depend, on the satisfaction of their referee as to the architectural design, or picturesque execution, of the proposed new works. Every one will be the better for such a plan. Money will be properly spent, instead of being wasted in Parliamentary fighting. In fact, we can conceive of but little opposition to our recommendation, except on the part of those who take a natural interest in the maintenance of this kind of warfare.

The Case of Mr. Strachan.—We have received 3s. in postage stamps from "Benson," and must now close our list. Mr. Edward Ashworth (17, Dix's Field, Exeter), writes to say he will willingly receive any further aid that might be offered. The Committee of the Architects' Benevolent Fund would probably assist if properly applied to.

ARCHITECTURAL ASSOCIATION.

The first general meeting of this Association for session 1880-81 was held on Friday, the 5th inst., Mr. Ernest C. Lee, president, in the chair. Votes of thanks having been passed to several gentlemen for services rendered in connexion with the opening *conversazione*, upwards of fifty gentlemen were nominated for election as members, including Professor Hayter Lewis.

The President expressed the satisfaction which he felt, and which would be felt by all the members of the Association, at the fact that such a patriarch in the profession as Mr. Hayter Lewis should desire to join them. It was a great honour to them, and he therefore begged to move that Professor Lewis be at once elected, waiving the usual interval between nomination and election. This was seconded by Mr. R. C. Page, one of the honorary secretaries, and carried by acclamation.

The President then proposed the adoption of the annual report, which contained the following passages:—

"The Committee, in submitting the report of the past session, are gratified in feeling that the prosperity of the Association in its different branches continues to increase; as is testified by the successful results of the work, and the efforts of its members to develop what has now become a recognised society for the professional education of young architects.

The numerous opportunities offered for study and improvement during past years have been turned to good account by many, and, judging from the numbers who have attended the classes and fortnightly meetings, and the merit of the work, the Committee feel fully justified in stating that the Association is in a very healthy condition.

Visits to buildings of interest were made on alternate Saturday afternoons from January until the end of the session, and were well attended upon all occasions, those present evidently appreciating the opportunities of acquiring practical information and studying contemporary architecture. The thanks of the Association are due to those architects who accorded permission, and in some instances met the members and conducted the visits personally, thereby adding much to their utility and interest.

The library has been well attended, especially by the new members. Several donations have been made, notably by Mr. George Godwin, F.R.S., Mr. H. L. Florence, and others. A catalogue of additions to the library will be issued shortly.

The Committee have much pleasure in announcing that negotiations are pending by which the Association will receive on loan from the Royal Institute of British Architects a number of valuable books, many of which duplicate those already in our library.

The Council of the Royal Institute of British Architects having invited the Association to be represented on a committee engaged in preparing a general scheme for an examination for membership of the Institute, Messrs. J. D. Mathews and H. L. Florence, Past-Presidents, were chosen to fulfil those duties.

The Birmingham Branch continues to work efficiently in connexion with this Association, and has availed itself fully of all the privileges of membership.

Amongst the honours taken by members of the Association during the past year have been:—

Royal Academy.—F. Bageallay, Gold Medal; J. Ince, Medal of Merit in same competition; R. Gibson, Travelling Studentship.

Royal Institute of British Architects.—L. Stokes, Pugin Travelling Studentship; F. Hemings and M. J. Lansdell, Medals of Merit in same competition; E. Harper, Soane Medallion; L. B. Broun, the Tite Prize; G. H. Blagrove, Prize Essay."

Mr. J. Douglass Mathews seconded the adoption of the report, referring especially to the steps which had been taken by and in the name of the Association in connexion with the Compulsory Examination Scheme. As stated in the report, Mr. Mathews and Mr. Florence were chosen by the Association to represent that body on the committee formed to consider the question under the auspices of the Institute, and from the statement made by Mr. Mathews it appeared that he and Mr. Florence, as representing the Association and the younger members of the profession generally, prepared, at the request of the committee, a scheme of what the examination should, in their opinion, be. That scheme was adopted by the committee, and afterwards by the Council of the Institute, with scarcely any alteration. Another committee had since been appointed and was now engaged in considering the best means of giving effect to the scheme of Examination, and on that committee the Association was well represented, their representatives including, besides himself and Mr. Florence, Messrs. T. H. Watson, Lacy W. Ridge, Roger Smith, and others. It was earnestly to be hoped that the Compulsory Examination, which would commence in 1882, should be a success. He and others of its promoters had long advocated the assimilation of the architectural profession in some degree to other professions dealing with the life and property of the public, by the establishment of diplomas to be granted only to those who should by examination demonstrate their fitness and competence to practise, but it was felt that they could not go

to the Legislature and ask for a diploma without first proving their earnestness by establishing such examinations as it was in their own power to do. With a view of making the Compulsory Examination as successful as possible, the Association,—which was to a far greater degree than any other society the nursery of the Institute and, indeed, of the profession at large,—would, he thought, do well to at once form classes for its more advanced members with the view of fitting them to pass the examination with credit to themselves and the Association.

The motion for the adoption of the report was then put and carried.

The balance-sheet, submitted by Mr. J. Douglass Mathews, and adopted on his motion, showed that the financial position of the Association is satisfactory, notwithstanding several heavy items of exceptional expenditure connected with the recent alteration of the premises in Conduit-street. The total receipts for the year were 655*l.* 5s. 2d., including 127*l.* 17s. 8d. balance in hand from last year, 51*l.* 13s. withdrawn from investment, and 426*l.* 6s. 6d. members' subscriptions and entrance-fees. The total expenditure was 603*l.* 11s. 4d. (including 139*l.* 10s. for rent; 106*l.* for alterations and improvements in new class-room and library, and for new furniture; and 28*l.* 9s. for law expenses in connexion with lease), leaving a balance in the hands of the treasurer of 51*l.* 13s.

The presentation of the many reports from the various classes and other agencies for carrying on the work of the Association was next proceeded with. They showed that what may be called the departmental work of the Association had been fairly well sustained during the past year, although hardly commensurable with what might be expected from so long a muster-roll of members and so many facilities as are afforded by the Association. The reading and discussion of these reports always occupies a very considerable time, and this year a discussion arose as to whether it would not be possible, in future, to print them in the Association's Brown Book, by which plan every member would have them, and they could then be "taken as read" at the first business meeting of the session, which is always the opening meeting. This suggestion was opposed by some members on the score of the extra expense which would be involved, but it was urged by others that the necessary outlay would be well expended, seeing that these reports gave detailed accounts and statistics of the work done in the various classes, and, indeed, described an integral and a very important part of the business of the Association. It was understood that this suggestion would be followed in future, but when the reading of the reports was about half-way got through, it was moved that that business be shunted for a time in order that the President might read his address. This was carried *nem. con.*

The President then delivered his inaugural address. After reviewing in detail the work of the last session (which, he said, thanks to the energy of the late President, Mr. S. Flint Clarkson, and to the indefatigable labours of the secretaries and committee, and those of the officers of the various classes, had not been retrogressive, although the number of members attending the classes was not so satisfactory as could be wished, considering that the Association numbered more than 800 members), he proceeded as follows:—On the question of prizes I have something to say. First, with reference to the too often unsatisfactory character of the drawings sent in for the open prizes, we cannot suppose (with the list of prizemen for the last year [all members of this Association] figuring in our report), that there are not enough, and to spare, of good men and true who are capable of competing and producing drawings which we should be proud to hang on our walls in exhibition. But the fact remains that they do not compete. Why is this? I think we must, however unwillingly, come to the conclusion that the prizes in themselves are not of sufficient value, and that the honour of taking the prize is too often gauged by its monetary worth, not by the students only, but also by the public. If this be the case, you will all be glad to hear that an attempt, perhaps too bold, but, for all that, a determined attempt, is, I hope, on the eve of being made to rectify this defect; and that the prize sub-committee have convened a meeting, and will submit the following report for the consideration of your committee at their next meeting. This is so important a matter that I shall take the liberty of giving it you *in extenso*:—

"*Architectural Association Prize Sub-Committee.*

At a meeting of this committee, held at the President's (Mr. E. C. Lee's) rooms, on October 19th, 1880, the members present being Messrs. Adams, Batterbury, Lee, Shuffrey, and Webb, it was unanimously decided to recommend the following suggestions for adoption and approval to the committee of the Architectural Association:—

1st. That a scheme be set on foot for raising a fund sufficient to endow a permanent annual prize, to go by the name of the 'Architectural Association Travelling Studentship.'

Taking into consideration the immense increase in the members of the Architectural Association of late years,—its importance as an educational body, and the laxity of competition for its open prizes arising, as the committee consider, from the small value of the prizes offered, the committee consider that the raising of the necessary funds to endow a Travelling Studentship would not present insuperable difficulties.

It is considered that an amount to produce annually the sum of 20*l.*,—say 400*l.* or thereabouts,—would be required, and the committee suggest that they should be empowered to take such steps as may appear to them advisable to raise this amount among the members of the Architectural Association.

In order to avoid the appearance even of competition with similar prizes offered by the Royal Academy and the Royal Institute of British Architects, it is proposed that the Studentship should be open to those members who are not more than twenty-three years of age, and further, that the election of a student be based not only on his draughtsmanship, but also on his powers of design, and that the drawings sent in should be limited in number. And the committee desire to express their opinion that the institution of such a Studentship would greatly benefit and raise the status of the Architectural Association.

2nd. That a special Prize Fund Committee be formed in connexion with the present Prize Sub-Committee, for the purpose of obtaining annual subscriptions sufficient to considerably increase the present amounts offered for open prizes, the committee fully believing that the comparative failure of the existing Prize Fund is largely owing to the want of any organised effort to raise the money required adequately to endow the medal, essay, and any other open prizes, which are from time to time set on foot."

I trust that this project will appeal to every member as one of the first importance, and that each one will subscribe in some form or other to enable it to become a reality. If we cannot get the whole of the amount this year, we shall strive to complete it in the next. It is a great work and a valuable one, and in after-years each of us will feel proud to have added his mite, and to be able to lay claim to have been one of the originators of the "Architectural Association Travelling Studentship," and to have raised the standard of the Association by giving a proper status to its prize fund. The library, in the very efficient hands of its present officers, continues to carry on its work most thoroughly, and arrangements for the extension of its usefulness are at present in negotiation with the Royal Institute of British Architects. And now I must say a few words to you concerning the Architectural Examination. You are most of you aware that the Royal Institute of British Architects propose in 1882 to make the Associateship attainable only by the passing of a Compulsory Examination, and I think you will most of you agree that it is a step in the right direction,—a step towards the architectural diploma period which we hope eventually to attain to. It will at once raise the status of the profession and the standard of education,—the social and artistic position of the architects of this country. It will, I trust, be the means eventually, though naturally by slow degrees, of eliminating those practitioners who take our name and enrol themselves under our banner simply for trade purposes. While we are legally powerless to prevent what is morally an infringement on our rights, at present there is nothing to prevent any small builder, auctioneer, or house-agent from tacking-on "Architect" to his name; nor can we, without an Act of Parliament, hope to have protection from this sort of piracy. Freedom from this, however, may come, and will, if the Compulsory Examination scheme is thoroughly carried out. We do not want to prevent people building houses,—if they are so ill advised,—without an architect; but we do object to having the profession dragged through the mire by ignorant tradesmen who have no claim or right whatever to our name. These, however, gentlemen, are higher matters than properly come within our province, though we must all, individually, feel the greatest interest in them, and strive to further the objects sought to be attained, as far as lies in the power of each one of us, as members of an association of students formed for mutual help in self-education. Let the task we set before us be to strengthen the hands of the Royal Institute of British Architects, by proving that among the younger members of our profession there is a large body of men able and willing to think and work and act together, and, who will not be afraid, when the time comes, to submit the result of their labours to the test of an examination. . . . . During the last session there has been sitting a committee, under the auspices of the Royal Institute of British Architects, on the vexed question of architectural competitions. What conclusion they have come to, and what advice they are prepared to give with regard to future procedure, we do not at present know; but we may well hope that a code of rules, based on the principle of paid limited competitions and professional adjudication, will be the result. In conclusion, gentlemen, I hope and trust that in the present session the harmony of the Association, notwithstanding its increasing ponderosity, will still be maintained; that in our social connexion we shall all be ever ready to extend a helping hand to our less successful brethren; and that in our labours together here we shall strive by all means in our power to fulfil the aspirations of our motto, and learn so to order our ways that posterity will at least allow that the architects of the nineteenth century, whatever else their shortcomings, did, to the utmost of their power, "Design with Beauty and Build in Truth."

The reading and consideration of the reports from the classes, &c., was next proceeded with, and this business having been disposed of,

Mr. Lacy W. Ridge moved a vote of thanks to the President for his address, which he characterised as extremely practical, and full of interest to the members of the Association. He urged that, in future years it would greatly facilitate the business of the opening meeting if the reports of the classes were printed in the Brown Book of the Association. The members would then have the advantage of seeing them in advance of the President's address.

Mr. Thomas Blashill, in seconding the motion, said he had been struck by the variety of subjects which the widening operations of the Association had rendered it necessary for the President to mention in his address. It was very desirable that members should join the various classes which were carried on under the auspices of the Association. With regard to the proposed Travelling Studentship, 400*l.* was a large sum to raise, and he ventured to suggest that pending the full realisation of their desires in that direction, the treasurer of the Association might, as the funds allowed, be permitted to make a grant in aid of the travelling expenses of the student who might be deemed most worthy of it, so that the proposal might take effect at once. Upon the members generally Mr. Blashill urged the importance of spending a few weeks abroad occasionally, as a useful auxiliary to home studies and travels, and he pointed out that the facilities now existing for foreign travel enabled students and others to get over a great deal of ground at a very small expense.

Mr. S. Flint Clarkson, in supporting the motion, said, with reference to the proposal to raise 400*l.* for endowing a Travelling Studentship, that he did not see why it was stipulated that that sum should be wholly contributed by the members of the Association. The Institute was not above receiving special gifts from non-members in aid of similar objects; why, then, should the Association lay down a different rule of procedure? He hoped this and other points would be well considered; for he believed that the proposed Travelling Studentship, if made sufficiently different from those already existing, would be a great success.

Mr. Riddett having said a few words, the motion was carried *nem. con.*, and Mr. Lee having briefly replied, the proceedings terminated.

THE PRINCESS'S THEATRE.

THE new theatre was opened on Saturday last, the 6th, with "Hamlet," Mr. Edwin Booth, the American actor, playing the principal character. Before giving a few particulars of the new house, we are impelled to say that the representation was unsatisfactory. The newspapers, properly anxious to show kindness to a visitor from afar, have sought to say what they could in favour of Mr. Booth's performance, but the truth may be read between the lines. It was mannered and monotonous, and never once "fetched" the house. We shall be glad to see Mr. Booth in another part, and to find ourselves able to admire. There is little to mention specially in respect of the acting in the other parts, except as regards Miss Gerrard, who, as Ophelia, though somewhat weak and colour-

less at first, in the mad scene achieved a genuine and well-merited success.

The architectural scenery that has been provided for the play is the worst that has been seen on the London stage for a long while. As the tragedy is to be played but a short time, if Mr. Gooch had brought together a number of old and inharmonious canvasses, surprise would scarcely have been expressed. But that such scenes as are exhibited should have been painted for the purpose at this time of day is surprising. The Norman period having been selected, the painter had nothing to do but to go to known examples of the style to ensure something like correctness; instead of doing which, he has chosen to burlesque every detail. Such a Norman interior as that in which the interview with Ophelia takes place, with two staircases and four fearsome beasts sitting on the newels, was never seen before out of a pantomime. And this, too, on the spot where for years, under Charles Kean, the scenery was always artistically beautiful and archæologically correct. Such a scene as that to which we allude exposed night after night before an audience is a public injury.

The new theatre has been erected from the designs of Mr. C. J. Phipps, architect, Mr. Mark Manley being the builder. The other contractors engaged were Messrs. Geo. Jackson & Sons for the proscenium, box-fronts, and other ornamental plaster work; Messrs. C. Drake & Co. for concrete floors and stairs; Mr. Edward Bell for painted decorations and gilding; Mr. D. Jones for the gaswork; Messrs. Strode & Co. for the sunlight; Mr. Wharton for the stage; Messrs. Gregory & Co., Regent-street, for the upholstery; Mr. Wadman for the stalls and dress-circle seats; Messrs. Cottam & Co. for the ornamental iron gates; Messrs. Wills & Co. for the waterfall and fernery; and Messrs. Burke & Co. for the mosaic pavements. Mr. E. Nightingale was clerk of the works.

The audience to the stalls, private boxes, dress circle, and upper boxes, enter the theatre from the new frontage in Oxford-street, by a vestibule, 20 ft. wide, opening into a crush-room at the foot of the grand staircase. The audience to the pit, amphitheatre, and gallery enter the theatre from the new entrance in Winsley-street, a few doors out of Oxford-street. The Royal and stage entrances are in Castle-street. A commodious room is provided for the Royal box.

On the first tier, the balcony or dress-circle has five rows of seats to hold 140, and behind these nine private boxes. The balcony advances nearer the stage than we have ever noticed in so large a theatre.

The upper circle, or second tier, has six rows of seats, and will hold 400 persons. The pit holds about 800. The dimensions of the auditory will be seen from the following measurements:—

	Ft.	In.
Curtain line to dress-circle front	32	0
Ditto to upper circle front	39	6
Ditto to amphitheatre front	41	6
Ditto to gallery	45	0
Ditto to the back wall of the pit	61	0
Ditto to the back of the stage	40	6
Ditto to the footlights	4	0
Width of the stage and scene docks	118	0
Height of the stage to the gridiron-floor	56	0
Depth of the stage to the cellars	19	0
Height of ceiling above pit	55	0

A special feature of the arrangements is a separate transfer-staircase from the highest level of the gallery to the ground-level of the pit. So that on crowded nights the overflow from the gallery can transfer down to the pit without mingling with the persons still ascending by the main entrance staircase; also from the pit, a passage at the back affords a means of transferring to the front entrance vestibule, where access is at once obtained to the several higher tiers of the auditory.

All the entrances and staircases are fireproof, and the stage is separated from the auditory by a solid brick wall carried up above the roof. A saloon and smoking-room are provided on the level of the dress-circle; the latter extending over the entrances and facing out into Oxford-street.

The proscenium opening is 30 ft. wide and 36 ft. high, flanked on either side by three tiers of private boxes, very lofty, as the custom now is. Above, in the tympanum of the arch, is an allegorical figure subject satisfactorily painted by Mr. Ballard, representing the various arts allied to the drama. The two spandrels supporting the ceiling contain figures of "Poetry" and "Music."

The general tone of the decoration is light cream colour, deepening in colour towards the lower parts of the auditory, and the whole of the ornament is gilded. The hangings to the private boxes are of figured silk,—a deep crimson colour. The act-drop, by Mr. William Beverley, represents a tapestry curtain with the Royal Arms in the centre, and, strange to say, is very unsatisfactory.

Mr. Phipps is an experienced theatre-architect, and, as might be expected, the arrangements for seeing and hearing appear to have been well attended to; the public staircases are of the right kind, short flights and no winders, and the vestibules and approaches are capacious; but from an art point of view the new Princess's is decidedly inferior to some of his other works.

THE TEMPLE BAR MEMORIAL.

The memorial at the commencement of Fleet-street was unveiled on Monday, the 8th, by H.R.H. Prince Leopold, in the presence of an immense and not altogether friendly crowd,—unfriendly, that is, to the memorial, not to the Prince, who was received enthusiastically. We have done our best to avoid joining in the common cry against this erection. But it cannot be done; the more the structure is looked at, the more clear the fact becomes that its position is a dire mistake, and that it must inevitably be removed before long. It stands immediately opposite to the entrance to the Law Offices, and will during some hours of the day absolutely prevent carriages from setting down at that door.

Although the memorial has already been illustrated and described in various quarters, we are bound, probably, to repeat some of the particulars, though very briefly. It consists of a basement of blue Guernsey granite and pedestal of red granite, the angles being protected by four spur stones of Shap granite. In the pedestal are four panels in relief executed in bronze, that on the south side depicting an incident in the life of her Majesty the Queen, on her visit to the City after her accession. On the north side the relievo represents the Queen, with the Prince and Princess of Wales, passing through the City to St. Paul's on Thanksgiving Day, 1872. The figures and accessories are so much in relief that when they get clogged with mud it will be impossible to clean them without damage. The best thing that can be done will be to put glass over them. The tablets at the ends are much smaller. That on the east end gives a representation of the old gate, with the strange intimation above that it was erected by Sir C. Wren, and removed by Horace Jones. Why the City Architect should thus unnecessarily hand himself down to posterity as an Iconoclast it puzzles us to say. The superstructure consists of four piers, with capitals, or rather eight pilasters of Craigleith stone, with the necessary architectural accessories, and with niches between them on the north and south sides in Ancaster stone. The whole is surmounted by a small pedestal with a dragon, holding the City shield modelled by Mr. C. B. Birch, A.R.A., and cast in bronze by Mr. Moore, of Thames Ditton. The vigour and power of this part of the work deserve praise. The niche on the south side is filled with a statue in Sicilian marble of the Queen, in her state robes. In the northern niche there is a statue of the Prince of Wales in Field Marshal's uniform,—singularly unlike his Royal Highness. Both these statues are by Mr. Boehm, A.R.A. The whole height of the memorial is 31 ft. 6 in., and the width of the base of the pedestal is 5 ft. 1 in. by 7 ft. 8 in., exclusive of the spur-stones. The pilasters are filled with carved cameo panels, emblematic of Peace and War, Art and Science, together with the rose, shamrock, and thistle. There are two portrait medallions on the east and west sides of the memorial, one representing Prince Albert Victor of Wales, and the other the late Lord Mayor, Sir F. Wyatt Truscott. We should have mentioned that the frieze above the pilasters is inscribed "MDCCCLXXX. Temple Bar formerly stood here." The carving and modelling were executed by Mr. H. Mabey, with the exception that the relief facing the north was modelled by Mr. Kelsey. Messrs. John Mowlem & Co. executed the masonry, the granite work being supplied by Messrs. Alex. Macdonald, Field, & Co. As regards the work of the City Architect, we have no hesitation in saying that if the site had been unobjectionable, the memorial would have obtained praise. The rapidity with which the work has been done, considering its character, is remarkable.

Those who have seen the memorial as it now stands will have noticed that only a portion of the space intended to be devoted to the purposes of a "refuge" for persons crossing the road is curbed and paved and provided with the ornate lamp-posts at the angles. That portion of the refuge, three or four square yards in area, is on the City side of the structure. With a view, perhaps, to make the memorial as little of an obstruction as possible, the western face of the masonry has been carried up right on the very confines of the western boundary of the City, and consequently the few square yards of space required for the refuge at the western end of the monument must be taken out of the roadway of the Strand. Somehow or other, those most concerned in the erection of the memorial seem to have acted in such haste as to omit to ask and obtain beforehand the sanction of the Strand District Board of Works for permission to encroach upon their domain. Only when the monument was nearly completed was the requisite permission sought, when lo! the Strand District Board passed a resolution refusing to accede to the request, and condemning the structure as an impediment to vehicular traffic. Subsequently, a deputation, consisting of Mr. Bedford and other representatives of the Corporation, waited on the Strand authorities to endeavour to induce them to rescind their resolution, and to give their sanction to the completion of the memorial. A motion made to that effect was, however, lost by 18 votes against 12 for it. To this determined rebuff is due the present incomplete state of the memorial. The dispute affords an apt illustration of the way in which the local authorities of London can thwart each other when conflicting interests prompt them.

THE METAL SPIRE OF ROUEN CATHEDRAL.

COPPER AND IRON.

The spire of the Cathedral of Rouen is legendary. This "unluckly manufactory chimney" has served a number of writers for a long time as a butt for sarcasm and laughter. And this work of Alavoine's, who was, nevertheless, one of the architects of the column of July, had up to the present only found detractors.

The lantern had been set up, and for long years stood in an adjoining courtyard. Put into its place, this last portion of the spire has considerably modified its aspect, and the gigantic *flèche*, 150 mètres in height, has since then been more justly appreciated. To-day, the work commenced in 1827 has entered into its last phase, as our sketch shows. The nakedness of the base was most unsightly. The artist had projected to overcome this by the aid of large turrets around it, and these are found effectual. They are nearly 25 mètres in height. For a long time previously a model in timber work, carefully worked out, painted lead colour, had given an idea of the importance of the intended addition.

The whole of the works have been under the direction of M. Barthélemy, diocesan architect. The frame-work of the turrets, executed in iron by M. Filleul, is covered in copper *repoussé*, with ornaments modelled and framed by M. Marron. A portable scaffolding, established by M. Gambier, was transported successively to the four angles of the tower for the building of each turret. The whole of the *repoussé* work in copper is isolated from the iron by ties and rings of hardened wood. It is composed of leaves hooked to each other, and not soldered, and is the most important work of the kind that has been executed in France up to the present time.

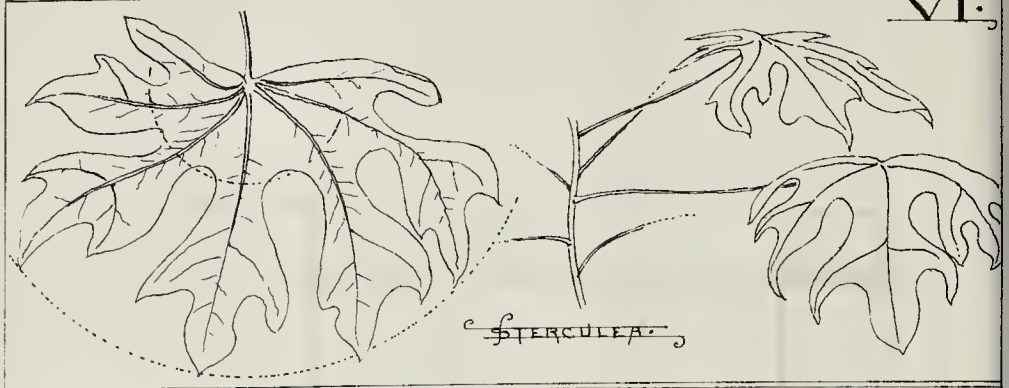
A colossal statue of Bartholdi, which was recently to be seen at the Paris Exposition des Beaux Arts, is the only work which can at all compare with the construction of these turrets, which are of enormous dimensions, but nevertheless appear very fitting at the great height at which they are placed.

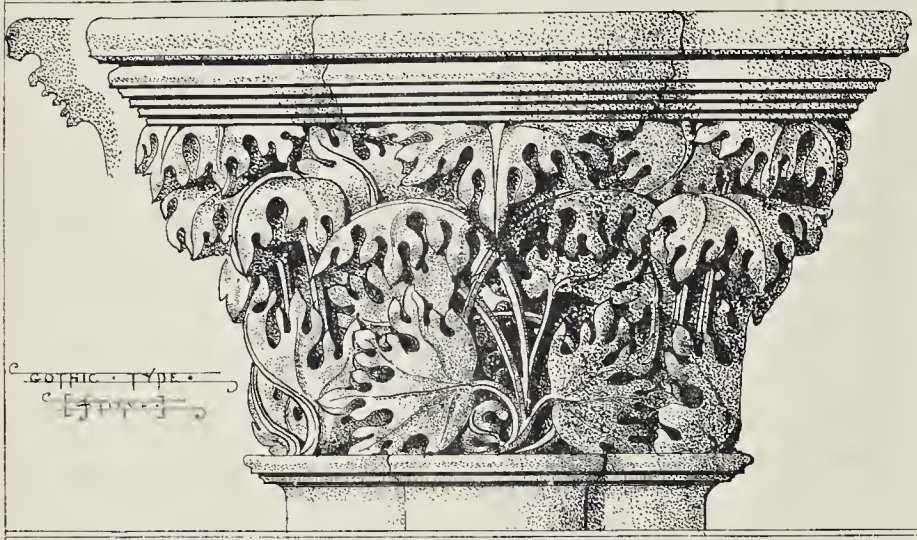
These are, in fact, the last complement of the work of Alavoine, and nothing now remains to entirely finish it but some touches of gilding, which by this time, indeed, may have been given.

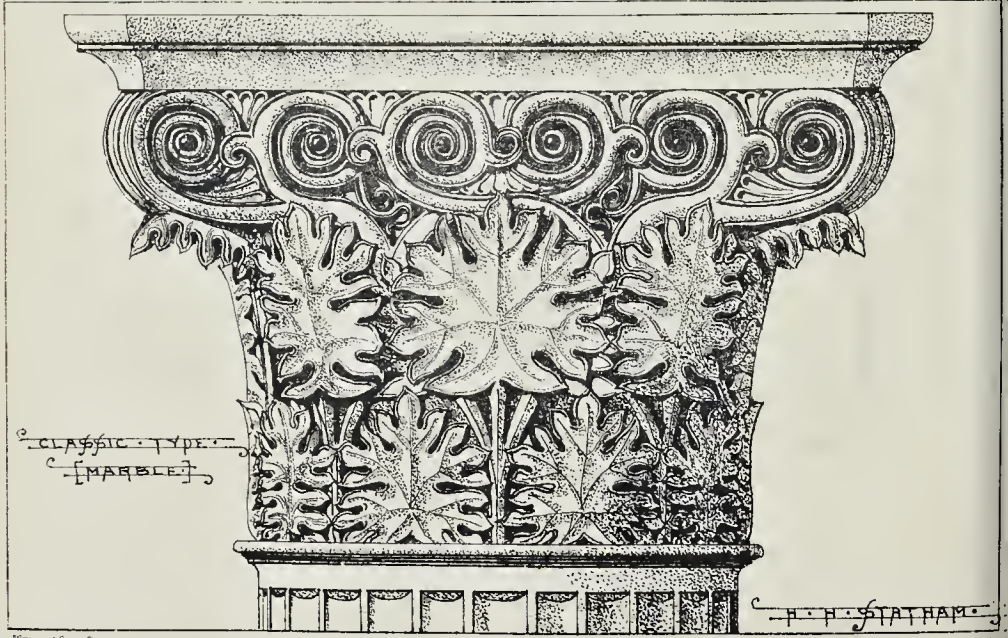
The sketch of the cathedral which we publish is taken from a roof in the Rue Grand Pont. It gives an idea of the effect of the spire as improved by its turrets, and from which the cross rises in the air to a prodigious height.

THE METAL SPIRE OF ROUEN CATHEDRAL.—From the Design of the Late M. Alavoine, Architect.

VI.







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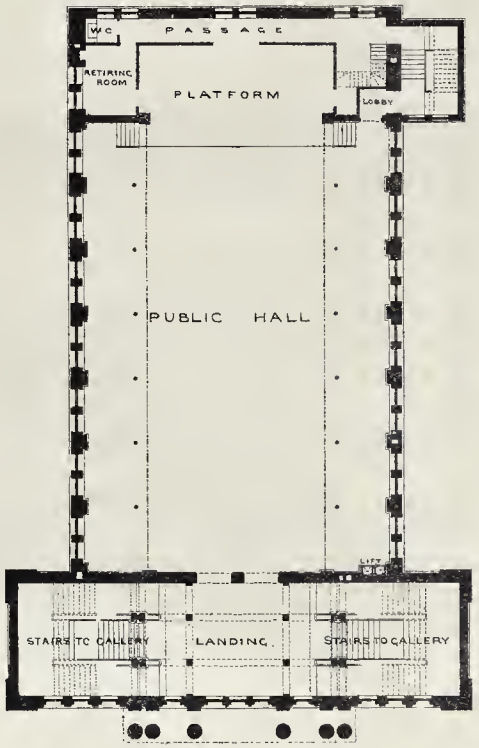
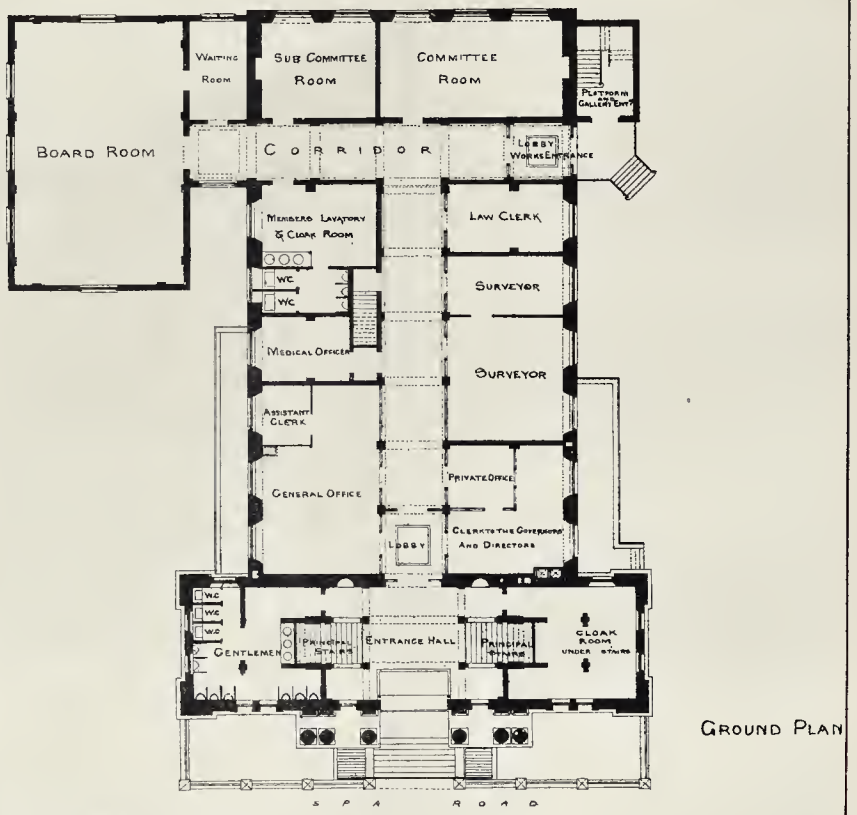
DECORATIVE SUGGESTIONS FROM NATURAL FORMS. — No. 6.



FIRST FLOOR PLAN

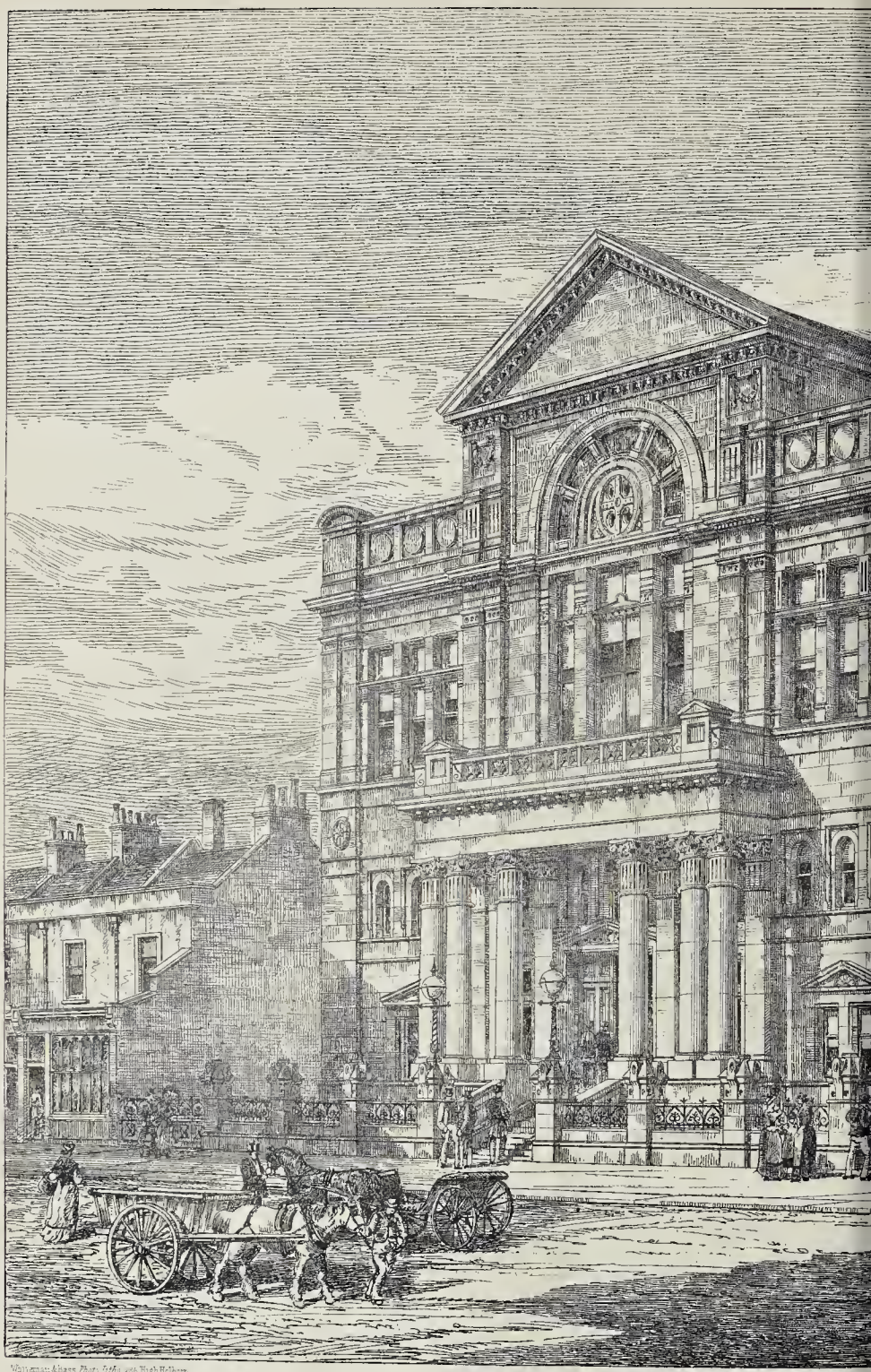


GROUND PLAN

Scale of Feet

Wyman & Sons, Printers, 74 Queen St.

BERMONDSEY TOWN-HALL.



Walmsley, Adams Photo. Lith. 208, High Holborn.

BERMONDSEY TOWN-HALL.—

Wyman & Sons, Printers, 74 Queen St.

Elkington & Son, Architects.

DECORATIVE SUGGESTIONS FROM NATURAL FORMS.—No. 6.

THE leaf of *Sterculea*, which forms the basis of the two capitals here given, bears, as will be seen, some resemblance in general style to the acanthus leaf, but is broader and rounder; the circle is, in fact, very predominant in the design of the leaf, both the points and inner margins of the indentations touching for the most part on the arcs of circles drawn from the point of departure of the leaf-ribs. If this leaf were used in flat or inlaid design, this circle element in it should be emphasised in the setting or background of the design: in carved ornament it can hardly be so without producing too stiff an effect.

The two designs here given are intended partly to illustrate what was observed in our leading article on the subject (*Builder*, October 9th), as to the double use which may be made of each suggestion by treating it in either picturesque or symmetrical style,—in other words, in the Gothic or the Classic type. Some features of Gothic and Classic capitals have, however, been purposely interchanged here; in the Gothic capital the central leaf under each projection of the cap is carried up and turned over under the abacus somewhat as in the usual treatment of the conventional acanthus in the Corinthian capital; and in the other more Classic form the scroll of the volute is inverted, a suggestion borrowed from the well-known type of Transitional capital found almost all over Europe during a portion of the twelfth century. The distinction between design for stone or for marble carving is also kept in view; the very conventional treatment of the leaf in the Classic design, with a small fillet carried round the margin, and the filleted scroll-work above, being only fitted for execution in a fine and hard material which will take and retain a very high finish. The eyes of the scrolls are supposed to be set with coloured stones or heads, a practice undoubtedly employed by the ancients in the Ionic capital, if not in other forms.

We have given the first six of these "suggestions" in consecutive numbers: in future we hope to continue to give others, perhaps more elaborated than these, from time to time as may be convenient.

BERMONDSEY TOWN HALL.

IN 1878 the Vestry of Bermondsey, having resolved to erect a public hall, board-room, and offices, in order to provide for the necessary requirements of the district, took steps to obtain a suitable site for the purpose. Early in the following year they purchased the tanyard and premises originally occupied by Messrs. John Barrow & Son, in the Spa-road and Neckinger-road, adjoining the public baths and washhouses.

The site, containing upwards of 49,000 ft. superficial, comprises not only the space necessary for the intended public hall and offices, but also a suitable dwelling-house for the resident clerk of works, and a warehouse building three stories high, the ground-floor of which has been converted into stabling for twenty horses, the upper floors being available for stores. The remaining portion of the land will be appropriated as a stone depôt. The property is situated within a convenient distance from the Vestry's wharf and dock abutting on the river Thames, the two establishments thereby enabling the Vestry to provide for carrying on the whole of the public business connected with the parish.

The following statement from the census return of the parish will indicate the rapid increase which has occurred of late years, viz.:

	No. of Houses.	Population.	Rateable value.
1801 ...	3,203 ...	17,169 ...	£34,387
1811 ...	3,505 ...	19,530 ...	59,873
1821 ...	4,691 ...	25,235 ...	65,141
1831 ...	5,388 ...	29,741 ...	72,593
1841 ...	5,963 ...	34,947 ...	76,633
1851 ...	7,556 ...	47,836 ...	123,876
1861 ...	8,523 ...	58,212 ...	150,216
1871 ...	11,073 ...	80,429 ...	281,902

The population at the present moment is estimated at 98,000, and the rateable value is 364,855*l.*

The extent of streets and roadways under the jurisdiction of the Vestry is upwards of thirty-two miles, being nearly doubled since the Metropolis Local Management Act came into operation in 1856.

The new Town-hall fronts the Spa-road. The principal elevation and portions of returns are faced with Portland stone, and the rest of the building is of picked stocks, with white Suffolk arches and bands. The ground-floor, as the accompanying plan shows, contains accommodation for the several officers of the Vestry and of the Boards of Governors and Directors under a local Act. The board-room is 46 ft. 9 in. by 29 ft. 6 in. in the clear, and 20 ft. in height.

The public hall is 80 ft. by 52 ft. 9 in. in the clear, and 37 ft. 9 in. in height, with galleries on each side, and an additional gallery at the south end over the first floor landing. The hall and galleries are estimated to hold 1,200 persons. Provision is made for a platform or dais and retiring-rooms at the north end, with separate access.

The front portion of the structure contains entrance-hall, lobbies, and staircases, besides gentlemen's and ladies' retiring-rooms, lavatories, &c., so that the public hall may be used at any time without interference with the ordinary business of the Vestry.

The front portion of the basement will be fitted up with apartments for caretaker, strong rooms, heating apparatus chamber, coal-cellars, and kitchen departments (if so required) in connexion with the hall.

The rear part will be separately approached as a cart store, &c., from the depôt.

The whole of the floors are fire-proof, on Dennett's principle, the corridors paved with stone, and the entrance-hall and lobbies with ornamental tiles.

The works are being carried out from the designs and under the superintendence of Messrs. George Elkington & Son, architects, 95, Cannon-street. The contract for the buildings, amounting to 21,200*l.*, is in the hands of Messrs. Perry & Co., Tredegar Works, Bow. Mr. S. Ford is clerk of the works.

It is intended that the first stone shall be laid on the 23rd inst. by Mr. Porter, churchwarden of the parish.

MR. EDMUND SHARPE'S WORKS.

THE Architectural Association has brought nearly to completion the volume to be dedicated to the memory of Mr. Edmund Sharpe, completing one of his projected tasks,—the illustration of the twelfth-century architecture of Charente. The volume will contain a memoir, and a full list of Mr. Sharpe's publications, and it has been represented to us that good service would be done by our printing a list in the *Builder*, and inviting our readers to find out gaps or errors in it, and to communicate with the secretary of the Publication Committee,—Mr. J. S. Quilter, 10, Brunswick-square, W.C. We gladly do this, and hope that the list will be as perfect as care and skill can make it. The books are dealt with this week; the minor works, pamphlets, and papers read before societies, &c., will be given in another number. It looks like a pleasant piece of hero-worship,—this thinking of even the sweepings of his workshop as of gold,—it is, besides, a view not far from the true one.

LIST OF BOOKS.

I. Decorated Windows, a series of Illustrations of the Window Tracery of the Decorated style of Ecclesiastical Architecture. London: Van Voorst. 1849.

Demy 8vo. (8½ in. by 5½ in.). Without pagination,—one page of text to each plate. Sixty steel engravings, dated 1848. 1*l.* 1*s.*—This work was issued in monthly parts each containing eight steel plates, in single leaves with explanatory letterpress. The work was classified in chronological order, by a list of plates issued with the last part. It was at first intended that the concluding part should be "a review of the whole subject, illustrated by woodcuts." This review was expanded so as to form the volume which stands next in the list. (?)

II. A Treatise on the Rise and Progress of Decorated Window Tracery in England. Illustrated with ninety-seven woodcuts and six engravings on steel. London: Van Voorst. 1849.

Demy 8vo. (8¼ in. by 5½ in.)

III. Architectural Parallels; or, the Progress of Ecclesiastical Architecture in England, through the Twelfth and Thirteenth Centuries. Exhibited in a series of parallel examples selected from the following abbey churches:—Fountains, Kirkstall, Furness, Roche, Byland, Hexham, Jervaulx, Whithy, Rievaulx, Netley, Bridlington, Tintern, St. Mary's York, Guishorongh, Selby, Howden. London: Van Voorst.

a. Large paper proofs, folio (24¼ in. by 18⅞ in.) 1848. 15*l.*

b. Small paper, tinted, folio (21¾ in. by 14¼ in.), 1848. 12*l.* 12*s.*

Small paper, plain, ditto. 10*l.* 10*s.*

Dedication to the Earl of Derby, January, 1848. No text; but two lists of the plates are given, in order to convey suggestions for binding the work. The illustrations comprise one group of plans on wood, and 120 lithographs,—the geometrical drawings on stone by R. J. Withers and T. Austin, and the views by H. Fielding; all printed by Maclure, Macdonald, and Macgregor, of Liverpool.

IV. Supplement to "Architectural Parallels," containing the full sized mouldings of the following abbey churches, Furness, Roche, Byland, Hexham, Jervaulx, Whithy, Fonntains, Netley, Rievaulx, Bridlington, Tintern, St. Mary's York, Guishorongh, Howden, Selby. London: Van Voorst. 1848.

Folio (21½ in. by 14¼ in.). No letter-press beyond a list of plates. Sixty plates, lithographed by R. J. Withers (fifty-seven) and T. Austin (three), and printed by McKie & Lawson, of Lancaster. 2*l.*

V. The Seven Periods of English Architecture Defined and Illustrated.

Super-royal 8vo. (9¾ in. by 6 in.).

a. First edition. London: G. Bell. Preface dated 1851. Text, pp. i. to xiii.—1 to 37. Twelve plates, drawn by T. Austin, and engraved on steel by G. B. Smith,—also seven woodcuts. 10*s.*

b. Second edition. London: Spon. 1871. Pp. i. to xiii.—1 to 37. Twenty steel engravings and woodcuts. 15*s.*

VI. The Architectural History of St. Mary's Church, New Shoreham. Chichester: Mason. 1861.

Imperial 4to (12¾ in. by 8¾ in.). Text forty-seven pages. Two steel engravings by G. B. Smith, six lithographs by H. Fielding, one by R. J. Withers, fifteen woodcuts.

Supplemental sketch of the Collective Architectural History of Chichester Cathedral, Boxgrove Priory, and St. Mary's Church, New Shoreham, as indicated by their mouldings.

Text thirty-two pages. Sixty-two woodcuts. These works by Mr. Sharpe form part of a volume which also contains "The Architectural History of Chichester Cathedral, &c.," by the Rev. R. Willis, M.A., F.R.S., and "Boxgrove Priory" by the Rev. J. L. Petit, M.A., F.S.A. Issued at 1*l.* 10*s.*

VII. An Account of the Churches visited during the Lincoln Excursion of the Architectural Association, August 22nd to 27th, 1870. London: Spon. 1871.

Sup. royal 8vo (9¾ in. by 6 in.). Preface dated June 1st, 1871. Text 152 pages. Sixty-five lithographs, mainly transferred to stone by Mr. William Henman, and printed by Kell Bros., also four woodcuts. 1*l.* 1*s.*

VIII. The Mouldings of the Six Periods of British Architecture from the Conquest to the Reformation. London: Spon.

Imperial 4to (12¾ in. by 9¾ in.), lithographed by Kell Bros.

a. No. I. Preface (2 pages), dated May 1st, 1871. Sixty plates, wholly devoted to Pier Arches. 1*l.* 1*s.*

b. No. II. 1871. No text. Sixty plates (nineteen of Pier Arches, forty-one of Doorway Arches). 1*l.* 1*s.*

c. No. III. 1874. No text, but a chronological arrangement for the whole of Nos. I., II., and III. Sixty plates (twenty-five of Pier Arches, thirty-five of Doorway Arches). 1*l.* 1*s.*

The author's intention was that the three numbers should be broken up, and the plates arranged according to the "chronological arrangement" issued with *c*.

IX.—The Ornamentation of the Transitional Period of British Architecture, A.D. 1145–1190. London: Spon.

Imperial 4to (12¾ in. by 9¾ in.)

a. No. I. Introduction (ten pages), dated Feb. 1st, 1871. Description of Plates (to page 32) completed as far as Plate XIV. Forty-two plates (thirty-seven of pier capitals, three of doorways, and two of arcades), lithographed by Kell Bros., also three woodcuts. 1*l.* 1*s.*

b. No. II. Part I. No text. Twenty plates (fifteen of pier capitals, three of doorways, one of arcades, one of corbel-shafts), photo-lithographed by Whiteman & Bass.

c. No. II. Part II. No text. Twenty-two plates (sixteen of pier capitals, three of doorways, three of arcades), photo-lithographed by Whiteman & Bass.

d. No. III. The lithography of the remainder was nearly finished when Mr. Sharpe died. The letterpress cannot be completed; but it may be possible to publish a sufficient number of drawings to make the work fairly complete, and to issue "directions for the rearrangement and the numbering of the plates, and the binding of the whole in one volume," as proposed by Mr. Sharpe at the first. The parts were issued in indiarubber bindings, so that they might be broken up and the whole of the plates rearranged.

X. The Architecture of the Cistercians. London: Spon.

Imperial 4to (12¾ in. by 9¾ in.)

a. Divided into:—

Part I. General Plan.

(Preface dated June 20th, 1874.) Text, twenty-eight pages (Lancaster printed). Plate I., photo-lithographed by C. F. Kell.

Part II. The Domus Conversorum: containing the Day-room and Dormitory of the Conversi of a Cistercian Monastery.

(Preface dated June 30th, 1874.) Text twenty-three pages, five plates photo-lithographed by C. F. Kell.

a. Re-issued as Illustrated Papers on Church Architecture. No. I. April, 1875.

b. Illustrated Papers on Church Architecture, No. II. April, 1876. Cistercian Architecture.

Part I. General Plan (continued).

Text (Lancaster printed), pp. 29 to 87; appendix, pp. i. to xx. Seven plates, photo-lithographed by C. F. Kell.

c. Part III. Development of Choir, announced, but never completed. Plates IV., V., VI., VII., and VIII. of *b.* were prepared for the "Development of Choir."

XI. The Ornamentation of the Transitional Period in Central Germany. London: Spon (Lancaster printed). 1877.

Note.—The title on the cover reads "Illustrated Papers on Church Architecture. No. 3. November, 1876."

Imperial 4to. (12¾ in. by 9¾ in.). Introduction two pages; descriptive letterpress, eight pages. Twenty-one plates engraved by G. B. Smith, "from drawings made upwards of forty years ago."

This work was the last actually published before Mr. Sharpe's death, on May 8th, 1877. The next "Illustrated Paper on Church Architecture" was, however, ready to receive his last touches, most of the lithographs being actually printed off. "I have already published, in a separate work, Illustrations of the Ornamentation of the Transitional Period of British Architecture. In the next and following numbers of this series will appear illustrations of

the same period of Mediæval Architecture in the North and in the West of France." (Introduction to XI.)

Queries.

Was Part I. of "Decorated Windows" really issued on November 1st, 1844, as at first proposed?

What was the date of the issue of "Architectural Parallels"?

How was it issued to subscribers?

Is the date 1846 correct for any completed large paper copies?

Has a prospectus of the work survived?

How and when were the illustrations of Tynemouth Priory Church (4 plates) published?

A paper was read on Tynemouth by Mr. Sharpe at the Newcastle-on-Tyne meeting of the Royal Archæological Institute,—where was this printed?

THE NEW CHURCH AT SPALDING.

THE dedication of the new church of St. Paul at Spalding took place on Wednesday, the 27th of October, and the readers of the *Builder* will no doubt, be interested in a description of what must be called a posthumous work of Sir Gilbert Scott. The edifice is the gift of Miss Charinton, of Spalding, who has, in addition, also built parsonage and school, and endowed the living. The cost of the whole has been about 30,000*l*., and the church will accommodate 500 worshippers.

It is Early English in style, and consists of a nave of three principal arches, sub-divided into six arches on each side, with north and south aisles. The principal entrance is the south porch. At the west end of the nave, and connected with it by a corridor, is a well-proportioned campanile, carrying a broach spire, 135 ft. high. The walls of the campanile are 4 ft. thick to the full height of the tower. It contains a peal of eight bells, by Lewis, of Brixton, hung in iron cages; the tenor weighs 16 cwt. On the north side of the church is the priests' vestry; over this is the organ-gallery. Adjoining this is the choir vestry, from which a spiral staircase leads downwards to the heating apparatus and upward to the organ-chamber. The dimensions of the edifice are as follow:—

	Ft.	In.
Entire length of interior ...	133	3
Nave (length)	69	6
Nave (width) including aisles..	49	0
Chancel (length)	35	0
Priests' vestry ...	16 6 × 13	0
Choir vestry ...	16 6 × 10	6

The materials used in the structure are red brick and Ancaster stone. The clearstory arcade consists of a continuous row of arches, supported on detached columns; six of these arches are pierced for windows. The whole of the roofs are covered with lead. The interior of the church presents a pleasing picture, from the peculiar treatment of the main arcade of the nave, which is supported on each side on three principal piers, with detached columns carrying the three semicircular arches. Each of the principal arches is divided into two pointed arches, springing from more slender columns between the main pieces. This unusual treatment may be seen in St. Thomas à Beckett's Church at Portsmouth, and at the church of Boxgrove, near Arundel, where the origin of this treatment is traceable in the Norman portion of the structure, and it was perfected in the subsequent Early English style. The stonework of the interior has been relieved by the introduction of stone with a red tint, also from Ancaster. The carving of the foliage throughout, and the various corbel-heads, are well executed. A very good likeness of the Bishop of Lincoln is carved in the north corbel of the hood of the chancel-arch. The windows of the chancel are set in deeply-splayed jambs, with clustered columns engaged, detached, and banded. The floor is elevated about 3 ft. above the ground-level, and is carried throughout upon Dennett's arching, thereby being protected from damp arising from the soil. The ironwork of the chancel-screen and the bandrail of the pulpit are by Skidmore, of Meriden, Coventry. The pulpit, in carved oak on a stone base, is by Farmer & Brindley, Lambeth; as is also the carved work in the chancel. The altar-table is of oak, carrying a thick slab of Mansfield stone rather more than 8 ft. long by 2 ft. 6 in. wide. It is raised seven steps above the floor-level of the nave, the steps within the sacrarium being grey fossil marble, polished. The stalls and screens are of carved English oak, very massive. The sedilia and piscina are hooded, and recessed in the thickness of the south wall. The font is in its form similar to the font in the cathedral at Lincoln, but in Mansfield Woodhouse stone, with Purbeck marble shafts. Mr. Hannaford was clerk of the works.

The contract for the whole of the work was undertaken by Messrs. Pattinson, Brothers, of Ruskington, near Sleaford, who must be congratulated on their work.

At the consecration, the venerable prelate of Lincoln congratulated the vicar of Spalding on the acquisition of another beautiful church to his parish, and remarked that, during the period of his incumbency more than 80,000*l*. had been spent in his parish in church restoration, building, and endowment, and that three new churches had been built in the same time within the period of his episcopate.

NOTES FROM BRISTOL.

THE building trade is not at all in a flourishing condition in Bristol or the neighbourhood, and, if the statement of one of the leading builders may be accepted, the operatives engaged in this branch of industry will, during the winter, have to pass through a hard time, for which most of them are ill-prepared. Speculative house-building, which a year or two ago seemed the rage on all sides, is now not nearly so active. The falling-off may be attributed to two causes: the house market is already oversupplied; most of the available building areas within an easy walking distance of the centre of Bristol have been used up; three or four large estates in the suburbs, however, are marked out for the erection of small and medium-sized houses, so that work in this department is not brought to a complete standstill.

Amongst the public buildings still in hand is St. Peter's Church, Clifton. Old St. Peter's was found too cramped for the congregation, and a fine new structure is being built on a convenient site only a few yards from the old edifice.

The Knowle Baptist Chapel, the foundation-stone of which was laid in the middle of the summer, is in an advanced state of progress, and will be before long ready for use. The place is internally light and convenient, and provides for some 500 or 600 worshippers, besides having spacious class and school accommodation. Mr. Beaven is the builder, and Mr. A. Hanford the architect. The cost is estimated at about 2,000*l*.

The Parochial Hall at St. Philip's,—a parish with between 30,000 and 40,000 inhabitants,—promises to be a fine one. It will meet a long-felt want of a large hall for public meetings in the centre of the district, and also provide room for the transaction of various matters of parish business. Messrs. Wilkins & Son are the builders.

A week ago the Mayor of Bristol laid the foundation-stone of a new Mission Church at Eastville,—a growing suburb of Bristol. The design is Early English in style, and the front of the building will be of Pennant stone, with Freestone dressings. The cost of the work is expected to amount to 1,700*l*. Mr. H. Williams is the architect, and Messrs. Eastabrook & Sons have taken the building contract.

A simple and inexpensive Mission-hall has been commenced in the heart of St. Philip's.

Mr. Kranss is just finishing the laying of a tramway line to Bedminster, after completing another branch of the same system which extends to Horfield. The Horfield line will be worked by steam, this being intended as an experiment to see how far the cheaper power can replace horse-flesh. One or two short bits of line have still to be laid to complete the tramway system, which will then supply nearly all parts of the city.

Instructions have been given to a committee of the Town Council to erect a bridge over the New Cut in place of a light iron one erected at the beginning of the century. The present bridge is manifestly insufficient, and the new one will be on a much more modern principle. The cost is roughly estimated at 8,000*l*.

Instructions were given last week for laying out a small public pleasure-ground at Cotham, presented to the city, at a cost of 800*l*.

The new police-courts in Bridewell-street, which cost some 15,000*l*., and have been in use several months, are a great improvement on the old Council-house, as far as ventilation and accommodation are concerned, but have two serious defects. The chief court has such peculiar acoustic properties that it is difficult to hear in it, and the smaller one is terribly draughty.

A new chapel is being added to the Borough Lunatic Asylum at Stapleton. The style of architecture is Norman Gothic, and accommodation will be found for about 350 patients and their attendants at a cost of 2,600*l*. Mr. Edwards has prepared the designs, and Messrs. Forse & Ashley have obtained the contract.

THE EARLIEST NORMAN KEEP, AND THE CASTLE OF FALAISE.

SIR,—As to the objection which you make to my statement,—that the earliest Norman keep is in all probability the one at Malling, in Kent, cannot be reconciled with the usual tradition in Normandy, that the *present castle* of Falaise is the one from which "William's father saw Arlette, the tanner's daughter,"—the explanation is, that although the present castle is on the same site, the existing building is certainly not of the time of the Conqueror, still less of his father, and is probably fifty years later than either. It is the old story. People consider the date of foundation as necessarily the data of the existing building, and make no allowance for the frequent rebuildings that took place everywhere, especially in the twelfth century. It is, perhaps, sufficient to say that Falaise was certainly one of the places visited by De Caumont and his friends in search of masonry of the first half of the eleventh century, and could find no masonry of that period in any one of the places they visited. This fact opened the eyes of De Caumont to the delusion which he had previously been under, in common with all the other antiquaries of Normandy. De Caumont himself never hesitated to acknowledge this; others were not always equally ready to acknowledge it. English people are often deceived by the name of the Norman style, which is quite correct in England, but in France this style is called the "Anglo-Norman" style. The style was, in fact, developed after Normandy became a province of England. There are quite as many Norman buildings in England as in Normandy. Few Englishmen know the architecture of Normandy better than I do. About fifty years ago I visited all parts of it, and was there many, many times. I was introduced to De Caumont by Dr. Buckland, the geologist, at Caen, at the meeting which De Caumont had called for the purpose of forming an Architectural Society. This was in the year 1834; two or three years after this, when I went again to Normandy for the purpose of going about and seeing things with my own eyes, I was accompanied by my friend M. Bonet, the excellent artist, whom De Caumont always gave up to me when I was in France, and we had instructions from De Caumont himself what places to go to. I have some scores of M. Bonet's drawings for which the sketches were taken on that occasion, amongst others the existing castle of Falaise, also of the church of St. Étienne, usually called the *Abbaie aux Hommes*, at Caen, of which my friend Bonet afterwards wrote and published the history; but this was not until after I had convinced both him and De Caumont that the existing vault and clearstory are of the time of Henry II., seventy years after the time of the Conqueror. The church originally had a wooden roof only, and, like all the other churches of the eleventh century, of the same width. When I first told this to my French friends, they would not believe it, for they had known the building all their lives, and must know it better than I did; but when I had persuaded them to go up to the clearstory gallery with me, they acknowledged that I was right; and Bonet has acknowledged this in print, both in the *Bulletin Monumental* and in his history of the church. The explanation of this is that I have profited by the teaching of Rickman and Professor Willis, that the history of any building can be best ascertained by comparison with others of the same period; they had not had the same opportunity.

Experienced eyes can often read off the history of a building almost at first sight, from having seen a score of others of the same kind, and therefore see the history of a particular building better than those who have studied it carefully, but have had no opportunity of comparing it with others.

For the same reason, beginners often cannot see the history at first, even when it is pointed out to them by those who have had experience, and afterwards wonder how they could have been so stupid as not to have seen it before.

English travellers in Normandy generally take

the dates of the buildings from Murray's "Handbook," and unless they have the latest edition this is very likely to mislead them. In the latest edition that I have seen, Gally Knight's "Tours in Normandy" was the authority for all the architectural history. The ideas of Mr. Gally Knight were rather in advance of his time, and he was assisted by Mr. R. C. Hussey, certainly one of the best-informed persons on this subject at that time, but that time was sixty years ago, and during the last half-century Architectural History has made great progress. JOHN HENRY PARKER, C.B.

*** The modest intimation that all who do not agree with Mr. Parker are ignoramuses, is characteristic, and not to be admired. There is no evidence whatever to disprove the general belief that William was born in the existing castle at Falaise. Is it reasonable to suppose that William's companions in England should forthwith proceed to erect structures such as the Tower of London, if they had known and seen nothing but earthen mounds and trenches in their own country? Some years have passed since we saw Falaise, but our recollection, aided by memoranda made at the time, tells us that it exhibited such work as might have been the precursor of that at the Tower.

We have not leisure at the moment to go fully into the question, but may mention, for what it is worth, the account of the siege which Falaise withstood in 1027, as given by a contemporary, Guillaume de Jumièges. Robert, the brother of Richard III., who was then Duke of Normandy, had rebelled against him and taken refuge with his adherents in the castle of Falaise, and the chronicler relates how that the Duke plied the battering-ram so long and so vigorously to the walls that Robert gave in. In other early writers also the walls of the castle are expressly mentioned.

HERTFORDSHIRE CONVALESCENT HOME, ST. LEONARD'S-ON-SEA.

THIS building stands on the crest of a hill near the West Marina Station, St. Leonard's, with an uninterrupted view to the sea, and a south-west view extending to Beachy Head. It was opened on the 28th ult. by H.R.H. the Princess Christian.

An endeavour has been made to avoid the character of an institution, and to give, both in the architecture and internal arrangements, as much the character of a home as was consistent with its uses.

The home is entered on one side to the men's department, and on the other to the women's, and the upper floors are approached by distinct staircases, the communication only being by a pass door, to be used by a matron. The sitting-rooms face the sea, and are sheltered by a continuous verandah. In the rear of the hall, and approachable from each side, is the dining-hall, and in direct communication with it is, in the rear, the kitchen, scullery, and other domestic offices, the dinner being served by a butlery-hatch.

On the right, as you enter on the women's side, is the committee-room, the matron's room, stores, and other accommodation. On the first and second floors there are dormitories, fitted to take forty beds, designed with a view, as far as possible, of securing cross ventilation to each room. Separate sick-rooms are provided for each sex, with lavatories and bath-rooms, there being also accommodation for the matron, the servants, and provision for stores of linen.

Provision has been made, on an average, for a space of not less than 1,000 cubic feet for each bed, and under no circumstances will more than seven persons sleep in one room, the average being less. Air is admitted under the sills of the windows, by hit-and-miss brass gratings, from bent flues, and the extraction is by means of ventilating-flues taken up beside the chimney-flues, fitted with "Eyre's" ventilators.

As regards the drainage, all contact with the main sewer is intercepted by a Doulton's trap, the sinks and bath wastes discharging in the open air with trapped gratings. All the soil-drains are without the building, and in every case ventilated at the top.

The rain-water has been preserved by a separate system of pipes, and is taken to a large tank available for house use. Internally, the building has been fitted with Lloyd's ventilating and warming stoves to the principal rooms, and the chimney-pieces are of wood fitted with tiles, the gift of a lady.

The principal entrance-door has some stained glass, given by Messrs. Shrigley & Hunt, who also gave some tiles for the chimney-pieces. The corridors have tiled floors, and the walls are finished with hard surfaces.

The whole of the works have been executed by Mr. Ebenezer Lawrance, of Wharf-road, City-road, London; and the designs have been prepared by Mr. Thomas Chatfeild Clarke, architect.

NEW FREE LIBRARY FOR DUNFERMLINE.

CONTRACTS were lately signed for a new library building presented to Dunfermline by Mr. Carnegie, a native of the town, and to be called the Carnegie Free Library. The sum gifted is 8,000*l.*, of which 5,000*l.* or so are to be spent on a new building, and the remainder on books. The plans were prepared by Mr. J. C. Walker, architect, Edinburgh, and the style is the Domestic Tudor. The new building will have a frontage to St. Margaret-street and Abbot-street, and it will be in close proximity to St. Margaret's Hall, recently built from designs by Mr. Starforth, architect, Edinburgh. The front to Abbot-street is 82 ft. in length, and two stories in height; while the St. Margaret-street elevation is 70 ft., and of the same height. The principal entrance is near to the corner of the Abbot-street frontage, and has been designed so as to give the appearance of a square tower. This part of the elevation is carried a story higher than the rest of the building. The doorway is finished above as a gablet with carved stone finial. The third-story of this part has oriel windows, and the interior is to be set apart as a smoking-room. The oriels are to be supported by boldly-moulded corbels, and surmounted by small turrets. The plans show a library-room, 57 ft. 3 in. by 25 ft. 6 in.; recreation-room, 26 ft. 6 in. by 25 ft. 6 in.; gentlemen's reading-room, 34 ft. 3 in. by 25 ft. 6 in.; ladies' reading-room, 22 ft. 6 in. by 18 ft. 10 in.; smoking-room, 28 ft. by 16 ft.; and a keeper's house, consisting of three rooms and a kitchen. Lavatories will be provided, and decorations are to be adopted in keeping with the general design of the structure.

FURTHER SALES OF BUILDING LAND.

THERE have been several sales of building sites in the suburbs within the last few days, in addition to those which from time to time have already been reported in the *Builder*. On Monday evening in last week Mr. W. H. Collier submitted for sale at Myddelton Hall, Upper-street, Islington, 122 plots, situated in Hornsey-lane, belonging to the British Land Company, on an estate which the company has recently purchased. The sites have frontages to a number of new roads which have been constructed, leading from Hornsey-lane and Hazelville-road, and are close to Highgate Archway, and within a few minutes' walk of the Crouch-end Station of the Great Northern Railway. Twelve of the plots have frontages of 20 ft., with a depth ranging from 127 ft. to 137 ft.; the remaining plots having also frontages of 20 ft., and a depth of from 80 ft. to 85 ft. Of the entire number of plots offered, 101 plots were sold, the larger plots realising an average sum of 132*l.* each, and the smaller ones 110*l.* each. The entire proceeds of the sale amounted to 11,110*l.*

On the same evening, Messrs. Baker & Son offered for sale, at the Victoria Tavern, Edgware-road, Kilburn, the second portion of the Stonebridge Estate, at Willesden, close to the Harrow-road Station of the Midland Railway, and the Willesden Junction of the London and North-Western line. The number of plots exhibited was 76, the plots having frontages of 16 ft. each, and a depth of from 90 ft. to 100 ft., and described as well adapted for small dwelling-houses. About one-half the number of plots offered were sold at prices averaging 34*l.* each, the total amount of the sale being 1,154*l.*

On Thursday evening, the 28th of October, Messrs. Protheroe & Morris offered for sale, at the Eagle Inn, Snaresbrook, 76 plots of freehold building land at Wanstead, having frontages to George-lane, which are reserved for shops, and other frontages to three new roads, to be called Mansfield, Camden, and Sydney roads, stated to be specially adapted for cottage property. The property is immediately adjacent to Epping Forest. Amongst the restrictions contained in the conditions of the sale, it was provided that the trade of an innkeeper or victualler is not to be carried on upon any lot on the estate, nor is any lot to be used for the erection of a school, church, or chapel, or as tea-gardens, or as a place of public amusement or resort. It is further provided that no trade or business is to be carried on on any lots except those fronting on George-lane, nor is anything to be carried on on any part of the estate which may be a nuisance or an annoyance to the adjoining property, that of the trustees of the Earl of Cowley; neither are any bricks or tiles to be made, nor is any clay or lime to be burnt. There was a large attendance at the sale, and a few lots only remained unsold. The shop lots facing George-lane realised from 5*l.* to 5*l.* 5*s.* per foot frontage, and those lots fronting the other roads 3*l.* per foot frontage; the total proceeds of the sale amounting to about 2,500*l.*

The second and last portion of the Harringay New Park Estate, Green-lanes, was also sold last week, at the Queen's Hotel, Wood-green, by Mr. R. J. Collier. It consisted of 139 lots. The first lots offered were stated to have frontages to the Green-lanes of 25 ft., with a depth of 280 ft., and were sold for 20*l.* per plot. A tavern site realised 550*l.*, and other plots of less important frontages were sold for proportionately good prices. The total proceeds of the sale amounted to 11,275*l.*, which, added to the sum realised by the first sale, makes the aggregate sum realised for the estate, fifteen acres in extent, 22,450*l.*, or about 1,500*l.* an acre. We are informed that the estate, when purchased by the vendor, did not cost more than 10,000*l.*, and that the profit on the re-sale, after deducting the cost of roadmaking and other expenses, will be about equal to the original purchase-money.

VALUATION OF PROPERTY IN KENSINGTON.

THE following is the result of the recent quinquennial valuation of property in the parish of St. Mary Abbotts, Kensington:—

	Gas, Water, and Railway Companies.		Houses, Land, and other Companies than in No. 1.	
	Gross. £	Rateable. £	Gross. £	Rateable. £
New Valuation List appproved 30th October, 1880	95,985	84,777	1,873,516	1,563,410
Valuation List in force to 5th April, 1881 ...	55,600	46,334	1,709,762	1,426,652
Increase ...	40,385	38,443	163,754	136,758

A YEAR'S BUILDING IN GREENOCK.

THE members of the Greenock Dean of Guild Court last week had a very pleasant meeting, when Dean Smith made his statement of the work passed through the court for the year ending with October. Altogether there had been 688 cases before the court, or 138 more than in the preceding year, showing that Greenock had not so seriously shared the great building depression as Glasgow and other towns in Scotland. Of the buildings erected during the year, there were twenty-two blocks or tenements, giving accommodation to 149 families; twenty villas for the better class population; nineteen workshops and stores; and fifty-one miscellaneous buildings, which included a wall, enclosing an extension of the public cemetery, of about a mile in length. In the way of public buildings, there were erected Free St. Andrew's Church, a Roman Catholic school, new Post-office buildings, the first section of the new Municipal buildings, and the West-end baths building. The estimated value of new buildings erected during the year was 181,900*l.*, an increase of 61,000*l.* as compared with the preceding twelve months; and with 12,000*l.* spent on the construction of sewers, the total sum is 193,900*l.* Greenock is extending, and its building trade appears to be healthy.

Criticism.—Mr. T. H. Hall Caine begins, November 15, at the Liverpool Free Library, a course of lectures on "Curiosities of Criticism: 1800—25." The lecturer's syllabus states that the lectures will deal with the critical anomalies on Wordsworth, Southey, Coleridge, Byron, Leigh Hunt, and Keats.

SOCIETY OF ARTS.

The first meeting of the 127th session of the Society will be held on Wednesday the 17th inst., when the opening address will be delivered by Mr. F. J. Bramwell, F.R.S., chairman of the Council.

The following arrangements for the Wednesday evenings before Christmas have been made:—

Nov. 17.—Opening meeting of the session. Address by Mr. F. J. Bramwell, F.R.S., chairman of the Council.
Nov. 24.—The Influence of Barry upon English Art. By J. Comyns Carr.
Dec. 1.—The Photophone. By W. H. Preece, Pres. Soc. Tel. Engineers.
Dec. 8.—London Fogs. By Dr. Alfred Carpenter.
Dec. 15.—The Use of Sound for Signals. By E. Price Edwards, secretary to the deputy-master of the Trinity House. On this evening Dr. Tyndall, F.R.S. will preside.

The first course of Cantor Lectures will be on "Some Points of Contact between the Scientific and Artistic Aspects of Pottery and Porcelain," by Prof. A. H. Church, F.C.S. Five lectures. The following is the syllabus of the course.

Nov. 22.—Bricks, Tiles, and unglazed Terra-cottas in general.
Nov. 29.—Vitreous, Plumbiferous, Boracic, and Felspathic Glazes and Enamels. Iridescent and Metallic Lustres, and Colouring Substances.
Dec. 6.—Stoneware and other Wares glazed with salt.
Dec. 13.—Soft Paste Porcelains,—European, and Oriental; and
Dec. 20.—Hard Paste Porcelains,—Chinese, Japanese, and European.

DISCOVERY OF ROMAN ANTIQUITIES IN YORK.

On the 16th of October the workmen engaged in excavating for the foundations of a new building attached to St. Mary's Convent, York (which is now being enlarged under the direction and from the designs of Messrs. Goldie & Child, architects), made a very remarkable discovery. At 6 ft. below the level of the ground several pieces of stone were found which, upon closer inspection, proved to be the remains of three small Roman altars, and near to them was a much larger mass which, upon being uncovered, proved to be a statue cut out of sandstone nearly life-size.

Of the altars, two are tolerably perfect. The largest measures 17 in. in height, and is 8 in. wide, measured at the shaft or body of the altar. The *mensa* or head is 9 in. in width, and shows the usual cavity for burning incense. It was evidently one of those small altars which the Romans set up in front of the statues in their private residences, and which, from their small size, could be removed from place to place with the rest of their household goods. It is carved out of hard polished stone, and is adorned with ornamental fluting. The remains of colour can be distinctly traced. The inscription is legible, and has been thus read:—

"C. JULIUS CRESCENTIUS
MATRIBUS DOMESTICIS
V. S. M. L.
ANNO URBIS CONDITÆ 1001" (or 1005).

The second altar is of sandstone, the same material as the figure, to which it was probably attached. It is 13½ in. in height, and the body of the altar is 7 in. wide. The only word that can be traced of the inscription is the word "MARTI," probably "Marti."

The third stone, which is also supposed to have formed the body of an altar, though both *mensa* and base have disappeared, bears an inscription, of which the following words alone have been made out:—

"DEO VETERI BIBLI—"

The termination of the last word is at present disputed.

The statue, which seems to be in a very perfect condition, except that the feet are wanting, represents a young man of muscular frame, clad in a military dress of the prætorian rank. The head, though perfect, was unfortunately broken off in the process of digging the statue up. It is presumed by one of the antiquaries who have seen these remains that the figure is intended to represent the god Mars, and that the altar bearing the word "Marti" was connected with it.

There can be no doubt that such a very remarkable discovery as this will lead to considerable comment, and that the inscriptions will lead to some discussion among the learned. Several readings and translations have been suggested to us, but we prefer to wait and see what others learned in such matters have to advance before expressing any opinion.

"SOME WORDS OF FAREWELL."

Mr. S. O. Hall, F.S.A., after editing for forty-two years the *Art Journal*, which he founded, has resigned the position, and has published some interesting and touching words of farewell to the public. Sketching the position of things at the time the journal was started, he shows that there was literally no "patronage" for British art. Collectors did, indeed, buy pictures as befitting household adornments, but they were "old masters" with familiar names, canvasses that had never been seen by the artists to whom they were attributed, copies or imitations by "'prentice hands;" and he showed, month after month, that a larger number of Titians, Raffaelles, and Rubenses paid duty in a year, than these masters had produced during their lives. On the other hand, he made manifest the policy of buying only such pictures as could be readily identified,—certified by the artists who were living; urging the probability that they would increase and not decrease in value, while it was almost certain that so-called "old masters" would ultimately be worth little more than the panels and frames. He has had his reward in living to see such old masters valued accordingly, and a thorough transfer of patronage to modern art.

In speaking of the circumstances which encouraged him in the task, Mr. Hall justly refers, as amongst them, to the operations of the Art-Union of London, but he does not say, as he might,—he has probably forgotten it in the lapse of years,—that it was the establishment of that society which led to the foundation of the journal, and provided for its first base of operations. Mr. Hall points with just pride to the part he has taken in bringing about the association of the Industrial Arts with the Fine Arts proper, and needs no excuse, though he asks it, for seeking to show that the art spirit and character of the age have been largely served and materially advanced by the journal he is about to consign to other hands,—to enjoy the repose earned by forty-two years of labour, and by sixty years of work as "a man of letters by profession." He does not look to be altogether idle, but hopes for ease and leisure to complete a work on which he has been some years engaged,—"Recollections of a Long Life."

Sincerely and heartily we wish him health and energy completely to carry out his wish.

ARTISANS' DWELLINGS IN LONDON.

On the 5th inst. a meeting of delegates from the Metropolitan Vestries was held at the St. Martin's Vestry-hall, Charing-cross, to adopt a memorial to the Home Secretary, based on a report agreed upon at a previous meeting, on the subject of the Artisans' Dwellings Act. Mr. E. J. Watherston presided. The following were among the conclusions arrived at in the report:—That no class of citizens had a right to dwellings or sites for dwellings at the public cost; that only imperative considerations of public health could justify the outlay of the public money for such purposes as those of the Artisans' Dwellings Act; and if these considerations could be adequately provided for under Torrens's Act, it was unjust to add to the heavy and constantly-increasing weight of local taxation by enforcing the provisions of Mr. Cross's Act. That owners of the class of property chiefly affected by these Acts should be placed under strong pecuniary inducements to keep it in proper and habitable condition; that, if property had been kept in such a state as to be unfit for human habitation, or so as to become a nuisance, the penalty of such a course should fall upon the owners, and that the provisions of the Act should be vigorously applied whenever premises were in the condition contemplated by Section 5, Act of 1868, whether that condition had resulted from overcrowding, defective construction, the absence of sufficient area for light and air, or general dilapidation and uncleanliness. That the working of the Artisans' and Labourers' Dwellings Improvement Act, 1875, was impolitic and ruinously extravagant, and that in the interests of the ratepayers the provisions of the Acts known as Torrens's Act, 1868-79, should be put in operation and fully exhausted by the local authorities throughout the metropolis before any further action was taken under the first-mentioned Act. That the cost of works under Torrens's Acts, whether executed by the owner or by the local authority, should be apportioned by the arbitrator between the parties holding the several freehold and leasehold interests, regard being had to their various responsibilities and the value of their interests.

On Monday afternoon, at a largely-attended meeting of the Council of the Charity Organisation Society, held under the presidency of General Cavenagh, the subject of artisans' dwellings in London was dealt with in a report from a special committee appointed by the society. This committee included the Duke of Westminster, the Earl of Shaftesbury, Lord Norton, Sir R. Cross, M.P., Sir C. P. Trevelyan, Sir U. Kay-Shuttleworth, Mr. Ernest Hart, Dr. Jabez Hogg, Dr. Hawksley, Dr. Greenhill, Miss Octavia Hill, and others. The report was now presented, and after entering fully into the great losses occasioned in purchasing and clearing the blocks of unhealthy houses and the re-sale of sites, the committee expressed the belief that "such losses might be very greatly reduced by an amended law and improved administration," and quoted the report of the Metropolitan Board of Works, which body laid stress upon "the slow and cumbrous method of procedure," and the "numerous and protracted formalities required by the statute." The committee recommended that a letter should be sent to the Home Secretary, asking that the Minister would appoint a departmental committee to make a searching and authoritative investigation into the causes of the delay, expense, and other evils that had attended the administration of the Artisans' Dwellings Acts, and the sections of the Metropolitan Streets Improvements Acts (of 1872 and 1877) providing for the re-housing of persons displaced under those Acts. This recommendation was adopted.

CONSECRATION OF A CHURCH AT GUNNISLAKE, CORNWALL.

The new church of St. Anne, Gunnislake, which takes the place of a little building, formerly a Baptist Chapel, was consecrated on Tuesday, November 2nd, by the Bishop of Truro. The new edifice, of which Mr. J. Piers St. Aubyn is the architect, is in the Early English style. The massive granite pillars of the arcade, the little clearstory, and the lancet lights, are very effective. The granite is the pure silver-grey stone of the district, and was supplied by Mr. E. Story, of the Gunnislake granite quarries and works. The church stands upon a very steep piece of ground, and the architect has resorted to a device to avoid the use of more building material than possible. He has arranged the seats of the nave in a series of steps, which have no bad effect, and have the advantage of enabling the congregation to see the preacher, and to have a full view of the communion-table.

The total cost of the building was 2,000*l.*, 500*l.* being given by the Duke of Bedford, and the Earl of Mount-Edgcumbe rendered liberal assistance.

The interior of the building is 83 ft. by 43 ft. wide, and will accommodate 300 people. The woodwork is chiefly pitch-pine. The iron communion-rails were wrought by Mr. W. Rose Kilby, son of the builder. The vestries are under the church, and are 20 ft. by 15 ft.

DISTRICT MARKETS.

Sir,—Of course, the realisation of such a project in London would meet with much opposition, but none the less would it be a benefit to the public. The extremely high price of food in some quarters of our great and increasing City drives people with limited incomes, however unwillingly, to co-operative stores, and this is on the increase, however much the provision-tradesmen may affect to ignore it. Every visitor to Paris must have seen what pleasing as well as useful features of that attractive centre of civilisation are the markets, gay with fruit and flowers, while, at the same time, affording also more substantial articles of supply. I should like to see such markets established in each of our suburbs. Also they would afford opportunities for very pleasing architectural structures. If two or three men of wealth would take up this idea, there seems but little doubt that it might be carried out to a financial success, and to the great advantage of the public. Perhaps the most striking anomaly in the food-supply of the metropolis of this sea-

girt isle is the high price of the fish that swarm round its shores. Scarcely a fourth of the price for this article of food paid in the western districts goes to the hardy mariner who wins it, with labour and peril, from the waves, and all the rest stops with the middlemen, who stand between the consumer and the toiler of the sea. This is one of the points in which the establishment of such district markets would be calculated to yield relief to the public. Many others exist, and I venture to write this for the chance of its insertion in the *Builder*,—not only because the cheapening of supply of the various articles of food to the consumer is a sanitary question, but that the structures for accommodating such markets would offer fertile opportunities for pleasing architectural display. C. S.

THE TOPOGRAPHICAL SOCIETY OF LONDON.

SIR,—In reference to the inaugural meeting of the above Society, held at the Mansion House, it may be of advantage to the profession to know that extensive collections of London topography are already in existence which are open to them for consultation. The Croll, and the recently-acquired Crace, collections are in the British Museum; the small Fauntleroy collection is in the Soane Museum; there are collections forming in the Guildhall Library, and illustrations of the utmost interest are contained in the Bodleian and Pepysian libraries. Besides these, my own collection, numbering upwards of 100,000 prints and drawings of London, can be seen by architects desirous of consulting it for any special purpose.

Without wishing to discourage the Society in any one of the objects they have set themselves, my own experience, extending over forty years, is that original illustrations of old London are rapidly becoming more and more difficult to obtain, and that, even with ample funds, many years must elapse before anything like a representative collection can be brought together. The Society has, however, planned out useful work in so many directions that its resources are sure in any case to find ample employment.

J. E. GARDNER.

453, *Strand*.

HOUSE-DRAINAGE AND SEWER WORKS AS A SPECIALTY.

SIR,—I beg to back up the remarks of a "Practical Sanitarian" at page 514, October 23rd, regarding the use of small-bore drain-pipes. Like him I deprecate the use of 4 in. drain-pipes for closets, &c., and especially if the distance is yards. I think, however, that needless expense is very often incurred by putting in 9 in. pipes where a less size would serve better. The ordinary sizes in use are 4 in., 6 in., and 9 in. diameter for houses and tenements. Now, I think, that 5 in., 6 in., and 7 in. would, for general use, be much better. Where the pipe has a fall of 1 in 30 it will take a very large flow of water to fill up a 7-in. pipe three-fifths. Bad workmanship has had a good deal to do with putting in large-sized pipes, *e. g.*, by leaving "shirt-collars" of cement sticking up at the joints. With leaking joints, again, the soil is left lying in the drain-pipe, owing to the water running into the ground through the joints, and so the larger the pipes the longer time is required to fill them up,—ergo, the old masons reasoned "large pipes are better than small ones!" How many thousands of lives have been lost by this stupid carelessness and ignorance none can tell: but the number must be great, and the evil is still going on. It is *legal*, however, and you cannot hang a man for *legal murder!* You poor betrayed woman is a wretch for killing her child, and may be sent to the gallows, but the speculative builder, who, often knowingly, executes his drainage so that wholesale disease and death are bound to be the result, gets off scot free! How admirable are our laws, and how honourable are our legislators!

I was lately examining the drains in a fine castle where the drain-pipes were partly laid through an expensive tunnel, and debouched into a stream less than 10 yards from the house. I turned on all the water-closets at once, but not a drop of water came out at the end of the 9-in. drain-pipe, it all soaked into the ground. In this case the joints were well cemented all round except a small piece at the bottom of each where the workman seems to have been unable to get his hand in easily between the bottom of the pipe and the stone floor of the tunnel. This incident caused me to get pipes made with attached rests about 1 in. high, so that in such cases, or where pipes were laid on a concrete bed, the workman could easily get his hand or tool in under the joint and so have no excuse for making a bad joint. The bottom of this rest is made flat, so as to prevent the pipe from rolling or moving after the joint is made. Rain or water in the trench is also prevented spoiling the joint, as would be the case with the holes dug at each joint, as shown by Mr. Waring in "Fig. 19," page 377, of your issue for the 25th of September. Of course, after these pipes have been laid, and the joints set and tested, the pipes required to be packed with the soil, or, better still, concreted either half-way up or wholly round. If outside the house the former is sufficient, which I have done where the drains were higher than the well supplying water to a mansion-house. These pipes were patented by me in December last, and the judges of the Philosophical Society's Exhibition at Glasgow just closed have awarded me: he "First-class Certificate—Highest Award" for them, in conjunction with my patent ventilating drain-trap, now largely used all over the kingdom. Even with the best materials, and no estimate, I find it difficult to get good work without close supervision; hence the necessity that exists for allowing no new houses to be occupied until the drainage and sanitary fittings have been passed by a competent inspector. Until such is carried out, I look upon the public as guilty of suicide, and our legislators of manslaughter, for all the deaths that have occurred, and which will occur, from the bad drainage of houses, say since January, 1880.

W. P. BUCHAN.

OLD PLASTER CEILINGS.

SIR,—Having had a large experience in reproducing old ceilings, especially of the date of George I., I can endorse Mr. Robins's statement as to the dangerous condition in which they often are.

I remember seeing the parts of the ceiling of the ball-room in old Northumberland House after the fire, and was astonished that the huge masses of plaster had not come down before; there were heads of boys in solid stucco (which I could scarcely lift) held up by a single spike.

There is, however, a remedy for this in the patent Fibrous Plaster. Any amount of relief can be produced, and the fibrous nature of the material prevents any portion of it being detached from the other part, besides being in itself exceedingly light. JOHN JACKSON.

BUILDERS' ACTIONS.

IN the Court of Exchequer, Dublin, on Monday, before Mr. Justice Barry and a special jury, a case, Ham noad *v.* Graham, was heard. The plaintiff, Mr. A. Hammond, a builder and contractor, sought to recover 276*l.* 12*s.* 5*d.*, balance alleged to be due by the defendant, Dr. John Graham, of Westmoreland-street, in this city, on foot of a building contract, and for 12*l.* for extra work in the construction of a drug-store and photograph-gallery at the rear of the defendant's premises, according to the plan of Mr. Briggs, architect. The defendant traversed the cause of the action, and pleaded various matters in the way of defence and set-off. He sued for 1,300*l.* as a counter-claim, on the ground that the work was badly done, which necessitated the taking down of the building and its reconstruction. The jury found for the defendant that there was nothing due to the plaintiff on the original contract, and they found that the plaintiff on the counter-claim was entitled to 13*l.* 1*s.*

COMPETITIONS.

Newtown Church, Exeter.—The Exeter Church Extension Society have selected Mr. R. Medley Fulford, of Exeter, as architect for the proposed church in Newtown. Seven sets of designs were sent in under motto by the Exeter architects to whom the competition was confined, and they were all submitted to Mr. Rohson, architect of London, who reported in favour of Mr. Fulford's design, bearing the motto of "Laus Deo," as worthy of the first place, and that of Mr. Webb, second. It is proposed to proceed with a portion of the work, if funds will not admit of the whole being carried out at present. The church is to be erected behind the Board Schools, at an estimated cost of about 6,000*l.*, and will accommodate 800 adults.

Books.

The Irrigation Works of India, and their Financial Results. By ROBERT B. BUCKLEY, Associate-Member of the Institution of Civil Engineers, Member of the Institute of Mechanical Engineers, Executive Engineer of the Public Works Department of India. London: W. H. Allen & Co. 1880.

GREAT difficulty exists in obtaining any reliable information as to the irrigation works of India. It is not easy even for the professional men who are engaged in these undertakings in one part of that vast continent to ascertain what is being done in other parts of India. Still less is it easy for the English student to do so. There is thus ample room for such a work as that of Mr. Buckley, which is a compilation from all accessible sources of information on the subject, consisting principally in Government reports and Parliamentary papers.

Down to the year 1854, all public works executed in India, except railways, were carried on by the Engineer department of the Army, under the superintendence of a military board. The expenditure was treated as a part of the ordinary current expenses of the year, and no distinction was made as to "capital," or productive and non-productive works. It is thus almost impossible to ascertain the financial outcome of these earlier works. Some of the most magnificent, and some of the most lucrative of the irrigation works of India were commenced under this system. Such were a part of the Ganges canal, commenced in 1847; the West Jumna canal, in 1817; the Cauvery Delta works, in 1834; those of the Godaveri, in 1844; and those of the Kistna in 1852.

In 1858, when the construction of railways, on the guarantee and under the supervision of the State, was in full activity, great pressure was brought to bear upon the Government of India, in order to induce it to promote irrigation by the same method of raising capital. The Madras Irrigation Company was then formed, with a Government guarantee of five per cent. upon a capital of one million pounds. A few years after a private company undertook, without any guarantee, the construction of a system of canals in Orissa. Both these attempts proved to be costly failures. The Orissa Company, formed under the title of the East India Irrigation Company, became practically bankrupt, and the works were purchased by the Government at a price far above their market-value. The Madras Company has only succeeded for one year in meeting its working expenses out of its revenue. It is still at work under the Government guarantee.

From 1867 to 1878, inclusive, while the sum of 18,600,000*l.* has been spent on State Railways, and 14,500,000*l.* on famine relief, less than 10,600,000*l.* has been spent on Irrigation works. The total outlay on works of this nature, up to the last return, was hard upon 17,000,000*l.*, including the outlay of the Madras Irrigation Company. The aggregate net gain, after paying not only working expenses, but 4½ per cent. interest on capital, was 85,500*l.* But the interest thus earned amounted to 700,000*l.*; and the working expenses distributed no less than 396,000*l.* per annum in the payment of labour and materials. Again, where the direct receipts of land revenue from irrigation works amounts to 680,000*l.*, the indirect increase of land revenue due to such works amounted to upwards of 700,000*l.* Taking good and bad together, therefore, India has been largely benefited by the expenditure on irrigation, while the benefit to the Government, in money, has been perceptibly larger than would have been the return of an equal sum of money if invested in English railways.

The irrigation works of India are divided into six groups, corresponding with the provinces in which they are situated. These are:—

1. The Madras irrigation works.
2. The Bombay irrigation works.
3. The Sind irrigation works.
4. The Bengal irrigation works.
5. The North-West Provinces irrigation works.
6. The Punjab irrigation works.

These comprise all the important works of India. There are others of less magnitude, chiefly tank works in Mysore, Rajpootana, and British Burmah, as to which available information is yet wanting.

The works thus locally distributed are divided as to their hydraulic character into five great classes. These are:—

1. Perennial canals, which draw their supplies from rivers that provide the requisite quantity of water throughout the year. These may almost be called derived rivers.

2. Intermittent canals, which draw their supplies from rivers of variable volume, which is stored, and rendered constantly available for the canals by means of reservoirs found in the basins of the rivers.

3. Chronic canals, which have a supply only during the rainy season.

4. Inundation canals, which draw the supplies from rivers having a constant discharge of more or less magnitude, but which are so constructed that the water only enters the canals when the rivers are in flood.

5. Tanks, or works which impound a supply from rivers with small catchment areas, or collect a supply by means of embankments thrown across valleys or gorges.

Of these works, all of the first class, the perennial canals, with but one or two exceptions, have been constructed by the British Government. Works of the last two classes, on the other hand, were largely constructed by the native princes of India before the English obtained possession of the country. They are to be found, on all scales, in almost all parts of India. The great Chembrambankum tank, in Madras, covers an area of nine square miles. In the Punjab and in the Sind are found inundation canals of from 200 ft. to 300 ft. in width. The account given by Mr. Buckley divides the works, in the first instance, according to the six provinces, and then shows to which of the above five classes each canal belongs.

A table is annexed to the first chapter, showing the rainfall in the twenty-two different tracts of country into which India is meteorologically divided. The annual fall ranges from 9 in., in Sind and Cutch, to 193 in. in Arakan.

This enormous variation is alone enough to show, not only the extreme importance of the subject of irrigation, but the wide difference of the methods which the engineer is at liberty to dispose, for that purpose, in different districts.

For any detailed description of the various groups of works, we must refer the reader to the volume itself. So large is the subject, that Mr. Buckley has been limited in the scale on which he treats it by the 200 pages of his volume. He refers to the special accounts which have been given of various works for the guidance of those who wish to enter into minute particulars. On one point it would have added to the value of the work if the author had been less reticent. Speaking of the Ganges Canal, into which water was admitted in April, 1851, he says, "During the next few years defects in the works gradually came to light which it is unnecessary here to recapitulate in detail. The chief defect was excessive declivity in the bed of the main channel, which caused a velocity of current greater than the sandy soil was calculated to withstand without erosion." As the original estimate, on the designs of Sir Proby Cautley, in 1841, for main canals and branches, amounted to 722,640*l.*, while the actual expenditure, up to the end of 1877-78, was 3,055,015*l.*, it is evident that this is a work into the plans and execution of which it would be highly instructive for the student of the subject of irrigation to enter fully and closely. It is only fair to the reputation of Sir Proby Cautley to cite, on this point, the evidence of the translator of Herr Kutter, who is now recognised as the first European authority on hydraulic formulæ. "Colonel Cautley," writes Mr. Jackson, in his preface to the translation of Kutter's formulæ, "relied upon Duhuat when he laid out the Ganges Canal, and found him but a rotten reed, for the water in every instance tore along at an unexpected velocity, and erosion of the bed and destruction of the works followed in its wake. Duhuat, then, must be put upon the top shelf of the book-case, and it will be just as well, when the steps are taken, to carry up every English work in which the names of Brunning, Girard, Bossut, Prony, Eytelwein, or D'Aubuisson are continually recurring as authorities against whom no action can be taken. In this general clearance Beardman, Downing, Box, and almost every other hydraulic text-book compiled by Englishmen, will, with more or less hesitation, have been shelved, and the young engineer will then be able to form a fair estimate of the contributions his countrymen have made to the common fund of knowledge concerning the laws which govern the flow of water."

Of the modern successful irrigation works of India, the most remarkable is that of the Cauvery Delta, designed by Sir Arthur Cotton, in 1834. This work consisted in a weir of 1,950 ft. in length across the Coleroon, a branch of the Cauvery, and in derived canals and subsidiary works. The sum of 134,000*l.* was expended on the works; and in 1875-6 the revenue, after paying working expenses, yielded a return of 85·8 per cent. on this sum. It will be difficult to find a parallel to this, as a financial operation. But the Godavery works, in the same year, yielded 16·94 per cent.; the West Jumna, 24·92; the East Jumna, 25·18; and the Scinde irrigation works, 24·16 per cent., on their respective capitals, after payment of working expenses. It must be remembered that the physical conditions which allow of such advantageous operations are very rare, and that even in some of these, advantage has been taken of works effected by some of the former rulers of India. But the irregularity of financial result is only a proof of the extreme importance of an accurate knowledge of the subject. It is as a first step towards this, and as a guide to the sources of more minute and detailed information, that we cordially recommend the modest and impartial work of Mr. Buckley to our readers.

Old French Plate; with Tables of the Paris Date-letters, and Fac-similes of other Marks. By Wilfred J. Cripps, M.A. London: John Murray. 1880.

Collectors of old French plate and students of the history of metal-working have reason to be grateful to Mr. Cripps. For the first time in any language, so far as we know, here are brought together fac-similes of so many of the marks used by makers and the official bodies who had control over the manufacture of plate in France, that the student may "fix the date of almost every specimen of old plate made in Paris," and ascertain the origin of a good deal of the old provincial French plate that he has an opportunity of examining. The historical chapter preceding the tables of marks is carefully compiled, and very interesting.

Miscellanea.

Association of Municipal and Sanitary Engineers.—The Lancashire and Cheshire District meeting of this Association was held on the 5th inst., when the members to the number of about forty visited the Salford new sewage works at Mode-wheel, Weaste, and the Manchester Corporation night soil works at Holt Town. The members of the Association were met at Weaste by Mr. Arthur Jacob, the borough engineer of Salford, who, before conducting the party over the works, entered into a brief description of the development of the sewerage system of Salford, the construction of the intercepting sewer from Broughton to Mode-wheel, and the nature of the works which are now being constructed at the latter place for dealing with the sewage of the borough before allowing it to pass into the river Irwell. The sewage, when the works are completed, will be delivered into pumping wells constructed near the outlet of the intercepting sewer, and from these it will be raised by a pair of powerful pumping engines into a mixing-house, where it will be thoroughly mixed with lime and other chemical ingredients; it will be conveyed by a couple of cast-iron mains into a series of concrete tanks where it will undergo a process of precipitation. These tanks are twelve in number in two parallel lines, and the sewage which is delivered into the tank, the furthest from the pumping station, in the process of precipitation, flows back towards the mixing-house, where the clarified effluent water, before passing into the river, will drive a pair of vortex-wheels which will actuate the machinery in the mixing-house. The precipitated material from the sewage is afterwards conveyed from the tanks into adjoining mud-pits, where it was allowed to dry. The works, which had been considerably delayed by the discovery of a peat-moss under the foundations of the tanks, have been in course of construction for about two years, and it is expected they will be completed in another twelve months. The precipitating tanks are 113 ft. long, with an average width of 78 ft., and a total area of 102,857 square feet. The works were originally designed by Mr. Fowler, the late borough engineer, but have undergone considerable modification, and are now being carried out under the supervision of Mr. Jacob.

Unsanitary Dwellings in Holborn.—Last week, at the Guildhall, before Alderman Sir Thos. Gabriel and Mr. Alderman Nottage, several adjourned summonses were heard concerning the unsanitary condition of certain houses in Elycourt, Holborn. The summonses were issued at the instance of Dr. W. Sedgwick Saunders, the medical officer of health for the City, on behalf of the Commissioners of Sewers, against the freeholders, leaseholders, and occupiers of eight houses in the court, to show cause why they should not be pulled down, as they were in such an unwholesome state as to be totally unfit for human habitation. Dr. Saunders, Dr. Sparks, and Inspectors Payne, Clark, and Saltmarsh gave evidence. Eventually Alderman Sir T. Gabriel said that he and Mr. Alderman Nottage were of opinion that the houses were permanently unwholesome, and that nothing short of pulling them down would meet the requirements of the case. Mr. Bartlett, on behalf of Messrs. Goathead, the trustees of the freeholders of Nos. 8, 9, 10, and 12, said that if Mr. Newby, the lessee, would give up the houses he would forgive him the rent he owed, and would pay the expenses in the action of ejectment which was now pending. Mr. Pontifex, on behalf of Captain Meeking, made a similar offer with regard to their interests in the property. Alderman Sir T. Gabriel, after a long discussion, adjourned the summonses relating to No. 7 *sine die*; that relating to No. 11 to January 7th; and with respect to Nos. 8, 9, 10, and 12, made an order that these should be pulled down within six weeks.

Handbook to the Builders' Supply Stores. The Builders' Supply Stores (145, Holborn-bars) have been established nearly a quarter of a century, so that their usefulness would seem to be proved. The handbook now issued gives particulars and trade prices of materials and fittings kept in stock, or supplied by associated firms.

Everton House.—Colonel Trevor Goff, late of the Highlanders, having acquired a considerable tract of land in the neighbourhood of Everton, near Lymington, resolved, some little time ago, to build himself a mansion there. Mr. George R. Crickmay, of Parliament-street, Westminster, and of Weymouth, was consulted, with the result that an edifice has been erected. The style of architecture is a free rendering of the Elizabethan style of domestic architecture. It is built of red brick, with Bath stone dressings. Red tiles are also utilised in the walls, whilst the gables are of half-timbered work. The roofs are of high pitch, and covered in with red tiles, and the chimneys are carried well up, breaking the sky-line picturesquely, and intermingling with the varied gable lines and general grouping. The cornices from which the roofs spring are deeply coved out in plaster, and bear upon their faces ornamental stucco-work of *sgraffito* character. The building rests upon a Portland stone plinth. On the front of the house towards the sea there is an open colonnade, supported by carved cantilever, and carried by an arcade of cut and moulded brick, which rest in their turn upon columns of polished red Aberdeen granite, with carved annulets, and carrying carved capitals. The whole of the ornamental carved work has been executed by Mr. Harry Hems. The contractor for the whole of the works is Mr. A. H. Preen, of Blandford.

Fittings for Trinidad Government Buildings.—The Crown Agents for the Colonies have recently directed some important decorations to be executed in the residence of the Governor, and amongst the new fittings which they have ordered to be supplied are some elegant chandeliers and brackets, also globe lights, especially prepared for the various rooms and corridors. The manufacture of these excellent specimens of modern art has been entrusted to Messrs. Henry Greene & Son, of Cannon-street, London Bridge, at whose establishment they have been displayed for a few days previously to their being shipped to their destination. The principal chandelier is very handsome, being a combination of ormolu with richly-cut crystal jewels set in the scrolls of the arms, the central body whence these scrolls spring being formed in massive metal work of very rich character, having ornamental crystal glass vases introduced into the stem of the chandelier, the whole being finished with pendent drops of the early Venetian style. There are smaller chandeliers *en suite* for the public and private drawing-rooms, dining-rooms, &c., the whole forming an exhibition very creditable to Messrs. Greene. Mr. Edmeston is the architect of the buildings.

Institution of Civil Engineers.—A list of subjects on which original communications are invited has been issued. It directs attention to the various trust funds, the interest on which provides the means of rewarding meritorious papers. The annual income derived from this source now reaches nearly 450*l.*, the whole of which is available for the purposes named, and with the exception of the Miller Fund and the Howard Bequest (which are restricted by the donors to particular objects) any person, whether connected with the Institution or not, native or foreigner, may compete. The students of the Institution are further eligible for the receipt of Miller scholarships and prizes for papers read at the supplemental meetings specially held for that class. The meetings were resumed on Tuesday, the 9th inst., when a paper by Mr. B. Walker, of Leeds, was read, treating of "Machinery for Steel-making by the Bessemer and the Siemens Processes." At the following meeting Mr. Seyrig, of Paris, will present a communication on "The Erection of Metallic Bridges."

Small Savings by Postage-Stamps.—From and after Monday, the 15th inst., at every Post-office in the United Kingdom, forms for the making of small deposits in Post-office Savings-Banks will be issued gratuitously. Each of these forms, which are about the size of an ordinary cheque, will have twelve divisions, in each of which a penny postage-stamp can be placed. When a form has thus been filled with twelve stamps, it will be received at any Post-office at which there is a savings-bank, as a deposit of a shilling. During the seven weeks that the experiment has been in operation in ten counties only, more than 14,000 of these forms have been received, and more than 7,000 new accounts have been opened through their agency. The arrangement promises to encourage thrift.

Improvements in the City, and Value of Property.—It has been some years in contemplation to form a new street leading from Monument-yard in a south-easterly direction into Lower Thames-street, coming ont opposite Billingsgate Market. The first instalment of this new road is now in course of formation, the purchase of a large warehouse situate at the corner of Monument-yard and Pudding-lane having been arranged between the Commissioners of Sewers and the Governors of Christ's Hospital, the freeholders of the property. The warehouse occupied about 3,480 superficial feet, and the price arranged between Mr. Haywood on behalf of the City and Mr. H. S. Legg on behalf of Christ's Hospital,—viz, 24,000*l.*,—has now been paid. A new roadway, therefore, is being formed on each side of the Monument, which joins at the back (eastwards), and then leads into Pudding-lane, occupying the site of the warehouse just mentioned, where, for the present, it will stop until funds are forthcoming to carry it on.

Accidents in Building.—On the 4th inst. Mr. St. Clare Bedford held an inquest at Charing-cross Hospital, as to the death of Henry Laurence Groom, aged 22. The deceased, a bricklayer's pointer, on the afternoon of the 1st inst. was standing on the end of a scaffold some 50 ft. high outside a building in course of repair in Old Compton-street, Soho, when he missed his footing and, falling to the ground, received injuries which resulted in his death soon afterwards. The foreman of the works, in reply to the Coroner, said that it was not usual to place pieces of timber to act as barriers at either end of the scaffold, although it could he done. The Coroner observed that the number of deaths from this cause was very great, and builders should take care to insure the lives of their workmen. The jury, in returning a verdict of "Accidental death," added that in future precautions should be adopted in order to prevent the lamentable loss of life so prevalent in building operations.

Albert Hall.—Arrangements have been made for the tenth season of the Royal Albert Hall Choral Society, under Mr. Barnby. The season was commenced on Thursday, the 11th of November, with a performance of Handel's "Judas Maccabæus," when the usual orchestra of 100 members was increased by the band of the Coldstream Guards. A grand performance of Mendelssohn's "Elijah" will be given on Thursday, the 2nd of December. Professor Macfarren's Oratorio, "St. John the Baptist," has been included in the programme, and arrangements are pending for a grand performance of Dr. Sullivan's new Cantata, "The Martyr of Antioch."

The Water Question.—At the Lamheth Vestry, Mr. W. T. Wiseman has given notice of a motion for discussion on the 18th inst., declaring further and immediate legislation is necessary respecting the supply of water to the metropolis and suburbs; that a special or royal commission should he forthwith appointed to inquire into and report upon the present and other available sources of supply; and that no legislation will he deemed satisfactory hy the ratepayers and water-consumers, unless it secures pure, full, and constant supply.

A Window for St. Alban's Abbey.—At a meeting of the Common Council last week, on the motion of Mr. Thomas Bedford, it was decided, "That this Court having resolved to restore the great east window in the lady-chapel of St. Alban's Abbey, and being desirous that the said window should he in every way worthy of the Corporation and of the magnificent building in which it is placed, agrees to fill the same with stained glass in the highest style of art, at an expense not exceeding 280*l.*"

Value of Land in the City.—The report of the special committee appointed by the members of Lloyd's to obtain the terms upon which the land situated at the north-west corner of the present site of Leadenhall-market might he purchased, states that the City Lands Committee declined the offer of 7*l.* 10s. per square foot for the area (about 33,000 ft.), equivalent to a total of about 247,000*l.* The City Lands Committee estimate the value of the land at about 350,000*l.*

London and Middlesex Archæological Society.—The Session for 1880-1 will commence on the 15th inst., when a paper will he read hy the Rev. F. C. Cass, M.A., "On the Battle of Barnet." The evening meetings will be continued from November to May, at 4, St. Martin's-place.

Builders' Benevolent Institution.—The thirty-third anniversary festival of this Institution was held at the Freemasons' Tavern on Thursday evening, Mr. Thomas F. Rider, president, in the chair. The gathering was a very successful one. Upwards of 250 of the friends of the charity sat down to dinner, and the subscriptions and donations announced reached the handsome total of 1,014*l.* 16s., of which sum the President's list (including 52*l.* 10s. from himself and 52*l.* 10s. from Mrs. Rider) accounted for 662*l.* 18s. We shall give a report of the proceedings next week.

Design for Battersea Bridge.—At a meeting of the Chelsea Vestry, on the 9th, it was moved hy Mr. Wheeler:—"That this Vestry is of opinion that the preparation of the design of the new Battersea Bridge should not he confined to the officers of the Metropolitan Board, but should he submitted to public competition, and that a copy of this resolution he forwarded to the Metropolitan Board of Works." The motion was, however, negatived.

Angle, Bulb, and Tee Iron.—Messrs. G. Bailey Toms & Co., of Laurence Pountney-hill, have issued an amended list of sizes of joist, channel, angle, tee, and fancy iron, which contains almost every section manufactured, comprising as it does between 1,200 and 1,300 sizes. It will he found of value to builders, engineers, and shipbuilders, when designing work, because it shows at a glance whether any section decided on is rolled or not.

Mr. Norton, of Old Bond-street, has been appointed Consulting Surveyor to the National Thrift Building Society, who have commenced business at 33, New Bridge-street, with a strong direction. The Society advertise a prize essay competition on "National Thrift," with prizes for the three best essays.

Royal Scottish Academy.—On Wednesday, at a meeting of the Royal Scottish Academy, held in Edinburgh, Mr. R. P. Bell and Mr. George Aikman were elected Associates of the Academy.

Balusters and Newels.—Messrs. Eberhard & Co., of Edward-street, Hampstead-road, have issued a new illustrated sheet of balusters, newels, and handrails, of superior design, and at prices that will compete with foreign manufactures.

Selwyn College.—It is stated that through the liberality of two donors, the building of the first block of Selwyn College, to accommodate sixty students, will soon he commenced.

TENDERS

For alterations and additions to West Hill Schools, Hednesford, for the Cannock School Board. Mr. B. Baker, architect, Willenhall. Quantities by the architect:—

Butler, Darlaston	£2,379	10	0
Tildesley, Willenhall	2,190	0	0
Punfield, Willenhall	2,173	0	0
Watton & Sons, Tamworth	2,163	18	8
Whittome, Stafford	2,149	0	0
Lovatt, Wolverhampton	2,109	0	0
Jones & Sons, Sedgley	2,095	0	0
Grosvenor, Stafford	2,070	0	0
Bedford, Wolverhampton	2,050	0	0
Bennett, Birmingham	2,033	0	0
Bradney & Co., Wolverhampton	1,993	0	0
Barton, Hednesford	1,994	0	0
Tesco, Darlaston	1,927	0	0
Guest, Stourbridge (accepted)	1,825	0	0
Tracey, Stafford	1,801	0	0

For additions to premises, Love-lane, City. Messrs. Ford & Hesketh, architects:—

Simpson & Son	£22,891	0	0
Colls & Sons	20,604	0	0
Scrivener & Co.	20,535	0	0
Kirk & Randall	20,467	0	0
McLachlan & Sons	21,249	0	0
Shaw	20,243	0	0
Perry & Co.	20,182	0	0
Adamson & Sons	19,988	0	0
Peto Bros.	19,707	0	0
Brass	19,531	0	0
Conder	19,390	0	0
Lawrance	18,896	0	0

For rebuilding Park House and offices, Reading. Messrs. Cooper, Son, & Miller, architects. Quantities supplied:—

Winser	£5,099	0	0
Dodd	4,990	0	0
Simmonds	4,989	0	0
Woodbridge	4,966	0	0
Shepherd	4,951	0	0
Simmins	4,940	0	0
Chapell	4,900	0	0
Elliott	4,888	0	0
Lovell	4,780	0	0
Claridge	4,581	0	0
Higgs	4,449	0	0
McLachlan & Sons	4,430	0	0

For alterations to Weavers' Arms public-house, London Wall, for Mr. Sheen. Messrs. Drury & Lovejoy, architects:—

Hockley	£449	0	0
Marr	408	0	0
Shurmur (accepted)	396	0	0

For the erection of residence, Streatham Park, Surrey, for Mr. W. L. Hooper. Messrs. Osborn & Russell, architects:—

Bowyer	£2,595	0	0
Brown	2,569	0	0
Wontner Smith & Co.	2,479	0	0
Woodward	2,404	0	0
Jarrett	2,396	0	0
Tongue	2,380	0	0
Sabey & Son	2,329	0	0
Barnes	2,309	0	0
Jerrard	2,288	0	0

For two cottages at Upton, Essex. Mr. J. Moore Smith, architect:—

Waterman	£639	0	0
Webb	579	0	0
North Bros.	565	0	0
Baxter	547	0	0
Martin	539	0	0
Brown, Stratford (accepted)	525	0	0

For repairs, decorations, &c., at 16, Hyde Park-square. Messrs. Joseph & Pearson, architects. No quantities supplied:—

Hackforth	£1,500	0	0
Hearn	1,296	0	0
McLachlan & Sons	1,048	0	0

For the erection of new public offices, assembly-room, and surveyor's residence, Brownhills, near Walsall, for the Brownhills Local Board. Mr. J. Siddalls, architect. Quantities supplied by the architect:—
T. & E. Cresswell, Walsall Wood (accepted) £2,700.

For the erection of houses at Stanley-road, Harringay New Park, Green-lanes, for Mr. G. Barter. Mr. Seckham Witherington, architect:—

Five Houses.

Whale	£2,335	0	0 !
Taylor & Parfitt	1,990	0	0
Partridge & Henderson	1,545	0	0
Coney, Liverpool-road	1,490	0	0 !

Ten Houses.

Whale	4,640	0	0
Taylor & Parfitt	3,780	0	0
Partridge & Henderson	3,009	0	0
Coney	2,940	0	0

For a warehouse, Lansdowne-place, Whitecross-street, for Mr. Hudson. Messrs. Gordon & Lowther, architects. Quantities provided:—

Sangster	£1,874	0	0
Wilson	1,850	0	0
Taylor & Parfitt	1,619	0	0
Nixon	1,587	0	0
Dye	1,488	0	0
Trill	1,475	0	0
Little	1,398	0	0

For alterations to White Hart public-house, Hoxton-street, for Mr. E. J. Rose. Messrs. Wilson, Son, & Aldwinckle, architects:—

Marr	£1,795	0	0
Hearle	1,775	0	0
Cocks	1,770	0	0
Andrews	1,757	0	0
Shurmur (accepted)	1,638	0	0
Palmer	1,497	0	0

For the erection of stables, Mallwood House, Balhamhill, for Mr. S. W. Cawston. Quantities supplied. Mr. A. Cawston, architect:—

Rider	£1,010	0	0
Carter	955	0	0
R. & F. Smith	875	0	0
Macey	866	0	0
Garrod	850	0	0
Bowyer	797	0	0

For the restoration of Llantrissant Church, Monmouthshire. Mr. E. A. Lansdowne, architect:—

Howard, Cardiff	£680	0	0
Jones & Son, Newport	547	0	0
Linton, Newport	520	0	0
Richards, Newport	490	0	0
White, Abergavenny	488	0	0
Bnrgoyne, Blaenavon	475	0	0
Morgan & Evans, Pontypool	479	0	0
Giles, Pontrilas	455	0	0
Blackburne, Newport	433	0	0

For new schoolroom and choir vestry, Christ Church, Watney-street. Mr. C. Peters, architect:—

Parish	£833	0	0
Page	730	0	0
Forest	637	0	0
Moyle & Son (accepted)	540	0	0

For repairs, alterations, and extension of shop-fronts, No. 1, New Cut, for Messrs. Cartwright & Sons. Mr. F. Harger, architect:—

Downing	£420	0	0
Smith	397	0	0
Campbell	380	0	0
Edmunds	372	0	0
Mills	360	0	0
Farr & Co. (accepted)	340	0	0

For building additional cells at the Head-Quarters Police Station, Aylesbury, and alterations to the Deputy-Chief Constable's residence, for her Majesty's Justices of the Peace. Mr. W. F. Taylor, surveyor. Quantities supplied:—

W. Y. Green	£407	9	11
Thos. Green	389	4	0
Mayne & Son	364	0	0
Cooper* (accepted)	349	17	0

* Extra for additional height of cells, as required by the Secretary of State, 40*l.* 3s.

For cleansing and restoring the mural monuments, St. Stephen's Church, Walbrook. Mr. T. Milbourn, surveyor:—

Mitchell	£168	0	0
Forsyth	160	0	0
Wilkins & Son (accepted)	95	0	0

For cleansing and repairing organ:—

Hill & Son (accepted)	£25	0	0

For foundations, &c., of proposed new building, Thames Embankment, for Mr. S. Parry. Messrs. Fowler & Hill, architects :—

Kellett & Bentley	£3,689	0	0 !
Killingback	3,596	0	0
Batch	3,354	0	0
Cooke	2,709	0	0
Dickinson	2,683	0	0
Crockett	2,558	0	0
Kirk & Randall	2,519	0	0
Reddin	2,460	0	0
Bell	2,354	0	0
Ford & Co.	2,339	0	0
Proat	2,195	0	0
Cardus (accepted)	1,979	0	0 !

For making up Highbury Quadrant, for the Vestry of St. Mary, Islington :—

Williamson	£1,250	0	0 !
Rutty	1,050	0	0
Walker	985	0	0
Jackson & Son	945	0	0
Irons	913	0	0
Bell, Wood-green (accepted)	737	0	0 !

For the erection of a villa residence at Lower Norwood, for Mr. J. Shrewsbury. Mr. J. S. Shrewsbury, architect. Quantities supplied :—

Woodbridge	£989	0	0
Goad	985	0	0
Silver	940	0	0
Crabb & Son	933	10	0
Jenkins	925	0	0
Bowyer	877	0	0
Pack Bros.	849	0	0
Taylor (accepted)	846	0	0

For new dormitory, &c., Ealing House Girls' Industrial Home, for Mr. Wm. Williams and the Committee. Mr. E. P. Loftus Brock, architect :—

Grover (accepted in part)	£1,195	0	0

For additions and alterations to No. 87, Tottenham-court-road, for Messrs. Menegilli & Co. Mr. C. Sewell, architect :—

Bolding & Son	£849	0	0
Stimpson & Co.	848	0	0
Pack Bros.	716	0	0
Neighbour & Scott	617	0	0

For alterations and additions to Almshouses at Bayham-street, Camden Town. Mr. Henry Jacques, architect. Quantities supplied :—

Shaw	£5,350	0	0
Mowlem & Co.	5,714	0	0
Manley	5,557	0	0
Laing & Son	5,435	0	0
Rider & Son	5,380	0	0
Howard & Dorrell	5,283	0	0
Dove Bros.	5,155	0	0
Adamson	4,975	0	0
Wall	4,950	0	0
Clemence	4,947	0	0
Toms (accepted)	4,459	0	0

For alterations and repairs to Nos. 20 and 21, Harp-lane, Tower-street, City, for Mr. Kuck. Mr. E. Hide, architect :—

	Alterations and repairs.			Extra room.		
Beckey	£987	0	0 !	£135	0	0
Austen	810	0	0	90	0	0
Julian	735	0	0	55	0	0
Rickes	694	10	0	—		
Cass & Beldon	610	0	0	—		
Angood	595	0	0	51	0	0
Derby	575	0	0	30	0	0
Elwes	569	10	0	75	0	0
Kemp	550	0	0	75	0	0
Ward & Lamble*	509	0	0	75	0	0
Badley	430	0	0 !	25	0	0

* Accepted.

For the erection of a granary, &c., High-street, Brentford, for Messrs. Jupp & Sons. Messrs. Smithies & Gladman, architects :—

Adamson & Sons	£995	0	0
Nye	995	0	0
Beauchamp	975	0	0
Brunsden	900	0	0

For extension of premises, 152, High-street, Camden Town, for Mr. Cates :—
Gould & Brand (accepted).

For the erection of public baths, Richmond, Surrey. Messrs. Geo. Elkington & Sons, architects :—

Contract No. 1.—Builder's Works.

Perry & Co.	£7,230	0	0
Crockett	7,223	0	0
T. & F. Drake	6,995	0	0
Reynolds & Co.	6,850	0	0
Prout	6,797	6	0
Higgs	6,750	0	0
Julian & Co.	6,659	0	0
J. & C. Bowyer	6,478	0	0
Priestly	6,441	0	0
Sweet & Loder	6,346	0	0
Osborne	6,337	0	0
Angood	6,300	0	0
Battley	6,273	0	0
Beale	6,090	0	0
Watson	5,890	0	0
Pack Bros.	5,593	0	0
Bull Bros. & Cooper	5,493	0	0
Lucas	4,228	5	3

Contract No. 2.—Engineering Works.

Clarke	£3,068	0	0
Fraser & Fraser	1,872	0	0
Benham & Sons	1,735	0	0
Rosser & Russell	1,699	0	0
Reynolds & Co.	1,600	0	0
Fraser & Co.	1,589	0	0
J. & F. May	1,550	0	0
Goddard & Massey	1,494	0	0
Hamilton, Wood, & Co.	1,388	0	0
T. Bradford & Co.	1,369	0	0
Chadderton Ironworks Company	1,150	0	0

For erecting warehouse and stabling on Chester Wharf, Redhill-street, Regent's Park, for Messrs. Turner & Byrne. Mr. Wm. Woodward, architect. Quantities supplied :—

Boyce	£2,180	0	0
Blyth	2,089	0	0
Cooper	1,898	0	0
Gritton	1,890	0	0
Bywater	1,879	0	0
Stanley Bird	1,869	0	0

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The Builder.

VOL. XXXIX. No. 1573. SATURDAY, NOVEMBER 20, 1880.

ILLUSTRATIONS.

CONTENTS.

Architecture and Building in Cyprus.

THE use of *arconi*, or large pointed arches of stone, in place of ordinary beams or trusses, for the support of the floors of dwelling-houses, is a peculiar feature in the domestic architecture of the island of Cyprus. It affords a special motive for decoration, from the desire which is naturally felt to give relief to the large plain spandrels, undivided by panelling or framework, and uniformly painted white, which divide the arches. So universal is the adoption of this mode of structure that, even in cases where there is no abutment that can safely resist the thrust of a large arch, the form is imitated in wood, which is coloured to represent masonry. The arches balance one another, but tie-bars are never introduced. They are of pointed form, the span varying from 18 ft. to 30 ft., and the altitude varying from one-half to two-thirds of the width of the span. The mean depth of the voussoire, or rim of the arch, is from 12 in. to 16 in., and the thickness varies from 7 in. to 10 in.

The area to be covered by a building is divided into rectangles, of which the width is not more than from 9 ft. to 12 ft., by these *arconi*. Upon them are laid beams made of the wood which the island supplies, in the way of joists, about a foot apart, the ends being mortised together. On these joists is laid a parallel series of whole canes on a stratum of cane matting, covered with an inch or two of sand or fine gravel. On this a pavement of stone slabs is laid, set in mortar.

Another distinctive feature of the architecture of Cyprus is the rigid orientation of the buildings. In all cases where it is possible, the length of the building is drawn in a line from east to west, so as to offer one face to the north wind and another to the noon-day sun. On the southern exposure is generally placed a *loggia* looking out on a garden, and shaded by trees, chiefly the carnba or the lemon-tree. On the north are generally placed the various appendages to the main building. This rule is so rigidly observed, that where the streets do not run east and west, the ground-floor of the adjoining house is constructed parallel with the line of the street, but the remainder of the edifice is carried up at an angle, so as to secure the orientation of the walls; cantilevers or brackets being introduced where required, made of wood, and variously ornamented. Where the difference of line is very great, the change is effected by a series of steps. This curious method of building is also found to prevail in Alexandria in Egypt.

The use of these *arconi*, instead of the ordinary beams, is attributed by Signor Luigi (an engineer pupil, holding a travelling studentship, from whose report to the Italian Minister of Public Works we take the preceding details) to the absence of timber of a size sufficient to make large beams in Cyprus. In another part of the report this absence is attributed to the ravages of the Turks, who have cut down and devastated the magnificent forests which dotted the island before its conquest by those depredators. We need not say that the influence of the materials which a country yields on the art and architecture of that country (as to which a recent writer in an art periodical appears to consider himself to be the discoverer) is well known. If there be any want of just appreciation of the subject, it is mainly as to the very restricted local limits within which this influence often makes itself perceptible. Thus in that part of the Adriatic seaboard where a fine travertine is deposited by the streams, decorative sculpture blossoms on every house-front almost with the luxuriance of a growth of ivy. At a very short distance, in the hills, not a scrap of this rich decoration is to be seen. But the difficulty in the present case is to some extent that of date. We are not disposed to attribute the origin of the *arconi* to so late a time as the Turkish conquest. As far as we are in possession of data on which to form an opinion, it has usually been at a very early period in the art history of a people that their canons of structure were fixed, and no doubt fixed in accordance with the nature of their building materials. Thus we find wooden forms of structure made permanent in stone. Thus, even in the case of Cyprus, we are told of stone forms of structure being simulated in wood. The *arconi* of Cyprus might with far greater probability have been traced to the influence of Roman builders. Enormous structures at Rome, Verona, Capua, Posilippo, Pompeii, and elsewhere in Italy, yet display the lofty vaults on which the Romans of the Imperial times reared their theatres, their baths, and their palaces. But these Italian vaults and arches, so far as our present acquaintance with them extends, are semicircular. Nowhere in Italy, in buildings earlier than the Papal sway, do we remember to have found the *sesto acuto*, or pointed arch. Arabic or Moorish influence is rather indicated by the occurrence of this form in Cyprus. At all events, the assumption that the *arconi* are the natural outcome of the destruction of the forests by the Turks is one that we are not prepared to admit without direct and conclusive evidence.

The building materials of Cyprus, though marble has not been found in the island, are abundant and varied. There is a calcareous stone approaching the texture of chalk, which abounds in the chain of Cerigne, the northern of the two ranges which traverse the island in an easterly and westerly direction, of a grey colour; which is sufficiently compact, as well as being of fine grain, to be made a substitute for marble in work which is not subjected to the weather. It is, however, difficult to obtain in large blocks, and suffers much if exposed. A material in more common use is an eocene sandstone, of yellow colour and fine grain, which is said closely to resemble in its appearance the well-known eocene limestone of the Paris basin. This occurs in regular beds of from 16 in. to 18 in. thick, sometimes, though rarely, attaining the thickness of 3 ft. It alternates with strata of very friable stone, and is obtainable in any required dimensions by the use of wooden or iron wedges. Powder is not employed in quarrying it. When first extracted, it is very soft and very easily wrought. It is capable of receiving ornamental and very delicate work, and hardens as it dries on exposure to the air. Its chief defect is that it cannot resist frost.

The most abundant building material in the island is a shell-bearing conglomerate of the quarternary period, which occurs in very regular beds in the neighbourhood of the sea. It is formed of fine sand, small pebbles, and a large number of small shells and their *detritus*. It often contains fragments of coral. It is easy to work when first quarried, though not so much so as the previously-described stone. It is of a fine yellowish-brown tint, and its effect in structural harmony is very good. Most of the architectural monuments of Cyprus are built of this stone.

Amongst these buildings may be named the tower of Commenda, the cathedral, the Palace of the Knights, the wall of Nicosia, the abbey of Lapais, the castles of Kantara, Buffavento, and Saint Ilarion, which crown the three highest peaks of the Cerigne chain of mountains, and all the Gothic architecture of Famagosta. The latter, very delicately wrought, shows the admirable durability of the stone, which has been tested by the lapse of five or six centuries. A proof of the estimation in which this stone is held is afforded by the fact that the castle of Buffavento is constructed of this material, quarried on the shore below, although the peak on which the castle stands is formed of the Jurassic limestone. At present this stone is but little used in building, as the houses are generally constructed of sun-baked brick. It is used for voussoirs, mouldings, &c., and in the rough state costs from 7 to 8 francs per mètre cube, or from 2½d. per cubic foot upwards.

The lime of Cyprus is of indifferent quality. It is furnished principally from the chain of the Cerigne mountains. Lime was recently produced by burning pieces of marble found in the ruins of the ancient cities of the island, but that kind of vandalism is now forbidden. Kitrea is the district which now supplies the whole of the island with lime. It is irregularly burnt, and not good, though it is slightly hydraulic. It

costs from 10 to 12 paras the oca, which is equal to from 1s. 3d. to 1s. 6d. per hundredweight. Little use, however, is made of lime in domestic buildings.

Cyprus is famous for that form of sulphate of lime which the Italians know by the name of *gesso*. It is found in abundance in the white marl, which forms the soil of half of the island. It occurs in many varieties, and of a texture that is either compact, laminated, tabular, crystalline, or fibrous, the latter kind being the most pure. The tabular *gesso* readily divides into flags of large size, and is in use throughout the island for pavements, steps, window-cills, facings, &c. The pavements of this material are more durable than would at first appear to be the case, in consequence of the Oriental habits of the islanders, in the way of wearing slippers, and of covering the floors with carpets or mats. This tabular *gesso* is quarried in the open air by means of long wedges, dividing the block into prismatic masses, which are then split into layers. These are afterwards squared, and roughly dressed. Large quantities are produced at Pyla, Ipsos, Caclia, and Macrassica, and they are exported to Syria and to Malta. They are generally from 18 in. to 2 ft. wide, and cost from 7½d. to 8d. per square yard. Compact, granular, and laminated *gesso* abounds at Ipsos, Lessi, Aradippo, Athiena, Larnaca, and Nicosia, and is used for plaster. The "lance-head *gesso*" yields an excellent scagliola, and is found at Pyla and at Ipsos, but in small quantities.

The burning of the *gesso* is effected in the most primitive manner. The stone is placed in conical heaps of two yards in diameter, and a yard and a half high, a cavity being left in the midst, which is filled with roots or brushwood, that yield more smoke than heat. Thus the stone becomes blackened, and irregularly burnt. When burnt, it sells at from 3 to 4 paras the oca, or from 4½d. to 5½d. per cwt. The quality is excellent, and, with more careful preparation, it might be exported in large quantities.

Cyprus abounds in good clay; and excellent bricks are made at Nicosia, Larnaca, Mazoto, Arposa, and Limasol. The clay is mixed as is customary in Europe, and the bricks are burnt in clamps, the fuel being roots, cotton stalks, and brushwood. They have the same dimensions as Italian bricks, and cost from 16s. to 20s. per thousand. They are, however, but little used, the Cypriots preferring to use sun-dried bricks, which, owing to the dryness of the climate, the great heat of the summer, and the low height to which the houses are reared, answer very well. These bricks are made of sixteen or eighteen parts of brick earth, mixed with one part of straw. They are made in moulds measuring 16 in. by 20 in. by 25 in., and are laid to dry on a floor exposed to the sun for ten or fifteen days. They attain a respectable hardness and durability. Sometimes sea-weed (*alga marina*) is used in the composition instead of straw. A man and two boys will make as many as 1,000 of these bricks in a day. The cost is from 12s. to 14s. per thousand.

Finer clay, fit for pottery, is also found in the island. Larnaca, Limasol, Lapisthos, Varostra, and Como are the localities in which pottery for domestic use is made, as well as water-pots for irrigation, and pipes for the conduct of water. The utensils are well made and properly burnt; but they are wanting in elegance, and are but rarely glazed. Fine clay, fit for plates, tazze, and similar objects, is found near Carpazo, but in quantities so small as not to cover the cost of working.

The ordinary houses of the peasantry, consisting of one or two rooms, are built of these sun-dried bricks, and thatched with straw. But they are not ill-adapted to the habits of the people, and are especially calculated to resist the torrid heat of the insular summer.

The bettermost houses are built on foundations of stone set in the lime of Kitrea, which is slightly hydraulic, mixed with sand, and with Italian pozzolana. The lime is allowed to slake by exposure to the air; it is used in the state of powder. The depth of the foundations is small; from 18 in. to 4 ft. 6 in. below the surface of the soil. The thickness of the foundation varies from 2 ft. to 2 ft. 6 in. For houses of a single story the foundation is carried up for 18 in. or 20 in. above the ground. For houses in two stories, the walls of the lower plane are built in masonry, at least as high as the upper cill of the windows. Above this the wall is carried up with a thickness of from 18 in. to 21 in. of sun-dried bricks, set in clay and straw. The bricks are laid so as form the thickness of the wall by their length, and are rapidly set by eye. The joints are never more than 4-10th in. wide. It is rarely the case that either plumb-line or level is used by the builders. The work is roughly done, and it is much if the angles of the building are vertical.

A bricklayer, with two boys, will lay from 500 to 600 bricks in a day, making from 7½ to 9 cubic yards of work. The construction is carried on in layers of from 6 ft. to 9 ft. deep, each layer being left for some days to dry before a new one is added. The wall, when finished, is plastered over without with a wash of clay mixed with straw, or clay and tow, and within with lime-wash, or a thin layer of *gesso*. The outer coating has to be renewed every third year, as it suffers from the rain. The material for coating the walls is supplied to the workmen in the most primitive manner, being made into a ball, and thrown from hand till it reaches the man who has to spread it.

The doorways are from 3 ft. 3 in. to 6 ft. 3 in. wide, and the windows from 3 ft. to 5 ft. They are always provided with a wooden cill. Above they are covered with slabs of stone or of *gesso*, or with wood. In the latter case relieving arches are turned above the architrave. The cost of the *arconi*, of which we have already spoken as supporting the floors, is from 10d. to 1s. per foot of span. The material of which these arches are built is generally the yellow tertiary sandstone, before described, which is called *macigno*. The roofs are formed in the same way as the floors, but with a slope of from 7 to 1 to 10 to 1. It is rarely the case that ceilings are introduced. The framework of the doors and windows is of the rudest description, and is only endurable in consequence of the warmth and dryness of the climate. Glass is used in the windows, in the better class of houses, but it is not so fixed as to close the apertures against draughts. Sometimes the window-frames are painted; but they are generally merely rubbed with oil so as to show the graining of the wood.

The kitchens are unworthy of the name; the fireplace consists of a bench of masonry with two or three *fornelli* (little vertical holes), never provided with top or chimney. The smoke spreads freely in the air, and escapes through small holes left in the walls near the roof. Chimneys are unknown. Signor Luigi says that he did not see one in Cyprus. The ovens are very simple. They are of an internal diameter of about 30 inches, and are built of sun-dried bricks, set in clay and straw. They are extremely economical, both as to their first construction (costing from four shillings to five shillings each) and from the small quantity of fuel which they require.

All the houses are provided with wells, of from 32 in. to 40 in. in diameter, and from 10 ft. to 33 ft. in depth. Beneath an upper stratum of compact clay, or of soft conglomerate, occurs a water-bearing sand, more or less compact. The water is not always good, being often charged with salts of soda and of magnesia.

The wells are sunk by two men, one digging, and the other removing the material. In a day they will sink from 6 ft. to 9 ft. It is rarely the case that any lining is used, a dwarf wall round the aperture being the utmost finish that is usual. The cost of these wells varies from 10 francs for a depth of 3½ mètres in compact clay soil, to as much as 60 francs for a depth of 10 mètres in hard conglomerate.

In the principal towns, Nicosia, Famagosta, and Larnaca, in addition to private wells and public fountains, fed from connected wells, vertical shafts are sunk into the water-bearing stratum, from 5 to 10 mètres apart, and are connected by little tunnels, 3 ft. wide and 6 ft. or 7 ft. high, directed as nearly as possible according to the dip of the subterranean water surface. They are placed so close together, not for the sake of increasing the water yield, but for the guidance of the workmen, and the sake of ventilation in excavating the tunnels. The tunnel is commenced at the lowest point, and runs upwards. As little rise as possible is given to it, and masonry lining is very seldom used. The cost of this work, including shafts, tunnel, and what little masonry used, is from 50 to 80 francs per mètre run of tunnel. The canal is continued in the open, the sides being walled, and rendered with a mixture of lime and earth which forms a sort of hydraulic cement, and the conduit being supported by embankment or masonry where the ground requires. At Nicosia at the present time iron tubing is being substituted for the ancient conduits in masonry.

ART COMPANIES (LIMITED).

For some time past there has been an increasing tendency on the part of the public to take their artistic taste and opinions, as Mr. Justin M'Carthy says, in his "History of Modern England," "in platoons," in the same way that Charlemagne's converts got their Christianity. People have been impressed with a considerable desire to have furniture that is in good taste, coupled with an inability or disinclination to give any thought of their own to it, or to exercise any individual taste. Thus the purveyors of furniture of all kinds have had very much their own way of it: they have engaged artists, have had furniture and upholstery designed in what was recognised as the taste of the day, and some of the leading firms dealing in this class of work have become practically almost purveyors of taste for the public, and have been half-unconsciously accepted as such by the latter. This unsatisfactory and half-understood way of doing the business is, however, no longer to be tolerated. If a thing is right to be done at all, let it be done openly and thoroughly. If art can be furnished retail, why not wholesale? Accordingly we have before us the prospectuses of two Limited Companies, the object of which is to purvey artistic taste for the public at large.

The "Furnishers' Alliance Company," with a capital of 50,000*l.* in 10,000 shares of 5*l.* each, is under the artistic superintendence of Dr. Christopher Dresser, whose knowledge of decoration, theoretically and practically, is not to be questioned. The company undertakes to supply the general public with artistic house-furnishing requirements of the best description, including furniture, carpets, wall decorations, hangings, pottery, table glass, silversmith's wares, hardware, &c., to meet the "unprecedented demand for artistic objects" which "the advanced standard of public taste during the last few years" has created. The whole direction and the selection of goods is entrusted to the eminent authority above named, and we are assured that "no object, whether an important work or a mere adjunct of furnishing, will be displayed unless its art qualities have been duly tested; the public will thus have an absolute guarantee that every article sold, whether costly or cheap, will possess intrinsic art merit, as regards its originality, design, and execution." By what process the art qualities of any object are to be "tested" we are not informed; but no doubt we are behind the age. There is evidently some new process of what may be called æsthetic chemistry invented, to which each object will be subjected for quantitative analysis, and we may expect, when the new establishment is in working order, to see the objects that are offered ticketed with the result of the analysis, as thus:

Form	33·715
Colour	41·23
Æsthetic correctness and suitability	25·055
	100

Thus, it will be possible for the public, by a simple process of addition, and by due observance of the figures representing each quality in the article, to obtain by precise analysis the special art-quality they want; at least, so we conclude from the terms of the prospectus.

The other company, "The London Decorating Company (Limited)," issue a prospectus which, on the outside of it, is more obviously and ostensibly an art scheme, seeing that it has a "picture" on the back of three allegorical figures with a decorated wall behind. The art department in this company is under the directorship of Mr. Walter Crane, from whose pencil we may presume there came these three figures of young women typifying Science, Art, and Health, the latter, we observe, turning her back on the spectator, perhaps a delicate allusion to the difficulties in the way of our health caused by fog and smoke, of which we are having more than usual at present. On turning to the prospectus, however, we find that health takes a rather prominent part in the society's scheme, which seems to have arisen out of an idea of extending the business of a certain Stone Paint and Protective Liquid Company, which has been taken over, so as to make it include the provision of artistic decoration also. This way of putting it gives no doubt a sort of practical status to the company, though, in the end, we presume it is pretty much the same thing as the other, and that the object of both is to

turn to commercial account the now-prevalent fashionable turn in favour of what is called art-furniture and art-decoration. As far as the practical side of the matter is concerned, the company's prospectus is satisfactory and sensible. They observe that many processes and materials used in decoration are known to be injurious to health, that scientific men are constantly recommending important and valuable processes, which the trade would gladly adopt if the necessary materials were provided through the several channels; but that scarcely any one knows where they may be obtained, and that sometimes they cannot be obtained at all; that means, we suppose, that they cannot be obtained consistently with commercial conditions. The London Decorating Company undertakes to purvey for and supply all such materials and processes, in regard to which they will be advised by Mr. Crookes, F.R.S., who will supervise the chemical tests and processes employed to secure that the paints, paper-hangings, and other materials, shall be free from poisonous or injurious qualities. So far so good. That is a process which a company under the advice of scientific experts may very well and usefully perform, and the company show considerable generalship and perception of what is likely to "go down" in thus emphasising the health part of their scheme. And in regard to the art part of it, the company are at least wisely reticent in not offering to supply any "test" of artistic quality. They also state that other artists and designers of high standing will be associated with the company, "so that all styles of art may be readily available," and, so far as the wording of the circular goes, it would appear that the customer in special cases may even be allowed to select his artist, though the indications on this head are somewhat vague. In other cases, where the work is not of a highly important nature, and where the customer does not want to spend more than he can help, a schedule of questions will be sent, the answers to which "will enable the artist to select a suitable design from the standing designs of the company, which will be numerous and regularly increased."

Now what does all this really mean? Of course, in the first instance, it means that the promoters think they have evolved a good investment for money, and expect to make such company a paying concern. That is the way in which we have come to look upon art, then, as a thing to be "exploited" for the benefit of shareholders. This is certainly not a very high view to take of the matter, to begin with. But the essential fallacy of both schemes is contained in the preposterous idea that art can be produced wholesale by a company, in the same way as patent locks or any other article of household furniture. The last-named company, as we observed, have sense enough to be a little reticent on this point; but they hit, without knowing it, on the real objection to their scheme in their way of recommending their art-director, "whose pictures are so familiar to every cultivated household." Just so. The type of art which is represented, and well represented, by the work of Mr. Crane, is what it is the fashion to admire, and "cultivated households" are those which believe in this type of art, and fill their houses with it. Those who do not are, we presume, uncultivated households. This is a most delightful begging of the whole question. We know a good many cultivated people who do not think so much of this type of art, of mere lank conventional figures all with the same expression; but the company would be ready, of course, to answer any argument against the fashionable form of decorative art by the simple and, we admit, entirely unanswerable retort that those who do not care for it are not cultivated. But the fallacy of the whole scheme lies in the radically false idea that art, which is to be of any value, can be produced wholesale to order, and of any pattern. What makes artistic design of any value is the presence of individual thought and individual style and expression; and the influence of such companies as we have referred to will be, must be, to stifle still further the influence of individual taste, and to reduce decorative art to a mere dead fashion followed for fashion's sake. Such schemes, if they succeed and acquire large public patronage, will put the finishing touch to the absurd affectation which has recently possessed the public mind of having all their houses decorated in a certain prevalent fashion, all their furniture made according to what are supposed to be "art" patterns. Go into house after house, and you find the same style of furniture and wall-papers, selected, not as the result of individual preferences arising out of the taste and study of the owners, but as what "art-furniture" firms are now making, and in regard to which anything that can really be called art or design really enters about as much as it enters into the tailor's consideration of the cut of your coat,—as much, but not more. People are encouraged to think themselves artistic because they use this type of furniture, when in reality they are simply following a precedent; and it is well known that some of the most prominent decorating firms will not even allow a customer to have a taste of his own, and will tell him so broadly, or hint almost as plainly that he must take what combinations they think best. No really "cultivated" person would condescend to give up his own tastes in this way into the hands of an art-upholsterer for a moment. But now we are offered schemes which will reduce all this affectation and pedantry to a wholesale system. The work of the individual artist, which, even under the present retail system of art-furnishing, is usually quite lost under the name of the "firm," would now (should these schemes succeed) be yet more surely swamped, and what is called "art" would be regarded as a form of goods to be produced wholesale to order from a manufactory. To all people who have any wide "cultivation," any insight into what "art" really means, and what makes it worth having or caring about, the mere statement of the case would be sufficient to show its absurdity. To those who choose to embark capital in such a speculation, we have, of course, nothing to say; that is their concern, and if they believe that the public have arrived at that state of "gulliability," in regard to æsthetics, that will induce them to believe that they can buy art at an art-shop, let them go in and win by all means, only do not let them pretend to pose as promoters of art or of artistic education. They have just as much right to such a standing as a company would have who, if there should arise a great fashion for one particular school of painting, say the Dutch, should open an establishment for providing an unlimited number of pictures in the manner of Teniers or Ostade. Decorations are a less important, and in some sense less intellectual, form of art than pictures, but what holds good in respect of one branch of art holds good in all. "Parroting" is of no real value; individual genius and thought working in reference to nature and to natural principles is what makes art, and nothing produced by rule and on a system can be of any value; and our advice to those who are attracted by such schemes is to consider a little what art really means, "to beware of spurious imitations," and not to allow themselves to be gulled into imagining that art can be turned out to order from an art-mill, in any quantities, like so many bales of Manchester goods.

BEWICK'S WORKS.

The exhibition of a number of Bewick's original water-colour studies for his subjects, along with impressions of the engravings from them, at the Fine-Art Society's Galleries in New Bond-street, will probably bring a good many of the general public who visit it to a first idea of the nature of Bewick's genius and the character of his work. Familiar as his name is to all who are especially interested in art, we suspect that to the outside circle it has been often little more than a name, and in some cases not even that. The exhibition of some of his works collectively ought, therefore, to be very useful, and we trust it will receive the attention it deserves, though it is a great pity that works of so minute and delicate a nature should not be examined under a better light than is to be found in the small front room in which they are exhibited.

The exhibition has been rendered possible by the liberality of the Misses Bewick in lending a large number of their father's drawings and engravings. The catalogue *raisonnée* offered to visitors gives a sketch of the circumstances of the artist's life, with comments on the drawings, which last are much too wordy and pretentious, and in some cases utterly absurd. The rage for deluging people with reflections on the works of art which they go to see is becoming a positive nuisance and impertinence, and ought to be checked. Nearly three pages of "gush" are offered to the holder of the catalogue in regard to the one little tailpiece of men shooting in a snow-covered landscape, with the usual cant phrases about "wealth of conception," &c., and with discoveries as to the meaning of this and that detail in the landscape which would probably have very much astonished Bewick if he could have read them. In the middle distance of the landscape is a rail-fence half-seen above the snow, a very small incident in a very small work; but this is how the critic fastens on it:—"The upright posts of the fence have individuality; thus the inequalities in the distances between them tell that the carpenter who set them up considered as he went on, but not before, how the line was to be spaced out and his material economised; again, some of the posts have, more than others, yielded to the weather; some posts have sunk or gone away in bad foundations or soft ground, and, as the circumstances compelled, sloped to the right or left." Wonderful! One would suppose that a dilapidated post-and-rail fence were one of the most unusual and significant objects to be seen in the world. In regard to another drawing, representing an old decayed boat, we are called on to admire "the dexterity which so deftly foreshortened the broken planks and battered ribs," as if artists, as a rule, did not attempt to draw in perspective; and we are told that "each plank has a biography in these details." The drawings are both admirable specimens of Bewick's peculiar qualities, but to have this kind of rant about them put into one's hands is enough to disgust amateurs who have any remnants of common sense left in their composition.

No one can look over this collection of drawings without being sometimes reminded of Hollar, of whose works a large collection was exhibited in the same gallery not very long since. Like Hollar, Bewick delighted in finishing with the most minute realism small objects which gave occasion for the display of the highest technical qualities of execution; Bewick usually chooses feathers for this kind of study, Hollar liked nothing better than shells, but also expended his skill on such things as muffs and other small articles of dress. Like Hollar, also, Bewick's skill seems to have been occasionally employed in the production of work of a strictly business nature; for the exhibition includes two bank-notes of North-country banks, engraved by him. He does not appear to have got through, however, anything like the enormous amount of work achieved by Hollar; and, on the other hand, he possessed powers of imagination and invention of which Hollar has left no indication. His head and tail pieces, by some of which he is most widely known, sufficiently indicate this. Small as they are, they exhibit humour, pathos, and a very close study and perception of human character, and of the action both of men and animals. There could not be a better illustration of this last quality than in the cut in which a mastiff is about to fly at the throat of a man: the energy of the dog is quite alarming, and the action of the man holding his stick with both hands across his chest as a bar to protect his throat, is just as real and natural. Another remarkably good one is that of a pack of boys run away with in a cart, the horse of which has started off, reins on neck, while left alone by the carter, who is running after him; the helpless condition of the occupants of the cart, holding on to its front and sides (one having been already thrown out), is most amusing; and we can fancy that such sketches are merely the transfer to paper of incidents witnessed by the artist in his Northumbrian village.

The comparison of the water-colour studies with the engravings in nearly all of this class of pieces is very much in favour of the engravings. In fact, in these cases the drawings are almost obviously finished just sufficiently to afford a good copy to work from, and many details in the engravings are not in the originals. In most cases the sketches have been copied the direct way on the blocks, and the impressions are therefore the reverse way. There are certain things which Bewick is not very successful with in the drawings, and sometimes in the engravings also; for instance, his drawing of water is mannered and deficient in variety. In one subject, representing a man fishing in the middle of a stream, it is curious that in both the original sketch and the engraving occurs the same oversight; the reflection of the figure, which is swayed rather to one side in attitude, is continued in the same line in the water instead of being reversed. It may, perhaps, be said that in the matter of reflections in water it is more often possible to catch good artists tripping than in anything else in nature. In looking

over the collection one cannot but note the rather frequent recurrence of snow pieces. In one of these, which are all beautiful in their way, it is noticeable (in the one numbered 50) how delicately the effect of the shadow on one side of the furrows of a snow-covered field is given; you can see that it is shadow on snow. The serious moral element in many of these little pieces,—serious in intent even when half-comic in expression, is of course not to be overlooked; among the most noteworthy examples are the wooden-legged soldier shaking hands with his old friend the bricklayer, whom he finds still whole and hearty in his native village to which he has returned aged and maimed (Bewick was a strong anti-"Jingo"); and in a more satirical vein the sketch representing the devil swinging himself easily on a gallows and contemplating the church in the distance.

In the case of the bird subjects, the original drawings are much more elaborate and highly finished than those of the imaginary pieces, for obvious reasons. These were accurate realistic studies, made as guides to the engraving of subjects which could not be kept long enough to serve as direct models for the lengthy process of cutting the block. In some few cases the coloured drawings are superior to the engravings, but not often; when the engravings are inferior in one point they often show superiority in another. Bewick's power and finish in the use of colour are however remarkably exemplified in many of these water-colour drawings of birds, and as these, of course, are not familiarly or generally known, they add very largely indeed to the interest of the exhibition. In the engravings, as many of our readers know well, the most remarkable characteristic is the softness and delicacy with which the texture of feathers, and their manner of growth, are represented, sometimes in a manner which seems to an ordinary eye quite incompatible with the stubborn and mechanical process of wood engraving. And in fact these works do represent what is very exceptional in the art, and what it would be impossible to get now, the characteristic touch of a master who gave a meaning to every stroke, and did everything (in his best works, at all events) with his own hand and eye. Wood engraving has become so comparatively mechanical now, that this delicacy of touch and style is not to be had at any price; the artist who might have engraved in this style in Bewick's day would now give himself to etching, and in all probability Bewick himself would have been an etcher had he lived in our day. Wood-engraving has, owing to great demand, sunk into a kind of popular art supplying reproductions speedily for popular taste; and the result is, that the highest class of artists who deal in reproducing processes at all have come to think lightly of engraving, and to make it a point of honour to give the first place to the needle and the copper as the only reproducing process worth the attention of an artist of the higher class. This is in some sense a very undesirable conclusion. Wood-engraving is a type of work much more easily reproduced and multiplied than etching, and is, *pro tanto*, the more valuable, if it be thorough individual artist's work in the first instance. And Bewick's wood engraving is so. No one could pretend to place the value of these engravings lower, in an artistic point of view, than it could be if they were etchings, and their practical value is greater. The impressions from them have been more numerous and more perfect than etchings on copper could have furnished. The difference is, that artistic work on wood is more laborious, and claims more time and pains from the artist, than the freer method on copper. But Bewick's engravings prove that the artist's feeling and touch may show itself on wood as perfectly as on copper, granted that the artist is willing to bestow the labour. Let him be willing to do so, and wood-engraving takes its old place as one of the finest of the reproducing forms of artistic work. That is the lesson we read in Bewick's engravings.

A Testimonial consisting of a centre ornament in silver, two dessert stands and salver, was presented on the 16th inst. to Mr. Thomas Hawksley, C.E., F.R.S., by the directors of the Nottingham Waterworks Company, in acknowledgment of his services as their Engineer-in-Chief, from the commencement of the undertaking, A.D. 1830, to the dissolution of the company, A.D. 1880 (a period of fifty years). The testimonial was designed and executed by Messrs. Hunt & Roskell.

DEPUTATION TO THE ADMINISTRATION ON THE FLOODS.

THE FIRST PRACTICAL STEP TO BE TAKEN.

The large and influential deputation which, on the 12th current, had an interview with the Chairman of the Local Government Board on the subject of the recent floods, was an example of a non-political public movement of no small importance. It is needless to say how thoroughly we sympathise with the object of the deputation, and with the appropriate tone in which Mr. Dodson replied to their remarks. The subject of the interview, as our readers are aware, is one to which, from the very first installation of the Local Government Board, we have not ceased, as occasion arose, to call the attention of the Government and of the public. On the present occasion, men of the highest position, as territorial landowners, and as public men, spoke of the enormous damage which, with much other waste of public money, might have been altogether averted, if our representations as to the primary need of a hydrographic survey of England had received the attention which we venture to say they deserved.

The Duke of Bedford, whose very name suggests the honourable association of the former members of his house with the great work of reclaiming the fens, introduced the deputation. The Speaker of the House of Commons, as member for Cambridgeshire, said that the question "was not only one affecting Cambridgeshire and the Levels, but that the rivers of every watershed throughout the kingdom are interested in the matter." Mr. Magniac, M.P., speaking as representing the town of Bedford and the County of Bedfordshire, "knew of tens of thousands of acres that were practically under water. One farmer he knew had not seen a large portion of his farm for two years, though he had to pay rent for it." The removal of mills, Mr. Magniac thought, would be a great benefit to all around. Mr. Palmer, Q.C., M.P. for Lincoln, said that district had suffered more than almost any other place in the country. Mr. Cope, of Huntingdon, spoke of the ravages committed by the Ouse for the last three years. In this valley alone the keep of 30,000 cattle had been destroyed, and the fertility of the soil permanently deteriorated. The death-rate had nearly doubled in the town of Huntingdon, and in the surrounding villages many persons had been obliged to live all the summer in the upper rooms of their houses, to which they obtained access only by boats. The Marquis of Huntly suggested the vesting the control of the watershed of rivers in one managing body. The Earl of Jersey called attention to the floods of the Thames. Other gentlemen spoke of the inability of the inhabitants of any of the districts affected to protect themselves, unless provision was made by new legislation for the comprehensive treatment of each watershed taken as a whole. We cordially endorse every word above cited.

Mr. Dodson, in reply, expressed his entire agreement with the sentiments expressed by the deputation. He commented with satisfaction on the general accord in the view that the inhabitants of the various districts would be prepared locally to effect the regulation of the river courses, if they were authorised so to do, by a measure which would treat each river system as a unity, and spread the cost only over the whole area affected. He also collected from the deputation that the increase of land-drainage was one of the causes to which the more destructive nature of floods was to be attributed, and promised to lay the whole matter before his colleagues. The speech of the right honourable gentleman was manly, statesmanlike, and to the point.

There are three highly important matters bearing on this difficult subject which were not touched either by the speakers or the President of the Local Government Board. The first is that the recent increase of damage from floods is not peculiar to England. It has been felt, and that most disastrously, in France, in Italy, in Hungary, and elsewhere. The Rhone, the Po, the Tiber, the Seine, the Danube, and other great rivers, have spread desolation over their banks. But the Governments of France, of Italy, and of Austria, have seen the threatened extent of the evil, and the responsibility under which they lay to meet it. In every case they have called in the best services of the most eminent men. They have named technical commissions; they have obtained exact hydrographic surveys of the river courses; and they have adopted well-considered measures for the protection of the country. Great works have been executed, others are in progress, or under consideration. In each of these countries the engineer has been set to work by the Government to protect the country.

The second point (which compared to the others is almost a bye) is, that although the draining of land tends to bring down the floods more rapidly than heretofore, the volume of water that is carried down is more increased by the destruction of timber and cover of all kinds than by any other cause. When the hills have been stripped of trees, what were formerly beneficial rivulets, of constant flow, are converted into destructive torrents, dry as soon as they have ceased to do damage. It may be difficult to point, in this country, to wholesale destruction of cover such as is to be seen on the slopes of the Apennines, but the steady warfare which the farmer has been lately taught to wage against hedge-rows, coppices, standing timber, and wood of all kinds, is to a great extent a cause of destructive flood. In a properly-sheltered and partly-wooded district the effect of vegetation on the rain is threefold. It entangles it in its fall, absorbing a considerable portion, and converting it into vegetable tissue; it evaporates a much larger portion from the enormous evaporative surface of branches and leaves; and it retains yet another portion, until it sinks into the soil (instead of at once running off the surface), by the entanglement of roots, stems, and moss. By this compound action, every tree and every hedge is a storm regulator. By cutting these down, and exposing enormous areas of undivided arable land, to sun and wind, the hygrometric character of the climate is changed, the permanently productive character of the soil is injured, and the floods are doubled or trebled, not so much in velocity as in volume. Any one who doubts this should read the reports addressed on the subject to the various Ministers of Public Works of the Governments we have cited.

Thirdly and lastly, and quite independent of any legislation as to water-shed boards (desirable as such a measure is), the first, foremost, and *sine qua non* condition of any effective action in the matter is a HYDROGRAPHIC SURVEY. Have we any need, after citing the remarks of the deputation, to reproduce our former arguments on this score? Can there be a moment's doubt about it? Are we to remain the only people in civilised Europe among whom, if a question is asked as to the volume of any of our rivers, the only reply that can be given is, "It is unknown"? Such is now the case; and whether commenced by Government as a necessary part of the Ordnance Survey, or whether inaugurated in detail, water-shed by water-shed, such a Survey is necessarily the first step to be taken to prevent floods. The deputation do not seem to have been accompanied by an engineer; but we cannot doubt that men of their eminence,—peers, members of the House of Commons, and large proprietors,—can only need to have this fact called to their attention to see that the Survey must be the first step to dealing with the floods.

THE PLUMB-RULE AND LEVEL, AND THEIR LESSONS.

In a preceding issue we gave a brief description of an improved plumb-rule, the invention of a building workman, and we hope that the instrument will be found generally useful; for there has been for centuries a need for the introduction of a compact, correct, and more ready instrument than the one in use. The plumb-rule, in its true construction, application, and proof, has furnished more than once a theme for a technical lesson or lessons in technical education for workmen in the columns of the *Builder*. One or two instances, among others, may be worth recalling. In 1871 the present writer published a sketch in these pages, entitled "How do you Prove your Plumb-rule? A Technical Lesson," which elicited other articles and communications from artisans and others on the "Technical Education of Workmen," some of them bearing directly on the plumb-rule and geometrical lessons involved in the application of workmen's tools. One of the most interesting of these communications was from the pen of poor "Jack Plane" (the late Mr. Randall), who died shortly afterwards through an unfortunate accident met in pursuit of his trade. The *nom de plume*, "Jack Plane," often occurred in

these pages previously to the date of his decease, and it were to be wished that we had in our midst many such intelligent and practical-minded working-men as the carpenter contributor of the *Builder*. "Jack Plane" well knew that every stroke the carpenter and the joiner take at their work is either a line, a square, or a circle, and that their daily labour is with the rule, the square, and compasses. Consequently, every part of their work is a lesson in geometry demonstrated before their eyes, and yet many of them remain unconscious of the facts or incapable of properly understanding them.

Now, the plumb-rule is a very simple instrument, and any man that ever handled a saw or a plane without being a mechanic considers himself capable of making one. Indeed, building workmen themselves think little time or care is necessary to construct one, so they are often constructed accordingly, and proved in rule-of-thumb manner. They vary in length and breadth, and betimes in thickness of scantling, according to the work they are intended for, or the usage they may be or are likely to be subjected to. Some workmen take a little pains in making one, and finishing it with a little taste, and with certain adjuncts when they intend the plumb-rule to last more than for a temporary job. A plumb-rule as ordinarily made, say, is a piece of a deal or pine leaf from three to four or more feet long, and from five to six or more inches wide. It has a pencil or otherwise a cutting gauge-line down the centre of its width, and three saw kerfs or notches in its top end, the middle one being in a line with the string-line, and those on either side, which are cut mostly oblique, being intended for fastening purposes, when there is an overplus of bob-line, the overlength being pressed into these side notches once or twice, and should any small overlength remain after adjustment it is allowed to drop behind. On the face of the plumb-rule, near the bottom, and centrally, a hole is cut of an egg-oval shape, for the play of the leaden "bob," which latter is about the size of a hen's egg, but rather more pointed on its top side. In a proper plumb-rule the string is made to pass directly through the elongated thickness of the "bob," and knotted at the bottom. On the face of some plumb-rules, immediately above the "bob"-hole, a fence is placed of a segment or looped shape, intended to confine the string and bob within reasonable limits and render it the sooner adjustable when required; for what is technically known as "killing the bob," or bringing the bob to hang without swinging or swaying more than is needed, has to be resorted to by the adjusting hand of the operator. To the uninitiated our description of an ordinary plumb-rule may appear somewhat complex, and it may be thought that the surroundings of the instrument are not so very simple after all, but the sight of the instrument itself ready for use, or in use, will at once show that the instrument is simplicity itself, as far as its construction and application are concerned. The defects of the ordinary plumb-rule are chiefly those connected with the attaching string, which twists in wet weather and breaks in dry, though in dry and wet, when used in outside building work, there is a constant wear and tear through fraying and unravelling, which, independently of breaking, renders a new string often necessary. It might be thought that the ordinary defects of the plumb-rule would have long since prompted some building workman to invent a new form of instrument, but the immemorial one being so readily constructed, and costing so little, and being at the same time so approximately accurate for all the practical purposes of building, workmen have gone on contentedly using it, never dreaming of, or perhaps seldom or never wishing for, a better instrument. We ourselves suggested several years ago the construction of a somewhat similar plumb-rule to that now introduced by Mr. Ryan, a weighted metal rod, hung in pendulum fashion, fixed in a groove or slit centrally on the broad face of the plumb-rule. But it did not take practical form. Many other matters since have occurred, knocking states and buildings out of perpendicular, and we have been obliged to move on with the instruments to our hands.

In making a wooden level or levelling instrument, the building operative proceeds on similar lines to those adopted by him with the plumb-rule; for the level in form is in part a plain rule, with its string and bob, though it cannot, as made, be applied in a perpendicular direction. Bricklayers and stonemasons, and often carpenters and joiners, for levelling purposes, use the spirit-level made to varying sizes. This instrument, of the size that is generally used and carried by workmen in their tool-baskets, is useful for short lengths of work, but over a long range, a good-sized accurate wooden building level is a safer instrument. A certain stone tested by a short spirit instrument may appear level while a course of three or more, a whole course may dip or have a rise at either end. In plumbing, the face of a wall, brick or stone, a rather longer plumb-rule should be preferred than a short one, even though it should not be so handy for the workman. Hundreds of houses are yearly built which are not truly perpendicular or plumb in their fronts; and when a row of speculative houses is built, the front walls are the only part to which the hurry-scurry or scamping workmen pay any attention as regards an approach to fair plumbing. Let any one with a good pair of eyes accustomed to look at frames, door-joints, openings, or walls "out of winding," walk into the suburbs, and make a perambulation of some of our sundry new streets daily cropping up. Let him use his eyes, or even one of them, by standing close to the buildings, or at the gable-end of one commencing the row. Illustrations of bad plumbing, and consequently bad workmanship (and materials too) will be plentiful. Front walls bulging in their centre, overhanging some inches atop, or undulating several times in their height,—the result of plumbing with a vengeance, and scamping on even worse grounds. Fractures or settlements in the brickwork of the suburban houses will be found in abundance, and though not all the direct consequence of bad plumbing and levelling, yet both are contributories to the results. A wall built with bad materials, particularly bad mortar, if built perfectly plumb, will have the better chance of standing than one that overhangs or undulates; but scamping builders are partial to an inland batter in wall-building as well as in scaffolding, for very obvious and cogent reasons. If some of the scamping builders of the present or last generation had been hung plumb as an example of equitable State handiwork, their successors would be acting more uprightly to-day, and building more perpendicularly. The men that "run up" in this world find their level at last.

Reverting to the plumb-rule and level, it may be noticed that the spirit level has been applied before now, but the arrangement has not come into use.

We want thinking workmen as well as working machines. A machine may work ordinarily well, but it will never put thought and expression into the work it executes, though it is in itself the outcome of deep and prolonged thought and experiment. Long since we have shown in these pages how the workman can prove his ordinarily-made plumb-rule, and yet how few operatives have learned to do so by any other method than "rule of thumb," despite the advance of, or the agitation for, the technical education of the workman. The carpenter's or building workman's square and mitre jack are constantly-used instruments in our building workshops, and yet many of their users are ignorant of the angle they geometrically form. The three common angles of 45°, 60°, and 90° often occur or are always occurring in building operations, yet there are hundreds of workmen who would be unable at a moment's notice to tell what parts of a circle these angles represent. Worthy "Jack Plane," in the *Builder* nearly a decade since, confessed from his own wide experience at that time of his fellow workmen that, although the mitre was in common use, not one workman in twenty knew that the angle of 45° was a true mitre. A number of his fellow workmen were equally ignorant of striking a "bob" hole, and did not know there was a correct method for describing the egg oval that constituted it. How much have our building workmen, as a general body, advanced since then in technical knowledge and its application to the true performance of their work? If there has, as we fear, been little appreciable advance, is it not time for the credit of the country that the movement for the supply of this urgent want should be at once expedited?

Sanitary Science and Civil Architecture.—At the next meeting of the Royal Institute of British Architects, to be held on the 29th inst., a paper will be read on "Sanitary Science in its Relation to Civil Architecture," by Mr. E. C. Robins, F.S.A.

THE WASTE LANDS OF ITALY AND OF IRELAND.

There is one portion of the area of Europe that is more desolate than the bogs of Connaught. It is found in the midst of the garden of the West, and in the immediate vicinity of the seat of the ancient capital of the world. Few things are more striking to a stranger than the abrupt and dismal contrast which is presented by those portions of Italy which are afflicted by malaria, and the laughing cultivation of such districts as *Campania Felix*, or the vineyards and olive forests of the Adriatic seaboard.

The causes of this desolation, and the means to be adopted for the reclamation of such fever-smitten spots as the *Campagna di Roma*, have long been matters of anxious discussion among the statesmen of Italy. Without at once entering into the thorny questions of the spongy nature of the soil, which some persons declare to be incapable of drainage, of the influence of level, and of geological depression; or of the effect of mis-government in past time in robbing the land of its natural cultivators, it may be interesting to see what the Italian Government is now practically attempting in the matter. The parallelism between this "squalid desert," and some of that waste land in Ireland which the bishops of the Romish Church desire to see restored to cultivation, is so close as to be not a little instructive.

Under the provisions of a recent law, the Italian Minister of Public Works nominated a technical commission for the purpose of investigating the subject of the reclamation of the *Agro Romano*. The Commission has recently sent in its report. It was the unanimous opinion of the Commissioners that it was impossible to restore the squalid desert, as they term it, of the *Campagna* to a healthy condition, except under the influence of cultivation. As to the details of the mode of culture they declined to express any opinion, further than that it was necessary to encourage the stalling of oxen on the territory for the sake of the manure. But as to the aid which the Government, at no permanent cost to the State, could afford towards the reclamation of the waste, their recommendations were practical and business-like.

The Commission recommend the establishment of four village centres of population, at a distance of about six miles from Rome, and on the lines of the Civita Vecchia, the Naples, and the Orte railways, and the Tivoli tramway. In each of these localities they propose that the proprietors of the land should be asked to place about 1,500 acres at the disposal of the Government for purposes of cultivation. No inducement is mentioned in the report for this patriotic act, but it may be supposed that the improvement of the soil is intended to cover some rent to the owner. On this point it would be desirable, however, to have something more definite. In the centre of each of these districts the Government is recommended to buy enough land to give room for the building of a village that would hold from 4,000 to 5,000 inhabitants. Roads are to be made and drained by the Government, to the site of new villages, and the land surrounding them is also to be reclaimed and drained in the most efficient manner.

Starting with 200 families to one village, the Government is to advance to the new colonists the money necessary to build their habitations, and to break up the soil for cultivation. A low rent, paid in kind, as a fixed proportion of the annual produce, is looked to as the means of reimbursing the outlay of the State. For the houses, they are to be leased to the builders, the rent being enough to pay interest and sinking fund on the capital advanced, and on the share of the cost of roads and drainage due to each house. By this means, at a fixed time, the houses will become the absolute property of the builders, the State in this case acting somewhat the part of a building society in this country. In case of the refusal of the proprietors to allow their lands to be occupied, they are to be purchased by the Government, and gradually redeemed, in the same way as the houses, so as to become the property of the cultivators.

While it is thus proposed to extend cultivated zones of land step by step into the Campagna, it is proposed, by way of rendering the advance of cultivation more easy, that the present unrestricted right of freedom for semi-wild oxen should be restricted; and that those proprietors who now cultivate any part of the district should be compelled to build healthy abodes for their work-

people. For this purpose, as well as for that of building cattle-sheds, the Commission propose that the Government should advance the money on loans similar to those offered to the settler in the new agricultural villages.

The ruling idea of the plan is, the intervention of the Government as the provider of temporary assistance, at no ultimate cost to the State. How far the invited colonists are likely to be forthcoming, on these terms, it is not intimated. The question, indeed, is probably one only to be decided by experience. It is very well for the Commission to steer clear of details, and to mention in the most casual manner the preliminary making good of the land by the best methods. It is here that the shoe pinches. If preliminary drainage will so far exterminate the malaria as to make the sites of the new villages only moderately healthy, there can be little doubt that immigrants would be only too eager. As to that, the report is silent. Nor do we suppose that there is any professional man who knows the locality, who would be willing to peril his reputation by predicting the effects of the first process of "*bonificazione*."

ARTISANS' WAGES ON THE CONTINENT.

An inquiry has been recently set on foot by the Industrial Society of Mülhouse as to the condition of wages in Alsace and the neighbouring provinces, principally affecting, as is natural, the textile trades, but extending also to other collateral trades. The cotton wages are below those of England or America; but it is somewhat singular that they show little or no fluctuation; though, on the other hand, the tendency is to steadily increase. Wages in textiles seldom dance up and down during the year on the Continent as they do in England, but they also have the advantage (for the operative) of seldom or never retrograding. At the commencement of the present century, when cotton was still spun by hand, a woman earned about 40 centimes (4d.) a day; at the present time the Alsace spinner (male) earns 3 fr. 50 c. to 4 fr. 50 c. (2s. 6d. to 3s. 4d.) per day, while the woman makes 1 fr. 50 c. to 2 fr. 50 c. Old records, dating from 1606, state that at that period 12 deniers, equal to about 3½d., was the price for spinning a kilogramme (2 lb.) of cotton by hand; 100 years later the payment for spinning the same quantity of flax was 7d. The Strasburg weavers of 1646 used to get a haller and a half for an ell of cloth for a dress, which was at the rate of about 1½d. per yard. Some old documents in the Convent of Unterlinden, at Colmar, show that the price of manufacturing a yard of linen in 1710 was from 1½d. to 2½d.; while now the same quantity costs 9d. The following short *résumé* of daily wages in francs at the present time paid in the cotton trade of Alsace, the Vosges, and Normandy will be of some interest:—

	Alsace.	Vosges.	Normandy.
	fr. c. fr. c.	fr. c. fr. c.	fr. c. fr. c.
Carders	2 80 to 2 75	3 25 to 3 75	3 50 to 4 0
Combers	1 40 to 2 0		
Drawers	1 30 to 2 0	1 75 to 2 25	2 20 to 2 50
Rovers	1 20 to 1 25	1 80 to 2 50	2 0 to 4 0
Bobbin Winders and Piecers...	1 0 to 1 50	0 90 to 1 25	1 0 to 1 75
Spinners	3 50 to 4 50	3 75 to 4 20	4 0 to 5 0

It will be seen from this table that textile wages are by no means uniform even in the same country (considering, for the nonce, Alsace as still French), the scale being higher in Normandy than in either of the other two districts. The general rate of pay, both in Germany and Switzerland, is still less. It is stated that in Alsace the manufacturers complain very much of the difficulty of obtaining sufficient number of children to act as bobbin-winders and piecers, in consequence of the dislike of the country people to send their boys and girls into the factories. Generally speaking, it may be said that wages in the cotton-mills of Lancashire are nearly 50 per cent. higher than at Mülhouse, added to which there is a great difference in the duration of the hours of labour, the week's work in England being fifty-six hours, while at Colmar and Mülhouse it consists of eleven or twelve hours a day, and in certain districts of the Vosges, of thirteen to fourteen hours a day. In some of the better regulated mills, however, such as those of M. Dollfus at Dornach and M. Herzog at Logelbach, it has been recognised that the hands engaged in the production of fine cotton and muslin goods turn out as much work in eleven hours as they used to do in twelve, the attention being better concentrated,—and it is a regular arrangement for the women to leave the mill for half an hour or an hour in the morning so as to allow them to prepare the mid-day family meal. Throughout other branches of textile trades, there is not very much uniformity on the Continent, wages differing very much according to the place. The linen-weavers at Colmar earn about 2 fr. to 3 fr. 50 c. per day for men, and 1 fr. 25 c. to 2 fr. 50 c. for women. In the woollen (merino) factories at Buhl, the women get 2 fr. to 2 fr. 50 c., the men 3 fr. 50 c. In the cloth-mills at Biechwiller, wages are not so high, having, in point of fact, been declining ever since the annexation to Germany. This branch, however, is the only one in the textiles in which there has not been a steady advance. Bleachers can earn 2 fr. 50 c. for a day of eleven hours; women, 1 fr. 75 c.; boys, fifteen to eighteen years old, 1 fr. 80 c.; and girls 1 fr. 40 c.

Turning to other trades, we find varying degrees of earnings, according to the place or the skill of the workmen. The chemical workers and starch-makers at Thann, Strasburg, and Colmar make about 2·75 to 3 francs per day, while in the paper-mills at Rixheim and Turkheim (where wall-papers are made) the wages for machinists, printers, and engravers are 3·60 to 5 francs; ordinary workmen, 2·50; women, 1·50; children, from 1 to 1·25. The Strasburg tanners earn 3·25 francs a day, whereas in 1850 they could only make 2·25. The glass-workers at Wildenstein get from 2·50 to 4, and the boys have 1·25, being an increase of about 25 per cent. in the last fifty years. Strasburg brewers earn from 4 to 4·50 f. a day, together with an allowance of beer. In the tobacco warehouses, foremen and overlookers are paid 6 to 7·50 f. per day; workmen, 2·75 to 4; women 1·75 to 2·50. In the printing trade at Strasburg the wages for machine-men are 15 to 35 francs per week; compositors 20 to 34 (generally piece-work); layers on, 4 to 16; binders, 10 to 36; girls employed in folding, 4 to 12 francs. In fitting and engineering shops, wages are singularly low, averaging 3·70 per day at Mülhouse, and 3·80 at Grafenstadt, a decline from the wages of 1878, which then reached 5 to 8 francs. But in certain mechanical trades connected with the textiles, such as engraving on metal for patterned cloths, the skilled hands can earn 12 francs a day. Work is, however, somewhat unsteady in this trade, sometimes there being none, while at other times there is a considerable rush of orders. Fitters and machinists make about 29 francs in the fortnight, or 2·40 per day; adjusters, 42 to 60, or 4·15 per day; turners and smiths, 54 to 57, or 4·65 per day; strikers, 2·90; coppersmiths, 5·25; tinsmithe, 4·25; saddlers, 3·50; carpenters, 4; joiners, 3·10; masons, 3·50; masons' labourers, 2·40; foremen masons, 30 francs the week; foremen joiners, 43; foremen mechanics, 55. As a general rule, wages in country places are lower than those of the towns; but, on the other hand, the artisan has very often some counterbalance in the shape of a little bit of garden or land, which he himself knows how to turn to some profit. Wages often vary according to the cheapness or dearness of living in the neighbourhood, as for instance in Normandy, where provisions are dearer than they are in Alsace and the Vosges. One cause of this is probably the proximity of Normandy to England, and the readiness with which Normandy farmers can find a better market there for their agricultural produce than they can at home.

THE NORTHERN IRON TRADE.

Alike in respect of the extent of production and of price, the condition of the iron trade of the North is, in all its branches, very greatly improved from those it knew a year ago, though the full extent of the first force of the revival has not been maintained. But when it is known that in the crude iron branch of the trade there were in September, 1879, only 80 furnaces in blast in the Cleveland and Durham district, and there are now 117; that the output of the furnaces last year was at the rate of 4,800 tons daily for the whole of the district; and that it is now at the rate of 7,000 tons daily, and the change in the extent in the production is at once apparent,—a change which has called into use a very large amount of labour, for which a year ago extra-parochial assistance was needed; and a large amount of capital, the works representing which last year were unproductive and wasting. That enlarged production was in response to an increase of the demand, and though one branch of the demand has for the time collapsed, yet the effect of the general enlargement is seen in the fact that the stocks of pig iron in the hands of the makers is considerably less than it was a year ago. It is evident, therefore, that large as has been the production over that period, the sales of crude iron have been still larger. But whilst the increase in the production has been chiefly noticeable in the latter portion of the time, that increase in the demand which has stimulated it was shown most markedly at the earlier part of the period; and thus it is that though stocks are less now than they were a year or so ago, they are in excess of what they were at the middle part of the year. Without there should be an early increase in the demand, it must be concluded that the output is in excess of it,—in which case increased stocks, weaker markets, and falling prices would be early characteristics of the trade in the Cleveland and Durham district; for that district is largely dependent upon the demand for crude iron from other manufacturing centres, about one-half of the total production being sold in the shape of pig iron to other home and foreign manufacturing centres.

But what must be considered the decline in recent months in the demand for the cheap crude iron of Cleveland, has not yet been accompanied by any falling off in the demand for the local manufactures from that iron. The chief of these is now that for iron for shipbuilding purposes; and whilst a year ago the associated makers of Durham and the North of England sold on an average 20,000 tons of plates and angles monthly, they now sell about 34,000 tons monthly; and this increase of 14,000 tons in the monthly sales has been accompanied by an equally satisfactory increase in the average realised price,—in the case of plates, the chief part of the trade, from 5*l.* 10s. per ton to 6*l.* 13s.; and in the case of angles from 5*l.* per ton to 5*l.* 19s. per ton. The satisfactory enlargement of the volume of trade has called into operation a large number of the rolling-mills in Durham that have long been idle; and the increase of the average price has, under the sliding-scale regulation in force, given a slight but acceptable addition to the wages of the workmen employed in the manufactured iron trade of the North of England, so that there has been, and yet remains, a substantial and general increase in this branch of the metallurgical industries of the North of England. With the increased consumption of pig iron locally necessitated, there is a fuller employment in contributory industries; in the iron and coal mines, in the carrying industries, and in others which share in the results. The whole trade of the North of England is, indeed, changed in the course of the year, and though the cause of the primal stimulus has passed away for the present,—the demand for crude iron for the United States,—yet the effects in great part remain; and there is a partially counterbalancing growth in the enlarged demand for pig iron for the Continent. Partial progress has been made in the district, it may be added, with the erection of works in different parts capable of meeting the growing demand for steel for various constructive purposes, and these works, in at least one important centre, will be for the use of the native iron in that manufacture.

At the present time the tendency of the trade in the North of England is not so markedly progressive as it was. Although the number of furnaces in blast is sixteen less than it was in 1873, yet, owing to regular working, and to the use of large furnaces, the present production of iron is at its maximum. We have seen that it is at the present time above a demand which shows a declension, if a temporary one. Whether or not the demand will rise now that prices of pig iron are so very low, and that rates of freight are also low, cannot be foretold. There have been inquiries for crude iron for the United States, and one or two small lots have been shipped from South Durham to America, but there is as yet no sign of a demand to anything like the extent that was known a year ago. From the Continent and from other home consuming districts there is a steady demand, whilst that for the local malleable iron trade is about at its largest for some years, and has, with the briskness in the shipbuilding trade, the indication of continued and even increased demand. And the change in the steel manufactures,—the proved success of the Thomas-Gilchrist process

—will stimulate the demand for cheap crude iron,—such as that of Cleveland. For the past two or three years there have been immense importations of Spanish and other foreign iron ores into the northern district, chiefly for use in the steel manufacture. The use of Cleveland iron may now be expected not only to grow, but to become slowly substitutional for those rich ores of Spain; and from all these sources it may be concluded that there is a probability of greater demand being known for pig-iron. In the manufactured iron trade the greatest animation is in the branches for the production of shipbuilding, and from the number of vessels on the stocks of the shipyards, and on the order books of the builders, the animation must for some time continue. The question of price is rather different, for it must be concluded that the facilities of production have become operative, rather preceding than following an increased demand. As this is the case, prices have weakened of late for all classes of iron, and till the conditions of demand and supply are changed that weakness will continue. But though prices are low, there is a counterbalancing lowness of the prices of raw materials, and thus the iron trade of the north may be said to be profitable at the present time. That in favoured instances this is eminently the case is proved by the fact that the largest Durham ironmaking company, —the Consett Iron Company,—has paid for its past year the large dividend of 20 per cent., whilst others not quite so favourably circumstanced have paid smaller but still substantial dividends. With a profitable trade, and one that seems to have the elements of growth, the iron manufacture of the North needs only to keep its production regulated by the fluctuating demand, to be ready in every way to share in the renewed period of prosperity that seems likely to dawn on the iron trade when nations are recuperated by economy and by the blessing of abundant harvests.

BARRACKS: THEIR PLANNING AND CONSTRUCTION.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the second ordinary general meeting of this Institute for the present session, Professor T. Hayter Lewis, vice-president, in the chair, the secretary announced the decease, on the 30th ult., of Mr. E. M. J. Forster, Associate.

Mr. E. Ingress Bell (of the War Office), Associate, then read a paper on "The Modern Barrack, its Plan and Construction." The author commenced by a reference to the power conferred by the "Military Forces Localisation Act" of 1872, for building barracks and otherwise effecting the localisation of the home forces. It was desired to maintain the permanent identification of particular regiments with particular localities. Since the passing of the Act old barracks had been enlarged or new ones built at fifty-four different stations in the United Kingdom, accommodating a total force of 12,000 men, and costing no less than two and a half millions sterling, exclusive of the land upon which they stand. He then dealt with the great barrack-building movement which marked the close of the last century,—using the defects of the system then inaugurated as a scale by which to test the improvements exhibited by the barracks of the present day. He dwelt upon the unvarying ugliness of the typical barrack of the last century, and traced the causes of its defective plan to the circumstances under which it was built. After the establishment of the army on a legal footing, at the Restoration, no barracks were built with the exception of those at Whitehall for the Horse and Foot Guards, and a few in Scotland. The reason was the antipathy of the nation to a standing army, and the consequent repugnance of the Parliament to vote the required funds. Meanwhile the army increased in numbers, and suffered in health from exposure and privation. The mortality amongst the troops was so alarming that various expedients were adopted; but still barracks were refused. Even so late as 1766, Blackstone wrote:—"Nothing should be more guarded against in a free community than making the military form a body distinct from the people. The soldiers should be intermixed with the people. No barracks should be allowed." The crowning objection to their erection was the use to which they had been put in Ireland. At length it became essential that some recognised plan for housing the troops should be adopted, and in the latter part of the century Mr. Pitt proposed a measure for building the necessary barracks. An enormous number of barracks was commenced simultaneously all over the country; they were based on one defective and hastily-considered model, and to that period (1793-97) we owed the dreary pile whose very name had become a synonym for ugliness and which was seen in most of our more important towns. The first step to systematise the construction of barracks on a better plan was taken at the close of the Crimean war. Committees and Royal Commissions under the auspices of Lords Panmure and Herbert inquired into and reported upon the condition of every barrack in the United Kingdom; and long and sad was the list of their shortcomings. The architectural profession was invited to compete for the erection of an infantry and a cavalry barrack. Those at Chelsea and at Knightsbridge were the indirect result; but in both cases the competition plans were set aside and the actual plans of the buildings, though not the elevations, were designed by the authorities at the War Office. The defects of the old system were due to complicated planning; overcrowding on the ground; buildings interfering with the ventilation of one another, containing too many rooms and too great a number of stories, built round enclosed courts, or too near boundary-walls; and to defective sanitation in all its branches. It was found that the excessive mortality amongst the troops,—no less than twice that of the civil population,—was traceable to specific diseases directly induced by the unhealthiness of barrack-rooms, by want of ventilation, by defective water-supply and sewerage.* The result was the promulgation of a series of recommendations:—(1) Prescribing the superficial and cubical space to be allotted to each man; (2) abolishing the old offensive urine-tubs from the barrack-rooms; (3) providing separate quarters for married men, baths, washing establishments, workshops, reading and recreation rooms, skittle-alleys, &c.; (4) regulating the warming, ventilation, water-supply, and drainage. The regulations which followed were directed to an improvement of the general system of barrack plan, and to the proper remedy for each particular defect in construction, warming, ventilating, &c. Consequently, at the present day, there is no one of her Majesty's subjects who is more scientifically provided for in all that conduces to health and physical well-being than the common soldier. The type of barrack which was accepted in the eighteenth century was exhibited in the plans of a vast unexecuted project for Hyde Park, and the want of provision for the decencies and necessities of barrack life was shown therein. The difficulties of acquiring, at reasonable rates, sites for Government buildings having been touched upon, Mr. Bell adverted to the conditions necessary to be observed in the disposition of the barracks as a whole, namely:—The want of a clear space around the barrack wall; of an ample parade-ground; the proper placing of the officers' quarters; the keep and store accommodation; guard-house; hospital; canteens; and the other items in a barrack establishment. The separate accommodation of each, and their proper mutual relation, were discussed and described in particular. The means of lighting and proportion of window space; the arrangements for warming and ventilating; the admission of fresh air and the extraction of foul air; the proportion of inlets and exits; and the special provisions and precautions rendered necessary by the habits of the soldier, were described. It was necessary that the soldier's rooms should be provided with indestructible fittings. With him valves were simply things to be fastened down, and ventilation openings only things to be stopped up. Long experience of his idiosyncrasies and of the exigencies of barrack occupation went to prove that of all methods of warming barrack-rooms that of the open fireplace was the best, and the best open fireplace was one perfected upon suggestions furnished by earlier models by Captain Galton. Under the old system fresh-air inlets were undreamt of, and the rooms were warmed at the expense of the purity of the air within them; under the new system the contrary, in some instances, had proved the case; and the rooms had been over-ventilated. It was easy to warm a room, equally easy to ventilate it, but not easy to both warm and ventilate it at the same time. The problem was no other than that of applying a constant system to varying atmospheric conditions, and all that could be looked for was a reasonable compromise, which experiment alone would dictate. Mr. Bell stated that a site for an ordinary barrack must comprise ten acres, exclusive of a training-ground and an encamping-ground for the militia. Instances were given of departure from the typical plan caused by special conditions of site, &c., and the scope left for ingenuity of planning in individual cases, notwithstanding the necessity for conforming to settled rules and principles, details of cost per man, and per cubic foot divided for the separate classes of buildings were given. Each barrack-room was designed to hold one-eighth part of the rank and file composing a brigade depôt, viz., twenty-eight men. 720 ft. of cubical space were allotted to each man. The married men had each a living-room, a bedroom, and a kitchen. The non-commissioned officers' quarters constituted a little club, furnished with comforts, aids to study, and means of wholesome recreation, for the like of which the city clerk scarcely knew where to look. The officers' quarters called for no special remark. The average cost per head of a barrack, in the latter part of the last century, was 12*l.*; the cost of the new Chelsea Barracks* was about 225*l.* per head, and of the Brigade Depôts 200*l.* per head. The improvements effected by somewhat similar means in the arrangement of stable buildings, the system of ventilation, of drainage, and other matters relating thereto, were explained. Cavalry stables were now arranged in two rows of stalls, the heads of the horses in each case being against an outer side wall. Every horse was allowed 1,200 cubical feet of space. A window was placed over every stall, and 8 ft. above the floor, and all the stable windows were made to open. When rooms were built over stables, foul-air shafts were carried up to above the roofs. These shafts had a sectional area of 18 in. per horse. The stalls were drained by surface channels only; these were carried to a distance of 12 ft. outside the stable. The loose boxes were 17 ft. by 12 ft. and 12 ft. high, allowing 2,500 cubical feet per horse. The parallel movement towards ameliorating the barracks of France, in which the English lead has been followed, and with due acknowledgments, was then described,—elucidated by the reports of M. Emile Trélat, and some useful and interesting extracts from the report were given in substance. The "Système Tollet," tried experimentally at Bonrges, Macon, Autun, and elsewhere,—based mainly upon English experience, and found to be quite successful,—was referred to, and its main features were elucidated. In conclusion, an appeal as to the improved character of the exterior appearance of the modern barrack was made to new buildings at Inverness, Reading, and elsewhere. Some deductions from Government experience and investigation bearing upon the larger civil buildings, such as workhouses, model buildings, &c., were submitted to the members. The whole subject was fully illustrated by drawings of old barracks, and of barracks built, or building by the War Department,—drawings which were placed at the service of the author, together with other facilities, by the courtesy of the Secretary of State for War.

The following is a list of the various illustrations to which Mr. Bell referred, and which were exhibited during the evening:—Downpatrick New Brigade Depôt: hospital annexe; Inverness New Brigade Depôt: plans, &c.; Oxford New Brigade Depôt: officers' stables, perspective sketch of keep, &c.; Worcester New Brigade Depôt: block plan; Type for Keep of Brigade Depôts; detailed plan of a modern barrack-room; Knightsbridge New Barracks: plans and view;† The Horse Guards, Whitehall: historical chart;‡ Project for Barracks in Hyde Park (A.D. 1716): plans, &c.;§ The Old Palace in the Savoy as converted into Barracks (A.D. 1736): plans, &c.; Vienna New Barracks for

* More than twenty years ago we called attention to the manner in which our soldiers were being murdered by being "stowed away" without the slightest regard to sanitary considerations. In our volume for 1858, pp. 150, 170, we gave some illustrations of "interiors" in the Portman-street Barracks (now removed) and in the old cavalry barracks at Knightsbridge.—Ed.

* A plan of the quarters for one company of Infantry in these barracks (Mr. George Morgan, architect), was published in vol. xiv. (1856) of the *Builder*, p. 160.

† Views and block plan of the new Knightsbridge Barracks were published in the *Builder* for 1878 (vol. xxxvi.), pp. 112, 113.

‡ This chart was, through Mr. Ingress Bell, presented to the Institute by Mr. Tregellas, of the War Office.

§ This project consisted of a design for a very extensive range of buildings, intended to accommodate no fewer than 7,000 men. It was prepared by one Du Bois, described on the plan as "one of his Majesty's engineers."

the Imperial Guard; The Système Tollet: plans, &c.*

In the discussion which followed,

Mr. Charles Barry, in moving a vote of thanks to Mr. Ingress Bell, said the paper in its earlier portion had given some interesting historical and other information as to early barrack construction, and in its latter part had given a great deal of what might fairly be styled authoritative information deduced under the best possible circumstances from expensively conducted experiments made by the War Office,—information which architects, who were not permitted to enter the arcana of military architecture, might yet turn to good account in the humbler sphere of civil architecture. The action of the War Office in regard to barrack construction seemed to have been tolerably consistent from the first, and except in one single instance, it did not seem to have sought outside aid. The result, as Mr. Bell had shown, was that the earlier barracks were very unsatisfactory. Mr. Bell had recounted how, in the case of the cavalry barracks at Knightsbridge, the plans submitted by Mr. Wyatt were set aside in favour of those furnished by the War-office officials, Mr. Wyatt's elevations alone being used. That was a very unsatisfactory method of working, because all architects recognised it as an essential condition that the outside and inside of a building should be interdependent. The result of the various sanitary inquiries made by the War-office authorities could not fail to be of much use to architects, and might be studied with profit. He ventured to suggest that similar *data* to that which had been collected by the Government with regard to the health of troops in barracks was very much wanted with regard to the health of occupants of other buildings, and particularly with regard to the health of people of the working-class housed during recent years in the large blocks of buildings which had been erected for them in London and elsewhere. One piece of information in Mr. Bell's paper which must have surprised many who heard it read was as to the cost of carrying out these barrack buildings. Mr. Bell spoke of their cubing out, on an average, at 5½d. per foot, in these present days of expensive labour, while 6¾d. per foot cube was mentioned as that of the cost of what were practically dwelling-houses, viz., the married quarters; and 8d. was given as the price for the gentlemen's residences known as officers' quarters. These prices struck him as being very low. He supposed the works were carried out by competition amongst builders in the usual way? Mr. Bell had spoken of the new barracks at Inverness in such terms that ought to induce every architect to see them, for he had said that every part of the buildings was consistent in character, satisfactory in aspect, and bespeaking its object. If those buildings really did conform to that very high standard of excellence, they constituted one of the most remarkable successes that could possibly be achieved in building. As to the cost per head given by Mr. Bell (225*l.* in one instance cited), it seemed to him (Mr. Barry) to be very high [A voice: "Enormous"] as compared with the cost of other public buildings, such as large schools in which the scholars were resident.

Dr. Balfour (who was introduced to the meeting as having been secretary of the commission instituted by Lord Panmure and Mr. Sidney Herbert to inquire into the sanitary condition of the soldier) observed that Mr. Bell might have brought the period in which barracks were generally unhealthy down to a much later date than the end of the last century; indeed, very nearly to the middle of this century. In 1836 he was appointed, with two military officers, to make a report on the health of the troops, and they found that in the barracks at Tobago the space allotted to each man was only 220 cubic feet. It was, therefore, not surprising to find that the mortality amongst the troops stationed there was very great. He had had the honour to serve for eight years in the Guards, and in his time there was in Hyde Park a building which he could not call a barrack, and adjoining it, a storehouse. The lower part of the building made to serve as a barrack was occupied as a guard-house for the troops who had the watching of the powder-magazine, and the upper floor was occupied as a dormitory and day-room for the company of soldiers engaged on that duty. So small was it, however, that the paillasses had to be arranged in tiers, one above another, on each side of the room, and besides that, there was an additional line of beds made up on the floor in the gangway between the double tier of beds on each side. The place was crowded to four times its healthy capacity, and it was therefore not to be wondered at that phthisis had largely prevailed amongst the men. As showing the light appreciation in which the health of the soldier was held by even high officials in the army at one time, Dr. Balfour mentioned that when, after the fire at the Tower of London, new barracks had been built, the authorities ordered that the men were to occupy some old buildings, as they wanted the new buildings for a store-house for blankets, for the old buildings were much too damp for blankets! The Duke of Wellington, when the matter was brought to his notice, ordered the troops to occupy the new barracks, and directed the storekeeper to put his blankets,—where he liked. On the matter of ventilation, Dr. Balfour mentioned, as having been successful in the old barracks at Winchester, the use of false or hollow beams running across the ceiling from outer wall to outer wall, the bottoms of such beams being of perforated zinc. He agreed with all that had been said in favour of Captain Galton's stoves, but when used it should be seen that they were properly fitted, as he found, when he was in charge of Netley Hospital, that though the Galton stoves had been fitted in the corridors, they had been provided neither with air-chambers behind the grates nor with louvre openings into the rooms.

Mr. Thomas Porter agreed with Mr. Barry in thinking that 200*l.* and upwards per head for buildings of the class described in the paper was an excessive price to pay, unless it included the cost of the ground, which he understood was not the case; but he could not agree with Mr. Barry in thinking that 5½d. per foot cube was a low price for such buildings, which were mainly composed of large rooms. Nor did he understand how, in the buildings described, the cost per foot cube could be reconciled with the cost per head.

Mr. E. C. Robins, in the course of a few remarks, spoke of the value of the statistics and data furnished by Mr. Bell in the paper, and referred to the works of Parkes and De Chaumont as being especially worthy of study by architects.

Mr. William White and Mr. Henry Dawson both expressed their inability to understand the cost of the buildings treated of in Mr. Bell's paper, Mr. White pointing out the vast difference between their cost and that of the older barracks.

The Chairman, in summing up the discussion, spoke of the paper as a valuable contribution to the Transactions of the Institute. The only thing with which he could compare it at the moment was the able article "Barracks" in the new edition of the *Encyclopædia Britannica*, which bore the initials of a well-known officer of the Royal Engineers. With regard to the cost of some of the buildings mentioned in the paper, he was able to say of his own knowledge that in the case of the new Chelsea Barracks a very large sum had to be expended in foundations on a portion of the site which had formerly been a part of the bed of the river. In putting the vote of thanks to the meeting, the Chairman included the name of Mr. Tregellas, for his kindness in presenting to the Institute the very interesting historical chart showing the Horse Guards buildings in Whitehall.

Mr. Ingress Bell, in replying on the discussions, said that in all cases the erection of the buildings he had described had been submitted to competition in the building trade in the usual way. The apparent discrepancy of cost per foot cube of the different portions of a modern barrack, as compared with the cost per head, would be explained by the fact that besides the barrack buildings proper there were numerous accessory buildings, such as canteens, cook-houses, bath-rooms, &c. As to Mr. Barry's *badinage* about the Inverness barracks, he (Mr. Bell) had been somewhat misunderstood with respect to the character of their design. All he wished to bring out was that they would compare favourably with most other buildings of their class.

* Of other illustrations of buildings for soldiers which we have published in past volumes, we may name the following:—Victoria Military Hospital, Netley (Mr. Mennie, architect), vol. xiv. (1856), pp. 458, 469; the Officers' new Barracks, Dover Castle (elevation by Mr. Salvin), vol. xvi. (1858), p. 679; and Plan for a Regimental Hospital (by Dr. Combe, Royal Artillery), vol. xviii. (1860), p. 608.

HINTS ON HOUSE DECORATION.

This was the subject of a long address given by Mr. William Morris, under the auspices of "The Trades Guild of Learning," on Saturday evening last, in the Hall of the Society of Arts, which was crowded to its utmost limits. Professor Hales, of King's College, presided, in the unavoidable absence, through domestic affliction, of Mr. Arthur Cohen, Q.C., M.P., who had been announced to preside.

Mr. Morris said that perhaps it would detract from the value of the instruction that his audience might get from him when he told them that he had no claim to represent any one craft in particular. Division of labour, which had played so great a part in furthering competitive commerce, which few dared to resist, and of which none, as it seemed to him, could foresee the result, had dealt especially hard upon that field of human culture in which he was born to labour. Division of labour, which was once the servant, was now the master of competitive commerce, which latter itself was once the servant, though now the master, of civilisation. It had resulted in some men becoming acquainted with many crafts, though masters of none. He would hold his peace on these matters unless he hoped by speaking to stir up others than himself to discontent with and rebellion against things as they were,—rebellion not against the laws of Nature, but against the customs of folly. Let them, however, proceed to consider by what forethought they could make the actual dwellings which almost all of them were of necessity compelled to live in, brighter, better, and more wholesome. In dealing with the subject he should perforce be speaking of those middle-class dwellings of which he knew most. There was no dignity or unity of plan about an ordinary modern house, big or little, and it was devoid of a centre. In brief, it was a mere congeries of rooms, with no special relation to each other. A few lucky people had the good fortune to live in the grand old houses their forefathers built. To such persons all he could say would be to remind them not to forget their duty to those buildings, not to alter or torment them, but to treat them as if their builders could still be wounded by their griefs and rejoiced by their well-being. There were some others who lived in houses that could scarcely be called noble,—nay, they might be called ignoble, but they were yet built solidly and conscientiously; and though they had little beauty, or none at all, they were characterised by fitness and common sense. The earliest buildings of this class dated from the time of Queen Anne, but many of them were later, and of the Georgian period. But these classes of buildings were very difficult to decorate properly, especially by those who had any leaning towards romance, because they still had some traces of style left in them. It should not be forgotten that the rebellion which they had met that night to further had been begun, for of late years houses had risen which were neither the cut-and-dried stock designs of the builder, nor academical imitations of by-gone styles. Especially deserving of their thanks was the School Board for London, who had shown that they recognised that art might go for something in education by refusing to allow shabbiness and scamped work to be characteristic of their school buildings. It was most inspiriting to see their fine buildings rising over the sordid level of the surrounding streets, and to be reminded of the well-founded hope in which they were built. Holland House, Kensington, was almost the only building left in London of the first-class of dwellings which he had mentioned. There were, until within the last few years, one or two houses in Lime-street of about the same period, but unfortunately they belonged to a society too poor to keep them standing,—viz., the honourable Company of Fishmongers. Besides these two classes of old houses, there were a few modern ones inhabited by the ringleaders of the rebellion against sordid ugliness. But the houses of those three classes taken together were utterly insignificant in number compared with the great mass of the houses of the people, —houses which he hoped it would one day be difficult to believe could ever have been built for a people not lacking in honesty and independence. The truth was that the people who lived in them had long since ceased to think about them, being content to live in them so long as they were warm and dry. He and those who thought with him wanted to make

the dwellings of the people fit for their occupants in appearance as well as in comfort. The first step towards the attainment of that end was to get people to interest themselves in the question as to what was best to be done with the makeshift houses which (however desirous of obtaining dwellings more satisfactory in an art point of view) the great majority of people would have to continue to live in for some years to come. Such makeshift buildings could not be got rid of all at once. For his own part, however had the house he lived in might be, he would not despair of improving it, in some degree, at any rate. He felt that he should have little claim upon the attention of his audience if the question involved nothing more than gaining a little more content and pleasure for those who already did not lack their fair share of them. The question included much more than that. His hope was that those who began to consider how to make the best of the chambers in which they ate, slept, and sat, would soon begin to feel an earnest discontent with the sordidness by which they were surrounded. His extravagant hope was that people might some day learn something of art, and form a longing for more, and that they would realise that there was no way of getting it except that of giving a man work to do congenial to him, without fear of intimidation by fellow-workmen and without anxiety as to the means of livelihood for himself and family. Before proceeding to speak of the interior of the house, the lecturer referred to the garden, which, he said, suburban gardeners generally made the worst of, aping, in the little patches of ground which the elastic conscience of the speculating builder left for them, all the windings and other features appropriate only to landscape gardening on a large scale. The abomination called "carpet-gardening" carried in its name the best proof of its own absurdity. As to the outside of the house itself, it was generally too ugly to render it possible to do much with it. In ordinary houses the paint used externally should be chiefly white or whitish, for when a building was ugly in form it would bear no ornamentation in the way of colour. The sash-bars of the windows should always be painted white, so as to break up the dreariness of the outside of the house. The lecturer cautioned people against using the dull brownish reds now apparently becoming fashionable for external painted work. This colour was sometimes called "chocolate," but a better name for it would be "cockroach" colour. He then proceeded to dwell on the details of interior house-decoration, referring, among other matters, to ceiling decoration, and urging the avoidance (where it was not possible to expose the timbers of the roof or floor above an apartment) of what he called those ghastly caricatures of art which made up the sum of modern cast plaster-work. Perhaps, he said, there were few of the crafts accessory to building which had fallen so low as that of the plasterer. He deprecated the filling to repletion with furniture of some rooms, and recommended people to let their furniture be simple though artistic, but only what was necessary for use,—none to satisfy the claims of fashion. All rooms should look as though intended to live in. Why should a dining-room generally look like nothing so much as a dentist's parlour, only to be occupied during an operation, and to be left when the operation was over,—the tooth out or the dinner in? While all rooms of well-to-do people should be artistic and comfortable in their decoration and furniture, their *ensemble* should not be such as to make a poor man ill at ease in them, nor should their luxuriousness be such as to make a thoughtful man ashamed. As things were at present, rich people would not have art, and poor people could not. A great deal had been heard of late about "cheap art." What was meant by it? Was there to be one art for the rich and another for the poor? Art was art, and people who talked about cheapening it forgot that it was not so accommodating as Law and Religion. And how was this cheap art proposed to be got? A great deal of it by that universal panacea, division of labour. A Pecksniff was to squint and scrawl for a time on a sheet of paper, and that sheet of paper was afterwards to set a lot of men to turn cranks all day for hire. From this were to accrue three-fold blessings,—food and clothing and very little leisure to the operatives, enormous riches to the capitalist, and moderate riches to the squinter on the paper. The result was to be an abundance of cheap art for the operatives or crank-turners. There had been many schemes suggested for such operations as skinning a flint or boiling down a flea for the sake of its tallow, and this scheme for the production of cheap art was on a par with them. The only way in which it was possible for art to live in the industrial crafts was to make each workman a master of his trade from beginning to end, and to abolish the pernicious system of keeping a man perpetually doing only one thing,—working at only one "branch" of his trade. Only the workman who was master of his craft from beginning to end could produce works of artistic merit, but under the present system of division of labour such a man was likely to be regarded as a very troublesome fellow, and as mere grit and friction in the gold-grinding machine.

A SUBSIDING TOWN.

We were recently at Northwich, where the chief trade is pumping brine out of the ground in order to produce common salt, and were much astonished by the appearance presented by part of it. The effect of continued pumping causes the surface of the ground to sink, and this subsidence results in serious damage to building property. A project is on foot, we believe, to obtain, by legislation, means of compensating owners of property injured by the subsidence, and not before it was needed. It would be difficult by words to convey an idea of the sad condition of many parts of the town. All new buildings are now constructed of timber framing, the lower part of which is formed of massive pieces of timber or oills, and as the ground subsides, and the house becomes 2 ft. or 3 ft. lower than the street, instead of perhaps 6 in. or 1 ft. above it, as originally constructed, screw-jacks are introduced under the timber oills or plates, and the whole is raised up to its original position. We saw one house and shop that had been twice raised, though it has been built only a very few years. The old County Court-room has come forward lately, as if to enlist legal assistance. We were at Northwich during the recent floods, and the lower streets with the basements of the houses, and the ground-floor too, were entirely under water. Northwich evidently needs looking after.

INDUSTRIAL ART-TRAINING AT GENEVA.

A favourable report reaches us concerning the Geneva special school founded two years ago by the State for the study of decorative arts. This establishment is situated in the capital itself, and the building cost the canton of Geneva no less than 40,000*l*. It suffices, however, to visit one of the apartments of the ground-floor to meet at once a clear proof of the success of the enterprise. This portion of the building is set aside for the exposition of the works of art achieved by the pupils; but the show-cases which were to hold these objects will be found nearly empty. The fact is, that nearly every article exhibited has at once found a purchaser, and thus this room remains in a denuded condition. Close at hand there are the offices for the administration of the school, and the workshop for the ceramic arts. The ovens and the foundry are, however, in an outer building. On the first and second floor of the school will be found the workshops for the moulding, chasing, and sculpture on wood and stone.

The school of 250 pupils and its annual budget amounts to 3,200*l*. There are two categories of pupils,—the first, known as the regular pupils, must, to be admitted, possess a diploma from the Municipal School of Arts applied to Industry, or else pass an examination. When they have thus established their competency and natural aptitude, they are admitted as regular pupils, and follow either a complete course of artistic training, or devote themselves to one special branch. These pupils alone are allowed to participate in the competitions and prizes offered by the State. The second class of pupils are the outdoor pupils, for the most part artisans, apprentices, and tradesmen; they are allowed to follow the course of training gratuitously when they can prove that they possess sufficient natural aptitude to benefit from this opportunity. There are three classes: the first for modelling and sculpture of ornament and the figure; the second, small and large *repoussé* work; the third, the ceramic arts.

The teaching is of an essentially practical description, and the professors keep a keen watch to prevent the pupils losing any time. In fact, all students who are not earnest in their work, or who are not sufficiently gifted to work with success, are carefully eliminated. Any absence during class hours is reported, and repeated offence in this respect may entail expulsion from the school. Altogether the work is carried forward in real earnest, and does credit to the small but well-administered canton of Geneva. The Swiss have so often distinguished themselves in schools of art in France and elsewhere that we are pleased to note the increased facilities now afforded by which they will be able to work in their own country, surrounded by the noble scenery that cannot fail to inspire all true artists.

COLOGNE CATHEDRAL.

A PORTION OF THE WEST FRONT.

As most of our readers are aware, the west front of Cologne Cathedral was one of the portions of that great church left in a very incomplete state by its Mediæval builders. In fact, what had been executed amounted to little more than a third of the southern tower and the basement of the northern one. Attached to the southern tower was a part of the jamb of the great west window. Nearly the whole of this was fourteenth-century work, though there were indications that a small portion of the north tower was of an earlier date. Our illustration represents the lower part of the southern tower, and shows one of the windows and the remarkably elegant doorway. This doorway, for more than four centuries, formed the principal entrance to the cathedral, and its tympanum is decorated with sculptures representing scenes from the lives of St. Peter and St. Paul. The canopy above it was a very beautiful example of German Geometrical tracery, but was in such a decayed state as to render its removal, some months back, absolutely necessary. The whole of this tower is covered with scaffolding, and is now in course of restoration. Our drawing represents it as it appeared before this operation was commenced, and before the canopy over the doorway was removed. We trust that the restoration in progress will not obliterate the appearance of antiquity of this part of the building, because it is very interesting to those who are now living, and will be still more to those who come after us, to be able to trace exactly where the Mediæval work ended and the modern work began. We hope, also, that even if the present pump is destroyed, it will be replaced by some kind of fountain or ornamental well, as these wells attached to German churches date from very early times, and are interesting features. The examples of them are very numerous; the best known, and those which recur most readily to our memory, are in Ratisbon cathedral, the Minster at Freiburg, and the cathedrals of Paderborn, Augsburg, and Prague. We have no doubt that the present not very ornamental pump at Cologne occupies the position of an ancient structure similar to those to which we have alluded.

While speaking about Cologne Cathedral, we should like to know whether any of our readers can explain the very singular view of Cologne Cathedral represented in p. xoi. of the "Nuremberg Chronicle"? Here a very lofty tower, of more than four stories in height, is shown to the north-east, and the apse, in a very unfinished condition, with a great crane on the top of it, is shown to the west. What makes the matter somewhat singular is that in this view the other churches of the town, especially St. Cunibert's and St. Martin's, are tolerably correctly drawn. We confess that we are quite at a loss to account for this very peculiar representation,—or shall we say misrepresentation?—of the cathedral. It is quite impossible that it could have looked at all like this in the year 1493, which is the date of the publishing of the "Nuremberg Chronicle." Is it possible that the engraving can be taken from a drawing made some centuries earlier, and that the tower shown belonged to the former cathedral? If what we surmise is the case, the drawing must have been made some time previously to the year 1322, as it shows the apse in a very unfinished state, and without a roof; whereas we know that the choir was completed and consecrated in that year.

It has been asserted that Conrad von Höchsteten did not really begin the present cathedral in 1248, but that he only patched up the older church, and that the present cathedral was not commenced until 1270 or 1275. This statement we find repeated in Murray's Handbook for Northern Germany. We cannot find what authority there

ie for thi« statement, ae it is quite at variance with that of Kugler; hat, judging from the style of the building, we should not he at all enrprised to find that it wae true. We have come acrose another statement, that Cologne Cathedral wae designed by Archbishop Englebert, whose shrine ie now to be seen in the cathedral. There appear, however, to have been two archbishope of the name of Englebert, Archbiehop Englebert II., whose name was von Rile, erected the beautiful "Bergen Tower" in 1261. The name von Rile is singular, as being that of the man to whom the design for the choir of the cathedral ie attributed, "Gerhard von Rile."

Now, if Archbishop Englebert von Rile designed the cathedral, it could not possibly have been commenced in 1248. Victor Hugo eays, in his charming work upon the Rhine, that the architect of Cologne Cathedral was named "Englebert de Berg." This is, however, probably the eame person as Englebert von Rile, and hie bearing the name *de* (or rather *von*) Berg may account for the tower which he erected at the eouth end of the town being called the "Bergen Thurm."

A letter in the *Athenæum*, by Mr. Edward Scott, gives a copy of a deed of contract entered into between a certain Rudenger, director of the works at Cologne Cathedral, and the Burgrave of Drachenfels, to the effect that the latter shall eupply stone from his quarry, "*ad opus structure Coloniensis*," and the date 1280 is attached to the contract. Now there is a eingular thing about this document, and that ie the fact that it nowhere mentions the cathedral aehaving heen then commenced! On the contrary, any person reading it would naturally suppose that it wae a contract to supply stone for a church about to he hnilt. Of this man called Rudenger we know as little as we do of Gerhard von Rile [why does Mr. Scott spell the name "*Riehl*"?] All the German anthorities we have seen spell it in the way we have adopted]. Whether they were master-maeons or contractors; whether they were eimply men employed by the chapter to arrange for the purchase of materials, or whether they were the absolute architects of the building, there is nothing to show. We have, however, the following namee associated with the building of Cologne Cathedral:—

Gerhard von Rile	c. 1248
Archbishop Englebert von Rile	c. 1261
Rndenger	1280
Meieter Johan von Köln	1322

The tradition that Albertus Magnus designed Cologne Cathedral seems to be devoid of foundation, and if, ae is also stated, that prelate designed his own cathedral church at Ratisbon, he is not likely to have designed the cathedral at Cologne, as the buildings show the influence of two different schools of architecture. Perhaps the fact that Albertus Magnus died at Cologne about the year 1300, and was, as the "Nuremberg Chronicle" relates, buried in the Church of the Holy Croee in that city,* may have given rise to a supposition that he had eomething to do with the erection of the cathedral.

Whether we have yet found the name of the architect of the magnificent Cathedral of Cologne is a matter of donht; and until eome more positive evidence is forthcoming, we must follow the example of the buildere of the Walhalla at Ratisbon, who have erected a tablet to his memory, without venturing to suggest his name.

NEW PREMISES FOR THE MANCHESTER AND COUNTY BANK, KING-STREET, MANCHESTER.

These premiece have been erected on the site of one of the oldeet houses in Manchester, Dr. White'e house, afterwarde converted into the York Hotel, and then used for a long period as offices until its purchase by the hank.

The building has a frontage to King-street of 53 ft., and to Chapel-walke at the eide, of 127 ft.; ahout half-way back from the front the site widene out to 64 ft. 6 in.

The whole block ie appropriated to the use of the hank; the towor on the left of the principal front containe an entrance porch, 19 ft. by 13 ft., with stone groined roof; above thie are waiting-room and directors' lavatory, the whole crowned by a slated spire rieing to a height of about 120 ft. Immediately to the right of the tower are windows lighting the staircase leading to the board-room, which ie on the first floor, and occupies the remainder of the frontage on this story; below it is the general committee-room, and above eome spare rooms. The upper windows to the eide street are those of the directors' dining-room, kitchen porter's residence, &c.

As the rooms to the front and side occupy only some 25 ft. in depth, there ie a large internal epace forming the hanking-room proper, lighted from ahove, which, however, extends to the side street and ie lighted on that eide by the lower range of windows. The banking-room thus formed ie ahont 100 ft. by 60 ft., and consiste of a central nave, 26 ft. wide, divided by granite columne from two eide aisles, 10 ft. 6 in. and 20 ft. 6 in. wide respectively.

Parallel to the side street, and leaving a space for the customers of 11 ft. in width hetween it and the wall, is the counter, 61 ft. long; hehind the counter and the epace for the cashiers is a dwarf ecreen, 5 ft. 3 in. high, heyond which all the clerke are accommodated; the managers' desks are at one end of the nave, on a raised daie surrounded hy a dwarf ecreen, and giving them complete supervision of the room. In the hasement are clerks' lavatoriee and cloak-rooms, book and etationery etores, and three strong-rooms situated in the centre of the cellars. Theso etrong-rooms, measuring ahout 19 ft. by 12 ft. each, are hnilt of iron plates enclosed on all sidee and above and helow hy hrickwork of great strength, hnilt of blue Staffordshire hricks in cement, and entered by magnificent fire-and-fraud-proof doors made hy Chatwood, of Bolton. The rest of the cellars are all lined with glazed white and grey hricks, arranged in eimple patterne, and the ceilinge are of etrong hrick arching.

The banking-room itself has oak panelled ceilings, that of the nave being arched, and the panels glazed; above this, again, ie the outer roof, glazed on Rendle's system. The walls are lined with panelled oak dados, 6 ft. high, above which they are covered with creamy coloured Belgian marble, the object being to have this part of the establishment finished in each a manner that painting and whitewashing might never be required. The floors of all passagee, &c., traversed by the customers, are laid in vitrified mosaic by Oppenheimer, and have a very artistic and business-like appearance. The strong-rooms are approached by hydranlic lifte, by meane of which the books, cash, &c., can he lowered and raiced. The board, committee, &c., roome, are all finished in pitch-pine, with high dadoee and panelled ceilings of that material.

The exterior of the building is faced with Spinkwell etone, the plinth, however, heing in polished red granite. The general contractors were Messrs. R. Neill & Sons, of Manchester, with whom worked Hamilton, bricksetter; Graham, maeon; Woolstenhulmee, ironfoundere; Jaffrey, plumher; Messrs. Pattison provided the marhle wall lining; Mr. Wilson, gratee and gas standards; Messrs. Lavers & Barrand, and Messrs. Edmundson & Son, the stained glass; Messre. Wren & Hopkinson, the hydraulic lifte; Messre. Milner & Co., the locks. Meesre. Mills & Murgatroyd were the architecte.

* See p. cclxiii.

THE SUBMARINE TELEGRAPH COMPANY'S NEW OFFICES.

The Submarine Telegraph Company was established in the year 1850, to work submarine telegraph cables, under concessions granted by the French and Belgian Governments, and was the pioneer of submarine telegraphy. The company hegan operations hy laying down a cable, containing four conductors, hetween Dover and Calais, and another cable, containing six conductors, hetween Dover and Ostend. There are at the present time twenty-four conductors laid down hetwoen England and France, contained in six cables; ten conductore between England and Belgium, contained in two cables; and one conductor hetween Jereey and France. By the Telegraph Act of 1868 the Government acquired, hy purchase from the Electric Telegraph Company and Reuter's Telegram Company respectively, two cables to Holland, containing eight conductors, and one cable to Cermany, containing four conductors. These three cables to Holland and Cermany are worked by the Submarine Telegraph Company, in addition to the before-mentioned cablee to France and Belgium. Beeidee the cable to Germany, purchaeed of Reuter'e Telegram Company, there ie another cable laid down between England and Borkum, helonging to the Cerman Union Telegraph Company, worked by the Submarine Company, affording three more conductors for the general European correepondence, *viâ* Germany, and one conductor, worked by the Anglo-American Company, for American telegrame. The cost of a telegram between England and the coaet of France in the year 1850, when the first cahle was laid, wae 6d. a word. Thie rate has heen gradnally reduced, until, in the year 1867, the price of a twenty-word meesage from London to any part of France wae 4 france, or 3s. 4d.

At the Telegraph Conference held in London laet year the rate for messages to and from any part of the United Kingdom, and any part of France, was fixed at 2½d. per word, and for Belgium, 2d. per word. If this were widely known the submarine wiree would be even more used than they now are.

Two pneumatic tuhes are laid down between the Post-office in St. Martin's-le-Grand and the Company's new building for the conveyance and distribution of telegrame tranemitted to and from the Continent and provincial statione in the United Kingdom; and a third pneumatic tube is connected with the original office of the company in Threadneedle-street, which will for the future be occupied exclusively hy the Post-office as a Postal Telegraph Station. There will aleo he placed two pneumatic tuhee in connexion with the Stock Exchange, to he used exclusively for the membere of that institution. All these tuhes are made of lead, and are about 2½ in. in diameter. They are enclosed in cast-iron pipes for protection, and are laid nnderground. At present there are transmitted by the Submarine Telegraph Company about 8,500 messagee a day on an average. The office is open day and night, and on every day, without exception, throughout the year.

The new officee are eituate at the angle of Throgmorton-avenne and London-wall, upon ground leased from the Carpenters' Company for a period of eighty yeare, at an annual rental of 1,200*l.*, being at the rate of 6s. per foot super. The eite occupiee a enperficial area of 4,000 ft., having a frontage of 50 ft. to London-wall, and 80 ft. to the Avenue. The total area of floor-space on the eight floore amounte to 21,000 square feet.

The mezzanine and lower baeement contain the rooms for the batteriee, Otto gae-engines, etoree, &c.

On the ground-floor are the public office, messengers' room, &c., towards the Avenue, and two spacious shops towarde London-wall.

On the firet floor are the board, retiring, secretary'e, and clerks' rooms; on the second floor the accountant'e rooms and Morse-hand storee; the third and fourth floors are appropriated entirely to working the instrnmente; and the fifth floor ie reserved for fnture extension.

The two elevations rise to a height of 62 ft. from the pavement to the parapet, and are faced with Portland etone.

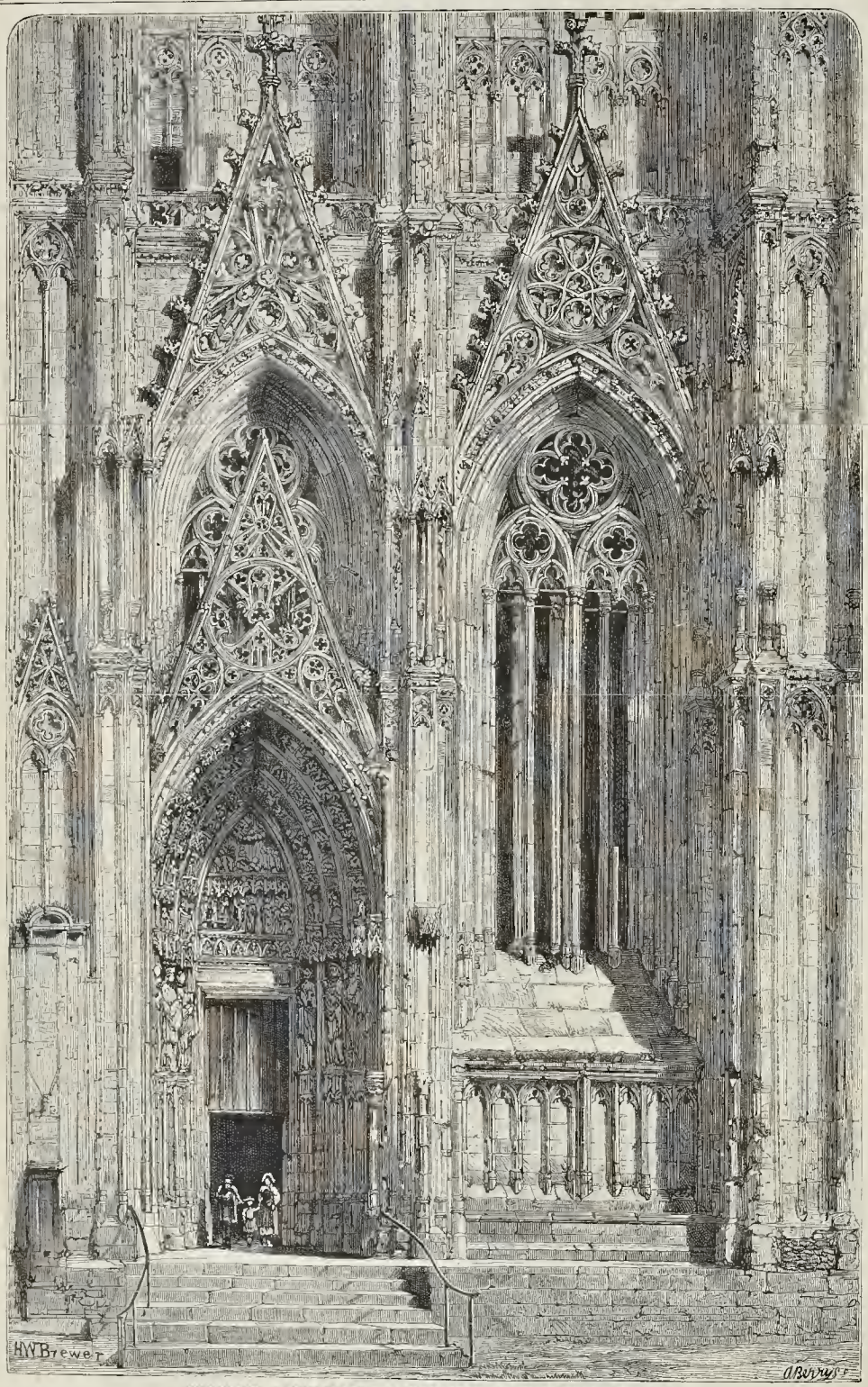
The carving is eomewhat elaborate, and eymbolises the four quarters of the globe, the monogram of the company, and other emblematic designs.

The works have been done at a cost of ahout 20,000*l.*, hy the following contractore:—Messrs. Peto Brothers, general contractors; Messrs. Edmundson & Co., gae engineere; Messrs. H. Greene & Son, gas-fittings; Mr. Banner, ventilation of drains, closets, &c., and M. Papier, of the instrument-rooms; Shand, Mason, & Co., for fire appliances; Pearson for trapless twin hasine; J. W. Falkner for fittings; R. Adams for casement fittings; and Daymond for carving.

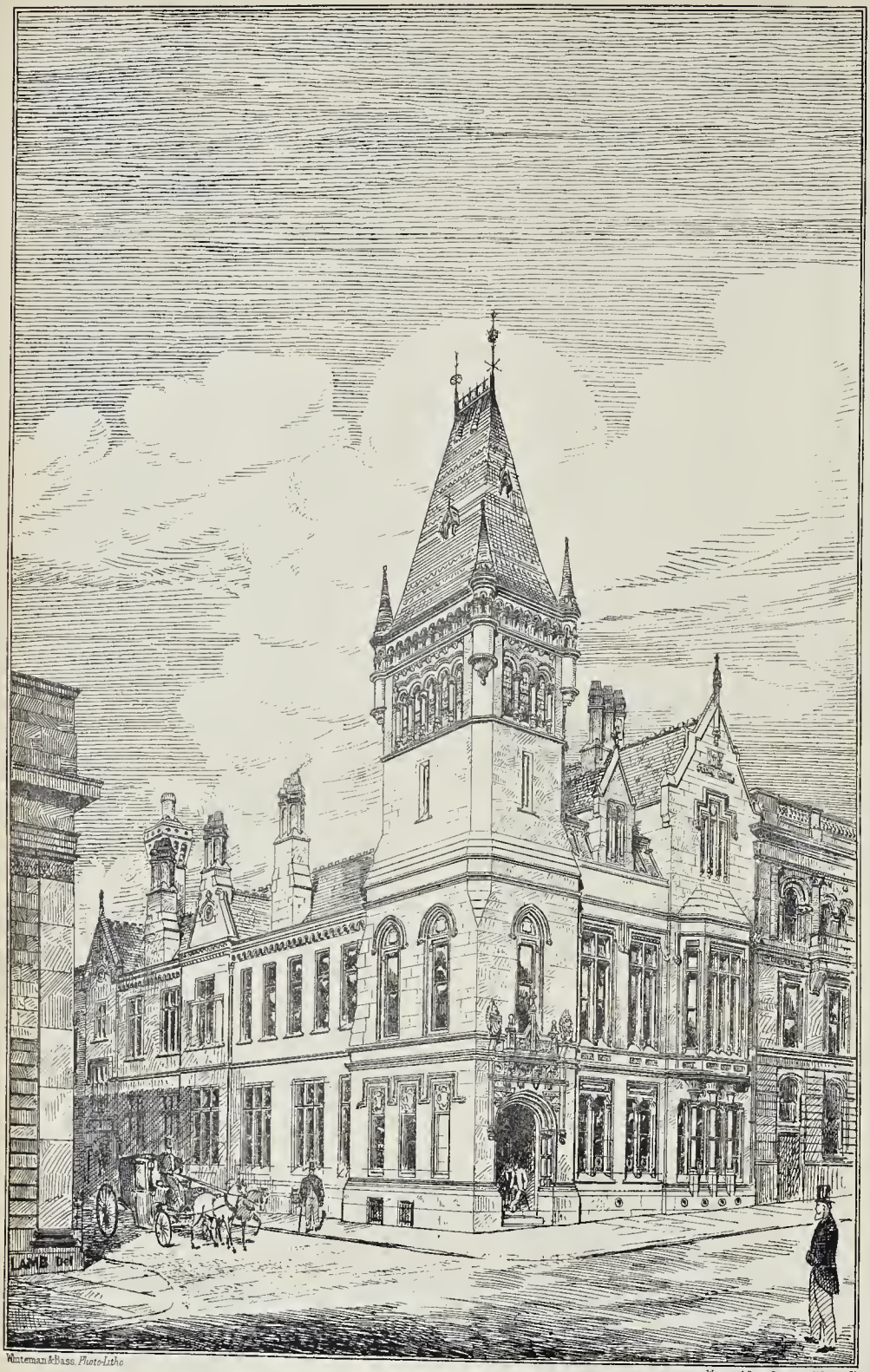
Mr. Grant was clerk of works; Mr. Caird, hnilder's foreman.

The architect to the company is Mr. Norton, of Old Bond-street, under whose superintendence the works have heen executed.

Stained Glass.—The large west window of St. Jude'e Church, Gray'e Inn-road, has just been filled with etained-glass repreeentations of the Four Evangeliets. The centre-piece of tracery above these containe the figure of "Our Lord Bleesing the World." In the base of the window are the emblematical hearings of the figures. The window was designed and executed by Mr. Geo. Reee, of Lamb's Conduit-etreet.



COLOGNE CATHEDRAL. A PORTION OF THE WEST FRONT.

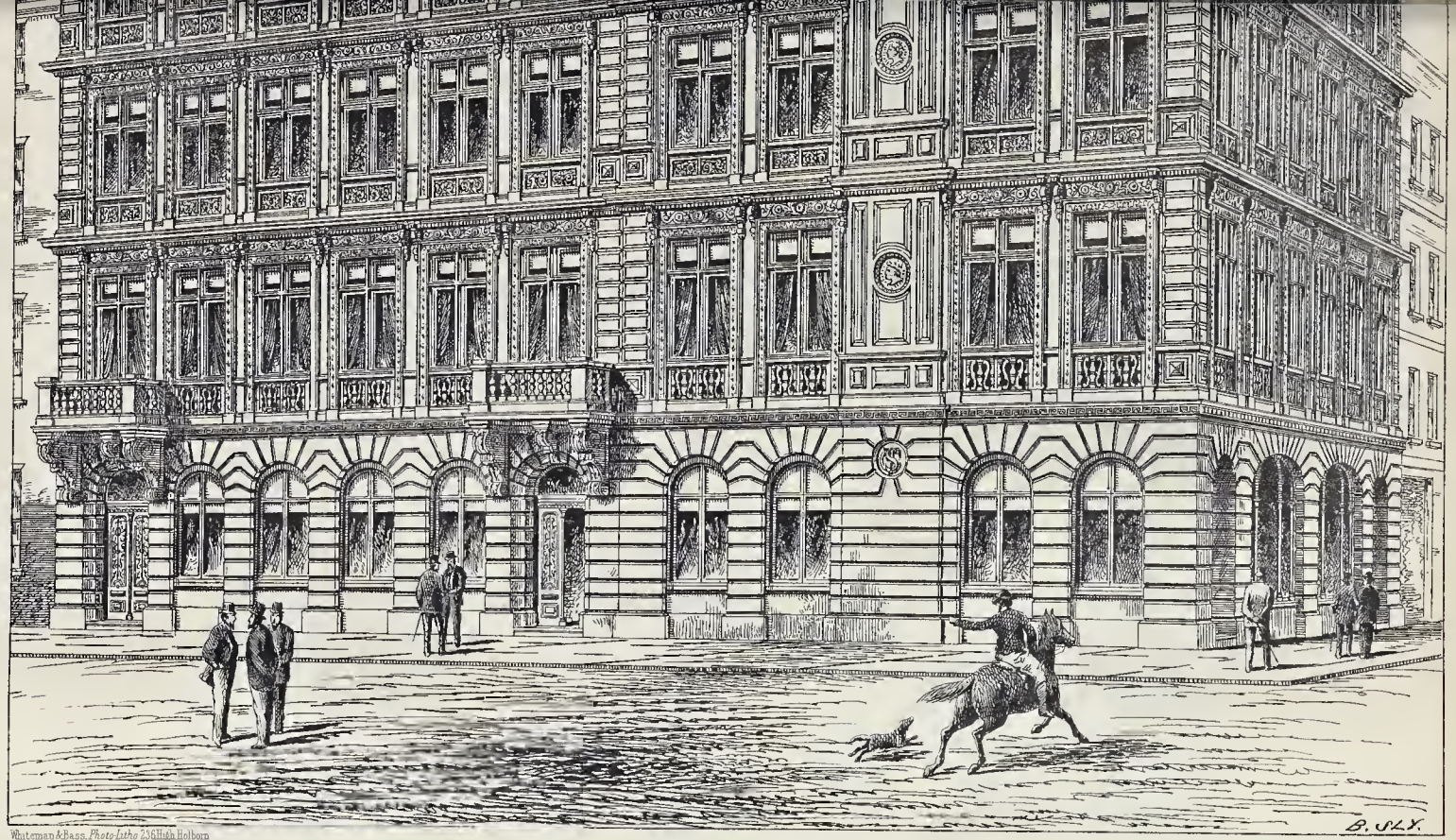


Whiteman & Bass, *Photo-Lithe*

Wyman & Sons, Printers, 74 Queen St.

THE MANCHESTER AND COUNTY BANK, KING-STREET, MANCHESTER.

MESSRS. MILLS & MURGATROYD, ARCHITECTS.



Whiteman & Bass. *Photo-Litho* 236 High Holborn

Wyman & Sons, Printers 74 Queen St.

THE SUB-MARINE TELEGRAPH COMPANY'S NEW OFFICES, LONDON WALL.——Mr. John Norton, Architect.

SNEINTON CHURCH INSTITUTE

NOTINTONE S.t ELEVATION

T.UMAN & PRATT, ARCHITECTS,
LONG ROW, NOTT.M

Whiteman & Bass. *Photo-Litho* 236 High Holborn

Wyman & Sons, Printers, 9 Queen St.

NEW SNEINTON CHURCH INSTITUTE.

This new building is situated at the corner of Beaumont-street and Notintone-street, opposite to St. Stephen's Church and adjacent to the Board Schools. The style of the architecture is Venetian Gothic, freely treated. The jambs and arches of the windows and doors, and the cornices, are of moulded brickwork supplied by the Hathern Brick Company from designs of the architects. The doorway to the large hall is constructed of Darley Dale stone with red Mansfield for the columns, the caps of which are carved in natural foliage, and upon the tympanum the name of the institution is cut in raised letters. The entrance to the coffee-tavern is built with moulded brickwork, and upon the tympanum of the door is placed a shield bearing the arms of the diocese. The caretaker's house is in Beaumont-street, from which side also the coffee-tavern is entered.

This part of the building consists of a well-proportioned room, 41 ft. in length, 20 ft. in width, and 22 ft. high. In the rear is the kitchen, conveniently situated, furnished with efficient appliances and hoist as a means of service to the hall above. Communicating with the coffee-tavern is the men's club-room, an apartment 20 ft. long and 16 ft. wide, and another room intended to be let for Oddfellows' lodges and other purposes on week-days, and used as a mission-room on Sundays. To render it available for this latter purpose there is an entrance from Notintone-street.

From this side of the building the Young Men's Institute rooms are approached, and these consist of a reading-room, 24 ft. in length by 16 ft. wide, and a room for games, &c., 41 ft. long by 17 ft. wide. Throughout the whole of the ground-floor there is a communication by means of which the caretaker can have access to all rooms without going out of the building. The approach to the large hall is by a stone staircase 6 ft. wide, entered from the northern end of the Notintone-street front. A small committee-room is here provided on the ground floor. From the corridor at the head of the staircase the doors of the large hall open to this room together with the platform. The retiring-rooms behind occupy the whole of the upper part of the building. The hall is 66 ft. in length, and 41 ft. in width, 30 ft. from floor to ceiling, and is capable of seating 500 people; a balcony runs round three sides. Underneath one side there is a passage by which the platform and retiring-rooms are reached, the latter being provided with lavatories. The roof of the hall is open timber, match boarded. The platform will accommodate a large number of persons, and is designed with especial regard to the requirements of concerted and chorus music. The hot-water apparatus by which the rooms are warmed has been supplied by Messrs. H. S. Cropper & Company, of Nottingham. The lighting is by sunlights, and the fresh air is admitted by casements in the windows, also by perforated boarding above the plate running round the room, communicating with the dormer ventilators in the roof. The exit of vitiated air is provided for by perforated zinc plates placed in the ceiling, and in direct connexion with the ventilating turret through which the sunlights discharge their heated vapours into the open air. The building has been erected in a satisfactory manner by Messrs. Wheatley & Maule. Messrs. Truman & Pratt, Long-row, Nottingham, are the architects.

THE BANK OF SCOTLAND, DUNDEE.

This building has recently undergone extensive alterations and additions. The floors and internal walls of the basement and ground stories were entirely removed, and the plan was rearranged on a more symmetrical basis. The original area was considerably extended by absorbing an open court, and the lighting much improved by glazing the roof of the extended portion. The building, which stands at the corner of two chief thoroughfares, has had the ground story rebuilt. Mr. G. S. Aitken, Dundee, was the architect.

Dusseldorf Exhibition.—The materials used in the construction of the Düsseldorf Exhibition are being in most part sent to Breslau, where an exhibition of Silesian industry is to take place next year. There is a surplus at Düsseldorf of 15,000*l.*, being nearly 15 per cent. of the gross receipts.

MR. EDMUND SHARPE'S WORKS.

For the List of Books, see page 595 of last week's *Builder*.

LIST OF PAPERS IN TRANSACTIONS OF DIFFERENT SOCIETIES, &c.

Transactions] of the Royal Institute of British Architects:—

I. On the Subordination and Distinctive Peculiarities of the Mouldings of the Seven Periods of English Architecture. Read at the Ordinary General Meeting, May 19th, 1851. Eight pages.

II. Letter to Professor Donaldson from Naples, dated Jan. 7th, 1865.

Two pages, printed with "Occasional Papers." In this paper Mr. Sharpe states that "the true history of Italian Mediæval Architecture has yet to be written." He was making preparations for writing and illustrating part of such a history when he died at Milan, in 1877.

III. The Architecture of the Cistercians. Read June 19th, 1871.

In Transactions 1870-71, pages 189 to 210. One plate (Cistercian Abbey, model plan).

Report of Proceedings,—General Conference of Architects, 1871:—

Perspective Views in Architectural Competitions. Opening of Discussion, May 24th, 1871. Pages 63 to 67.

The *Journal* of the British Archæological Association:—

On the Ruins of the Cistercian Monastery of St. Mary-in-Furness. Vol. VI. (1851), pages 309 to 317; 359 to 374. Ground-plan, and 24 woodcuts.

The *Archæological Journal*, published under the direction of the Council of the Royal Archæological Institute of Great Britain and Ireland:—

I. On the Geometrical Period of Gothic Architecture. Read at the Lincoln meeting, in June, 1848. Vol. IX. (1852). Pages 170 to 179.

"This formed the basis of a work, subsequently published, in which I proposed a new division and nomenclature of the styles of English Architecture." (Allusion to "Seven Periods,"—in Paper read at Lincoln in 1868. See below.)

II. Report as to Byland Abbey Exploration. Dated Nov. 14, 1875.

Vol. XXXIII. (1876), pages 2 to 5.

III. Description of Byland Abbey.

Vol. XXXIII. (1876), pages 5 to 8.

Separate card (8¾ in. by 5½ in.).

Guide to the description of Ely Cathedral delivered July 10th, 1854. (Cambridge printed).

Reports and Papers read at the Meetings of the Architectural Societies of the Diocese of Lincoln, county of York, &c., during the year 1868. Lincoln: Williamson. 8vo.:

On Lincoln Cathedral.—A paper read at the Lincoln meeting [of the Lincoln Diocesan Architectural Society], June 17th, 1868. Pages 179 to 190.

This paper was also published as a pamphlet. Pages 1 to 12.

Separate card (8¾ in. by 5¾ in.)

Guide to the Architectural History of Lincoln Cathedral, as described June 17th, 1868. (Lancaster printed).

PAMPHLETS.

I. A Letter on Branch Railways, addressed to the Right Honourable Lord Stanley of Alderley, President of the Board of Trade, &c., containing suggestions for the erection of a system of secondary railways for the agricultural districts. With an Appendix and Map. London: Simpkin, Marshall, & Co. (Lancaster printed), 1857.

8vo. Thirty-six pages. Map of Vale of Llanrwst. 1s. 6d.

II. A Letter to the Right Honourable the Chancellor of the Exchequer on the Disfranchisement of the Borough of Lancaster. Lancaster, 1867.

8vo. Objecting to the Disfranchisement by Mr. Disraeli's 1867 Bill.

III. Four Letters on Colour in Churches, on Walls, and in Windows. (Reprinted from the *Builder*).

a. First edition. London: Spon. (Lancaster printed), 1870. 8vo., Twenty-seven pages.

b. Second edition. London: Spon. 1871. 8vo., Twenty-four pages.

QUERIES.

1. It is intended to compile as an appendix to these lists references to the critical notices of Mr. Sharpe's works. A general reference to the publications in which such notices may be found will be valued by the compilers, if the exact reference cannot be furnished to them.

2. The compilers have also in hand a list of papers printed in the professional journals, and will be glad to receive notes as to them, or as to any of Mr. Sharpe's contributions or communications to journals, magazines, reviews, &c.

3. In September, 1845, a paper was read by Mr. Sharpe at the Winchester meeting of the Royal Archæological Institute, "On the Pointed Arch, illustrated by Drawings and by Models of Vaulting and Groining." The origin of the pointed arch was always a favourite subject with Mr. Sharpe, and was brought forward many times in his published works. Was this, apparently the earliest of his papers, published?

4. In July, 1853, it was stated at the Chichester meeting of the Royal Archæological Institute that "examination had been made of the great portion of the churches of Sussex [by Mr. Sharpe] for the express purpose of bringing the results of the careful survey before the Institute." This was alluded to by Mr. Sharpe at a meeting [when?] of the Royal Institute of British Architects in consequence of something said there by Professor Willis; but were the notes completed and printed after all?

5. At the Kingston-upon-Hull meeting of the Royal Archæological Institute in 1867, Mr. Sharpe gave a paper on Selby Abbey (where he acted as *cicerone*); notices of other churches in the East Riding; also, remarks on Thornton Abbey Chapter-house, and the offices of the Abbey. These were not published in the *Archæological Journal*; are they in print anywhere?

6. There are probably occasional papers in the publications of other societies, English and foreign, as yet unknown to the compilers, who therefore ask for information; as also with respect to plates, &c., contributed to works by other authors.

Communications to be addressed to Mr. J. S. Quilter, 10, Brunswick-square, W.C.

LANDSCAPE BUILDING.

A town ought not, even when stretched on the most level plain, to be laid out too stiffly. The plan of it ought not to be a simple device of streets lying along, with others lying across at right angles to these, like the checks of a tartan plaid. No doubt there should be order in the plan, but there should be variety also. In one quarter the streets might be arranged like the spokes in a cart-wheel, which all diverge from one particular notable central body. In another quarter they might be arranged like the principal streets of Carlsruhe, in the Duchy of Baden, are, which radiate from the grand ducal palace, like the rays of a fan. A town is not properly built, with respect to landscape, where the streets are so narrow, and the buildings so close together, that to apply a common expression you cannot see the town for the houses. The passengers along the street should not be enclosed by monotonous ranges of houses, as by prison walls; but through gaps and openings frequently occurring he should be afforded glimpses of the composition of the town, and down avenues and vistas get occasional views of ornate and remarkable buildings—of monuments and statues, and even of parks and trees, as he moves along. In the spacious parts of the town the blocks of buildings might be set down in open order, like battalions of soldiers ranged in preparation for the combat on the battle-field.

In old times, after town walls of stone had given place to flat earthen fortifications, ramparts gave breadth and definition to town landscape—now we have to look to terracing and esplanades to fulfil this purpose. There is great scope for a discriminating imagination to work in laying out these properly. Large solitary buildings, superb crescents and circuses, have little effect, and lose much of their grandeur when they are not surrounded by a border of ground marked out as their own policy by a parapet, retaining wall, or green slope, and to make this border of sufficient size, and yet not too large, to make it appear wide and not waste, requires a just and discriminating eye.

It contributes to the variety and elegance of a street to have ins and outs. It adds to its amenity, more especially if it be long, when some of the buildings are withdrawn behind the line of the others, and placed in recess. In one division of a chief street the blocks of houses on each side might be placed at one end at a considerable distance apart, and the open space between them kept wide, and the other blocks might be made gradually to converge, to draw closer to the centre of the street and to each other,—step by step,—thus making the plan of the open street similar to the sections of a telescope, till they approached at the other end within easy hail of each other.

A very long street should not be laid out in a perfectly straight line, if it is possible to avoid it, but should either be laid out on a very flat curve, or should bend gracefully away from the straight at either end If a street sweeps towards the sun at the extremities of its curve, the effect of the line is bold; if, on the contrary, the extremities sweep from the sun, the effect is fine. Where the line takes the form of the letter S, there is always indication of caprice. In landscape building, as in landscape gardening, the device of making smaller objects cluster round a larger one, and that other device of leading up from a number of insignificant figures, past guarded and chequered intermediate objects to one grand culminating figure, should not be neglected.

There are always a sufficient number of large buildings in every town to form culminating figures. Cathedrals, halls of justice, town-halls, exchanges, hospitals, barracks, theatres, and, for it is principally great size that is wanted, even prisons are all appropriate for this purpose; they all form heads and peaks rising out of the broken sea of buildings of which the town is composed, and they are all sufficiently large and important to concentrate lines and avenues of approach upon to a greater or lesser extent.

I would even advocate the keeping down the size and restraining the ornamentation, in the houses forming the sides of the streets leading up to the most magnificent fanes, making their architecture tidy and clean, and neat to be sure, but comparatively plain and homely, making them to a certain regulated size and measure of ornament, although still handsome and well-appointed, but of that simple elegance which, like the modest flower, is passed by with little notice in order that the full efflorescence of sculpture might burst forth more luxuriously and voluptuously and conspicuously in the shafts, and mullions, and arches, and cornices, in the flutings and scrolls, in the supports and buttresses, in the domes and minarets and turrets, in the gilded balls and rosy trellises and flaming pinnacles,—cutting against the blue and white sky,—of the mighty fane itself.

There is a large space opened up in the side of a principal street or chief thoroughfare; through this opening, the angles and corners of other buildings are seen to stand projected, like the wings of the scenery of the stage; there are angles and corners of other buildings beyond these again, so that the eye dodges from projection to recess, from recess to projection one after another in unequal steps successively, and as the opening grows narrower and narrower, as it cuts deeper and further back, the sight is at last either lost in a pillar of darkness or rests on the clear, perceived through an upright slashing between the walls. These large openings in the side of streets, which afford such town vistas, are generally temporary, and are soon built up, we would propose making them (or something of the same kind, but perhaps more ornamental) permanent.

We build too much on the simple system of adding house to house and street to street, and designing single buildings alone. Our architects are too moderate in their ambition; they are content with getting a church, a hall, or a hospital to design, when they should aspire to the whole quarter of a city. One mind is confined to the planning of a block of houses which should have scope given it in plotting for the erection of a suburb. Genius is cramped and shut in; there is no outlet for a happy thought,—no room for a long shot ahead,—no chance of bringing out a harmonious symphony of buildings in a cordon.

The architect should work out his finest effects of chiaroscuro, not on a solitary building, but on a whole street or square of houses. It is the privilege of ruins to present large sheets of light amidst the black recesses of the angles of their walls. Should the architect attempt to produce a similar effect in his design, he would find it quite impossible to do so with a single house. In a slated and glazed building no large sheets of perfectly pure light and blue sky can be introduced; but if he has a square of houses or a street to work upon, he can introduce large sheets of light where he pleases, by leaving open spaces between the houses; and he can make these spaces wide or narrow, as may suit, or seem best. If he has a whole quarter of a town to design, he can work with light and shadow on a grand scale.

We should be glad to see an attempt made to work out some of the quarters of our cities as one design, and as one harmonious whole. There is rhythm in architecture as well as rhythm in poetry, and some attempt should be made to maintain it in the one as in the other. As it is to-day there is no absolute certainty even that a *single block* of building will be presented to view in a balanced form, even when it is designed by a single architect, and the whole of it erected at one time. When the one-half is built after the other, and the design of each half is by a separate architect, it is almost certain, such is the neglect of rhythm in architecture at the present day, that the one-half will not balance the other. A very common thing to see is one half of a block of buildings in the Gothic and the other half in the Italian style of ornamentation. When a professional architect is called upon to prepare a design for a building to be put down by the side of the design of another professional architect, instead of trying to make his design harmonise with that of his professional brother, and, exerting a legitimate rivalry, he frequently tries to prepare one which will drown his brother's design altogether. But by setting the elevation of the one house at variance with the other, the effect produced is generally like placing a blue and green light side by side,—the eye is set blinking, and can settle on neither. Thus the architect defeats his own object in such a case.

Where there is a city architect, he should be invested with a certain power of control over the styles of architecture to be introduced into particular localities. It would add to the character of a city if some of its quarters were carried out architectnrally, as harmonious wholes; and I could even name spots where the genius of one designer has dominated and produced a balanced and harmonious set of elevations. The effect is at once striking and satisfactory.

The view of the great street of a great city when it is empty of carts and carriages, and heavy traffic,—on a Sunday or holiday, or in the early morning,—the view of the great street of a great city is imposing, and gives expansion to the mind. It stretches away in a long vista, the sides of which are composed of countless buildings, with innumerable doors and windows, and posts and pilasters on either hand. In the principal part of the street there is a grand building, it may be the Town-hall or the Exchange, with a row of great steps stretched across its base, and above that a colonnade of tall, graceful, commanding pillars, upon the top of which rests a noble architrave. On the pavement in front of this grand edifice stand statues of the mighty men of old, and in some quiet nook, represented in the finest whitest marble, the graceful figure of a damsel or two,—

> "High in the air, 'over that very porch,'
> Four steeds divine,
> That strike the orb resounding with their feet,
> Forth from their nostrils snort ethereal flame."

But, alas! we can scarcely obtain the view of the great street of a great city now,—without a shadow coming between us and the end of the view. The gloomy girder railway-bridge interrupts the line, and breaks the continuity of our principal street and leading thoroughfares. It also disfigures the river view of the city, and displays its unseemliness and deformity by the very side of our handsomest over-river bridges,—the masterpieces of Rennie and Telford.

Another difficulty the landscape builder has to contend with is the passion for economising space, and the confirmed habit of filling up every available inch of building-ground in the heart of the town. No sooner is one building pulled down by city improvers to give light and air to one closely-packed portion of the town than another open place is covered and built up in another portion of it. And unless the law for providing light and air to all tenements be made stricter than it is, this kind of work is sure to go on to the deterioration of all amenity, and the closing up of the view of all architectural beauty.

City improvement, however, is a subject on which I do not propose to enter. W. Y. B.

NEW BUILDINGS IN VICTORIA-STREET, WESTMINSTER.

QUEEN'S MANSIONS.—ARMY AND NAVY HOTEL.

THE vacant land on the north side of Victoria-street, Westminster, has for the most part been now covered with spacious buildings, consisting largely of residential blocks in flats for the upper classes. A very extensive block, designated Queen's Mansions, is at present in course of erection, and almost completed externally. It is situated immediately opposite to the Army and Navy Co-operative Stores, having a frontage to Victoria-street of upwards of 150 ft., and is very lofty, containing five floors, the elevation being carried to a height of between 75 ft. and 80 ft. The materials are red brick, with a profusion of Portland stone dressings and window ornamentation. Massive bay windows, projecting considerably beyond the main face of the frontage, are carried up in succession from the ground-floor to the upper floors of the building, and at the foot of each floor window there is a prominent stone balcony. The building internally is intended to be artistically decorated, and to comprise spacious suites of family apartments on each floor, which will have the advantage of a lift in addition to the staircase approaches.

On the same side of the street eastward, a site has been secured on which the new Army and Navy Hotel is about to be erected. For the purposes of this new building the greater portion of the site of Palmer's old almshouses has been purchased. These almshouses, which were first established and built in 1650, but rebuilt in 1817, are now in course of demolition. The site of the buildings and gardens extends in depth from Victoria-street, Chapel-street, Broadway, northwards, the Victoria-street frontage being about 60 ft. in length. The new hotel will cover a large portion of the site until recently occupied as the almshouses. It is stated that in place of the old dwellings now being taken down, the trustees are about to erect new almshouses in Rochester-row. The new hotel, for the special use of the two services, is intended to be of large dimensions, and its erection is to be commenced as soon as the ground is cleared.

Although, as above stated, the vacant land in this important West-end thoroughfare is being occupied by new buildings, it should be added that there are at present two huge and dismal-looking blocks, which are best described as unfinished carcasses, the works at which are for the present, at least, suspended. One of these, at the western end of the thoroughfare, not far from the Victoria Railway Station, is a massive and substantial building entirely in Portland stone, upon which, it is said, upwards of 15,000*l.* have been already expended. Externally the building has been completed, with the exception of the carving and sculpture on the main frontages, but the interior work remains to be done. It is intended as residential chambers, similar to the "Members' Mansions" a little further eastward. The other unfinished building, the works at which have also been stopped, is a large red-brick structure of about 140 ft. in length, and five stories in height, showing nothing more than the shell. It is stated to have been originally intended for a co-operative store.

VALUE OF FREEHOLD PROPERTY IN HATTON GARDEN AND CHARTERHOUSE LANE.

ON Tuesday, Messrs. Debenham, Tewson, & Co., offered for sale, at the Auction Mart, two freehold properties, situated in the neighbourhood of Hatton-garden and Charterhouse-lane, respectively. The property in the locality of Hatton-garden comprised a building of five floors in Charles-street, at the corner of Great Saffron-hill, close to Hatton-garden, and the recent improvements in that neighbourhood. The property, which covers an area of 1,965 superficial feet, was said to be very substantially constructed of stone. The premises are let on lease to Messrs. Wyman & Westwood, wholesale druggists, for the residue of a term of twenty-one years from June, 1879, at a rental of 400*l.* per annum, the lessees undertaking to repair, pay insurance premiums, and all usual outgoings. There was a close competition for the property by several bidders, and it was ultimately sold for 7,300*l.*

The property in the neighbourhood of Charterhouse-street comprised the premises Nos. 24 and 25, Charterhouse-lane, situated immediately opposite the Metropolitan Meat Market, having a frontage of 22 ft., and occupying an area of 770 superficial feet. They were said to be let on lease for a term of fourteen years from June, 1872, at a rent of 60*l.* per annum. It was stated that the property was of greater value as a site for a more important building. The first bid was 2,000*l.*, the offer being rapidly brought up to 3,250*l.*, at which it was sold.

The Hanover Gallery, Bond-street.—The winter exhibition in this bright and commodious little gallery includes 144 pictures, two small pieces of sculpture, and 333 drawings and sketches made for *Punch* by Tenniel (5), Sambourne (10), Keene (105), and Du Maurier (213). The largest work amongst the pictures is a painting by R. B. Browning, "The Delivery to the Secular Arm" (No. 5), which displays a higher aim and more technical ability than the painter has before shown. Pictures by Messrs. Millais, Watts, Val. Prinsep, Boughton, Alma Tadema, Marks, Sir F. Leighton, and some other eminent artists, are in the collection.

ENGINEERING EXHIBITION AT ISLINGTON.

The Engineering Exhibition at the Agricultural Hall, Islington, opened on Monday last, is perhaps the least successful of the trade exhibitions which have been held there of late. It is certainly by no means so large and so fairly representative a collection of materials and appliances as were the Building Trade and Printing Exhibitions. There is very little machinery in motion, and the area of the hall is only partially occupied, although what we heard characterised as "peepshow business" is more largely represented than in the previous exhibitions of the same series. Besides peepshows pure and simple, there are exhibited such things as the *Little Western* dory-boat (in which cockle-shell of a craft two men were foolhardy enough to cross the Atlantic from America not long ago), spring mattresses, cooking-stoves, stove-polish, toilet-soap, cement for mending broken glass and china, Indian hearthrugs, gas-burners, "non-alcoholic champagne," bronghame, and a number of other materials or products that have little or no relation to the asserted object of the exhibition. The two largest and best displays are made by Messrs. S. & E. Ransome & Co. and Messrs. Moser & Son. The former firm have a good display of hoisting crabs for builders' use, screw-jacks, sack-hoists, saw-benches, emery-wheels, "free-grit" and "annular" grindstones (made of Ransome's well-known artificial stone), and a good collection of engineering tools of every description, including their new "crucible cast-steel" spanners, which possess the merits of strength, lightness, and cheapness. The stand occupied by Messrs. Moser & Son is interesting not only by reason of the extent and variety of the machinery and appliances exhibited, but because it forms almost a small museum of specimens illustrating the fracture and behaviour under various tests and modes of treatment of "S. C. Crown" and "H.P." iron. The specimens of the former brand exhibit in their fracture a strong fibrous texture; while examples of the latter brand of iron (which is manufactured by Messrs. Moser themselves) are put forward as evidence in support of their statement that the material combines in itself the characteristics of both steel and copper. Mr. E. S. Hindley, of Bourton, Dorset, exhibits some portable combined vertical engines and boilers, together with horizontal engines and a circular saw-bench. Messrs. Smith & Coventry exhibit their patent "open-spindle capstan-rest chasing lathe," which makes screws, studs, pins, &c., from the bar with once chucking. The same firm also show drilling, milling, and drill-grinding machines. Messrs. Thomas B. Jordan & Son exhibit their patent pulverising-machine, for crushing and pulverising emery, granite, limestone, flints, cements, &c., to any degree of fineness without the use of sieves. The degree of fineness of the material leaving the machine is regulated pneumatically. Messrs. A. Lusty & Co. exhibit band-saws and band-sawing machinery. The Rustless and General Iron Company (Messrs. James E. & Samuel Spencer) exhibit "Anti-corrodo" tubes and fittings of all kinds, treated by Barff's "anti-corrodo" rustless process. Mr. James Hardinge exhibits the "Swifteure" wood-working machine, together with "Hurricane" portable forges and other workshop and portable plant. Among other exhibits more or less directly of interest to the building trade are the paints of the Indestructible Paint Company; Jeyes's "Concentrated Creosote" (used in tanks of boiling water with the view of preserving timber); Messrs. Ewart & Son's "Empress" ventilator, their "Crown" boiler for baths, &c., and their "Amethysta" gas-stove for warming and ventilating by introducing a continuous current of fresh warm air into apartments; Messrs. Robert Boyle & Son's self-acting "Air-Pump Ventilators"; Messrs. Maryon & Co.'s self-acting lattice shutters and grills for shop-fronts and private houses; Balmain's luminous paint; Messrs. W. Sneaton & Sons' patent "Eddystone" water-closets, and their machine-made cast-lead "Eclipse" traps; McHaffie's, Sharp's, Kite's, and other ventilators; the "Otto" and Bisschop's gas-engines; Hodson's patent rotary steam-engines; Hamilton's patent prismoidal lights, stall-boards, &c.; and, to bring this list to a close, Spence's metal, exhibited by Messrs. J. Berger Spence & Co. The capabilities of this material, practical as well as artistic, were fully described in a paper read before the Society of Arts early this year by Dr. Granville Cole, and reported by us at the time.* Its practical uses include its employment, in lieu of lead, for jointing gas and water mains, and for fixing ironwork in stone, &c. Its artistic value is sufficiently attested by the display made by Messrs. Spence in the Agricultural Hall, which includes some bas-reliefs, medallions, and a bust of Sir Henry Cole. The "Crown Jewel" stove is as peculiar in appearance as the problem which it seeks to partially solve is important. It is an American invention, and it claims to be absolutely smokeless; it only burns anthracite coal or coke. It somewhat resembles in form an ornate but gigantic lantern, resting on a stand, the fire being enclosed in a basin-shaped grate, and visible all round through the talc windows which constitute the bulbous or lantern-like portion of the stove. It is charged with fuel by means of a vertical cylinder easily got at by the removal of the top cap. This fuel cylinder being fully charged, the stove burns for a long time without attention; for as fast as the fuel is consumed by combustion, the grate is automatically replenished from the cylinder. There are many other things which we have not space to mention. The exhibition, which closes this (Saturday) evening, has not been very numerously attended.

THE GLASS TRADE IN ENGLAND.

At the suggestion of Mr. C. R. Crickmay, architect, of Weymouth, who had grieved over the knowledge that a large and increasing quantity of glass for building purposes is imported into this country, and was naturally anxious that our own country should not only supply itself, but stand first in the estimation of the consumers in every country, the Worshipful Company of Glass Sellers have offered substantial prizes for an essay on "The Past and Present Position of the Glass Trade in all its Branches, and Suggestions for Improvement in the English Trade," and propose to give a gentleman of authority 25*l.* for adjudicating on the respective merits of the several essays.

It seems to us that instead of referring the essays to one person they should refer them to a committee of three, or at any rate two, representing the technical aspect of the question, the art aspect, and the commercial aspect. The Company would probably find competent persons who would undertake this without a fee. One other suggestion we would make, which is, that instead of offering three premiums, as is proposed, the whole sum at their disposal should be offered for the best essay. This course would be more likely to bring the right man into the field.

VALUE OF OLD SION COLLEGE SITE.

According to the sums realised for a number of building sites on the Sion College Estate in Aldermanbury, which were let on lease last week for a term of eighty years, at the Auction Mart, by Messrs. Fox & Bousfield, the governors of the college are likely to be put into possession of a very large annual income, representing a capital sum which will be comparatively little affected by the cost of the intended new college buildings on the Thames Embankment. The sites let last week were seven in number, containing altogether an area of 7,500 ft., and consisted of the land upon which the president's house and a number of shops and other ancient structures fronting London-wall and Aldermanbury until recently stood. Four of the sites immediately adjoin St. Alphage's Church, and a question of ancient lights as affecting this edifice arose in connexion with the intended new warehouse or other buildings, but this has been arranged.

There was a very numerous attendance at the letting of the sites last week, and in order to show the restrictions under which the new buildings are to be erected, a model, pointing out the same, was exhibited in the room, and explained by the auctioneer. The sites were all quickly let; the four sites in Aldermanbury-avenue, extending in depth to the church, realising 310*l.*, 150*l.*, 125*l.*, and 130*l.* each, or 715*l.* per annum altogether; and the three sites facing London-wall being let for 230*l.*, 230*l.*, and 300*l.* per annum each, together 760*l.* per annum, or an aggregate sum for the seven sites, containing 7,500 superficial feet, of 1,475*l.* per annum. The entire site of the college and grounds, which will now shortly be covered with buildings of a mercantile character, is about an acre in extent, and supposing the remaining sites to be let at the same rate as those which were disposed of last week, the Governors of the college will ultimately derive an annual income from the site of about 7,400*l.* per annum, the whole of the site, according to the history of the college, having originally been purchased, in the seventeenth century, for 2,450*l.*

Capitalising the above annual sum at twenty years' purchase gives about 150,000*l.* as the present value of the freehold of the site, but it was observed at the letting last week that a fairer estimate would be twenty-five years' purchase, which would represent as its present value, 185,000*l.*

* *Builder*, vol. xxxviii., p. 213.

LIVERPOOL ARCHITECTURAL SOCIETY.

The annual dinner of this Society was held on Tuesday, the 5th of October, at the Alexandra Hotel, Dale-street, forty-four members and guests being present, among the latter Mr. J. Murgatroyd, president of the Manchester Architectural Association; Mr. J. Holden, hon. secretary of the Manchester Society of Architects; Mr. Alexander Ross, president of the Liverpool Engineering Society; and Mr. J. C. White, president of the Liverpool Master Builders' Association.

The first ordinary meeting of the society was held on the following day, October the 6th, the president, Mr. Charles Aldridge, F.R.I.B.A., in the chair.

After the election of members, and other business, the report of the visitors on last session's work by members of the class of construction and design was read, the first prize being awarded to Leonard J. Pilkington, and the second to Constantine Phillips. The President then read his opening address, of which the following are the preliminary remarks:—

"We commence to-day the thirty-third session of this society, which I need scarcely remind you has the privilege of seniority amongst all the provincial architectural societies, a fact of which I think we should be proud. During the thirty-three years since the society was founded it has had no doubt its ups and downs,—periods of success and depression,—but I think I may venture to say that at no time has it been more prosperous or better supported by the profession in Liverpool than at the present. We now number 138 members, composed of forty-seven Fellows, twenty Professional Associates, thirty-five Associates, thirty-two Students, and four Honorary and Corresponding Members.

Prosperity, however, is often as trying as adversity: at the one time we are apt to despond, and give up endeavouring to improve matters when they seem so hopeless, and at the other time we run into the danger of following a similar course, by the very reason of our success, thinking we have gained the summit of our ambition; but should we not seize the present opportunity to look around us and see what we can do to enlarge the sphere of our society, and attract others to join us? We must not rest content until we have induced every architect and architectural student to become a member, and surely there is no reason why this should not be. There is another way by which we can add very much to our usefulness, and that is by increasing the work done by the educational branch. The class of design and construction, which was commenced three years ago, has now, I am glad to say, become sufficiently strong in numbers to warrant us undertaking a course that I have contemplated for some time, and which will, I hope, be carried out this session if I can get the necessary support from the Fellows and students. It is proposed the class should meet fortnightly instead of monthly, and that at each alternate meeting a short course of instruction be given on construction. These lectures might be arranged in the same way as a specification, so that the course during the present session might comprise all the trades, commencing at excavator and bricklayer. I have drawn up a syllabus of these lectures, together with a list of subjects for the class of design, and I hope on this day fortnight the first lecture will be given."

Free Lectures: Parkes Museum.—In response to a suggestion made to the Executive Committee by the Nineteenth Century Building Society, the following course of lectures on "Dwelling Houses," largely descriptive of articles and apparatus in the Museum, will be delivered in the Museum, University College, Gower-street. The admission to the lectures will be by free tickets, which will be distributed through the agency of the metropolitan building societies. December 11th, "Situation and Construction," by Edwd. C. Robins, F.S.A.; January 8th, 1881, "Ventilation, Lighting, and Warming," by Edwd. C. Robins; January 22nd, "Water Supply and Filtration," by Prof. W. H. Corfield; February 5th, "Drainage," by Rogers Field, C.E.; and February 19th, "Water-closets, Sinks, and Baths," by Prof. W. H. Corfield. Each lecture will commence at half-past three in the afternoon.

BUILDERS' BENEVOLENT INSTITUTION.

ANNUAL DINNER.

THE thirty-third anniversary festival in aid of the funds of this deserving Institution was celebrated on Thursday, the 11th inst., at the Freemasons' Tavern, Mr. Thomas F. Rider (of the firm of Rider & Son, Union-street, Borough) in the chair, supported by Mr. Edward I'Anson, F.R.I.B.A., Mr. George Plucknett (Cubitt & Co.), Mr. John Hebb (Assistant Architect, Metropolitan Board of Works), Mr. ex-Sheriff Burt, Mr. E. B. I'Anson, M.A., Mr. F. J. Dove (Dove Brothers), and about 250 other supporters and friends of the Institution.

The usual loyal and patriotic toasts were duly honoured, the Chairman, in proposing that of "Prince and Princess of Wales and the rest of the Members of the Royal Family," remarking that their Royal Highnesses the Prince of Wales, the Duke of Connaught, and Prince Leopold, might almost be claimed by the builders as belonging to their trade; for were they not all three most excellent Masons? and was not masonry one of the most important departments of building work? In proposing the toast of "The Army, Navy, and Reserve Forces," he observed that the Navy, like the building trade, had been somewhat interfered with by the introduction of iron in place of wood.

Major Bratton, in responding for the Army and Navy, referred to the ill-fated *Atalanta*, and paid a warm tribute of praise to her commander, Captain Francis Stirling, with whom he (the gallant Major) had served for three years. The foundering of that vessel was, he was quite sure, due to no want of skill in seamanship on the part of her captain.

Captain Bird responded for "The Reserve Forces."

The Chairman, in proposing the toast of the evening, "The Builders' Benevolent Institution," said: "At a preliminary meeting of the various branches of the building trades, called together by Mr. Thomas Cozens, of 17, Lissongrove, North-street, Marylebone, on Wednesday evening, January 27, 1847, at the 'King Alfred' Tavern, Lisson-grove, — present, Mr. Cozens, stonemason," and nineteen others, consisting of three builders, three carpenters, two bricklayers, two plumbers, two ironmongers, one grainer, one paperhanger, two timber merchants, one lead merchant, and two whose occupation is not stated,—"for the purpose of forming an association for the relief of decayed masters connected with the building trades, Mr. Cozens having been unanimously elected to the chair, the objects of the meeting were taken into serious consideration, and various discussions took place, when it was proposed by Mr. George Chamberlain, lead merchant, seconded by Mr. Ferguson, paperhanger, and unanimously resolved, 'That the gentlemen present should form a committee, provisionally, for the purpose of carrying out the objects of the Institution,' and Mr. William Grubb was appointed secretary *pro tem.*'" Such, gentlemen, is the entry in the old minute-book with regard to the formation of this Institution. Various committee meetings were then held, and on the 22nd of February the title of "Builders' Benevolent Institution" was settled upon. On the 29th of March the first committee was appointed, amongst whom were Mr. Cozens, the founder; three of the Messrs. Bird (two of whom for so many years did excellent service to the Institution),—and, by the bye, other birds have also been great friends to the Institution, including the Condor and the Dove; Mr. Ebbs (whose widow has been since 1877 a pensioner of the charity); and Mr. Richardson, who, as many of us will remember, has often told us that he was at the formation of the society. Mr. Biers, who was president of the Master Carpenters' Society, seems to have been the first president, for I find that on the 19th of July they did what all new institutions must do, had a great public meeting, which was held at the old Freemasons' Tavern,—present, Mr. Biers in the chair, supported by Lord Robert Grosvenor, M.P., Lord Dudley Stuart, M.P., Col. Thomas Wood, M.P., Sir Benjamin Hall, M.P., Mr. David Salomons, Mr. Geo. Cochrane, and a large number of influential representatives of building interests. The chairman made a capital speech, beginning, of course, by expressing the usual wish that some one more able had been found to preside. That is my own wish to-night. He pointed out the many risks and difficulties attending the building trade, and after going into a most glowing description of the likeness between the builder's trade and the calling of a sailor, concluded by proposing that as soon as 4,000*l.* had been subscribed, operations should be commenced, and also that when 5,000*l.* more had been separately collected for the "Builders' Almshouses," they should be commenced. This and other resolutions were carried, and I notice amongst the names of those supporting them George Spencer Smith (grandfather of Mr. H. G. Smith, known to us all), and Joshua Higgs (the father of Mr. W. Higgs, our president a few years ago). On the 30th of July the first application for a pension came from one Robert Wright, but he was informed "the funds did not admit of it." An appeal was issued to the trade on behalf of the Institution, attached to a copy of the rules. Mr. George Bird was elected treasurer,—an office which he continued to fill until 1861,—a period of twenty-four years,—when our excellent friend Mr. Plucknett succeeded him. In August of the same year (1847), nineteen applications were made for pensions, and of the applicants, fifteen were approved as candidates. On the 30th of that month it was decided that the pensions should be from 10*l.* to 30*l.* per annum,—a sufficiently wide margin; that, at the discretion of the committee, on the death of a pensioner, his pension might be continued to his widow; and that temporary relief might be granted to orphans. In November, 1847, 200*l.* Stock was bought. The next matter of importance was the determination, in 1848, to have an annual dinner, and on the 19th of July was celebrated the first anniversary of the foundation of the Institution, and it may perhaps interest you to know what the arrangements of the committee were for the entertainment of the guests. I find that it was finally arranged,—"That the dinner should consist of soups, fish, meat, poultry, and vegetables in season, two 'firsts' of champagne, port and sherry *ad libitum*, coffee or tea, soda-water, ginger-beer, &c.; that the ladies in the gallery should be provided with 'a *déjeûner* of cold viands, wine, ginger-beer, soda-water, coffee, or tea," that vocalists were engaged, and "Mr. Day asked to furnish an instrument for the night." Lord Robert Grosvenor, M.P., was in the chair, and the whole of the proceedings seem to have passed off most amicably, for there is no entry of them in the minute-book.* In October it was resolved, on the suggestion of Mr. Joseph Bird, that a series of balls should be given, the profits to be appropriated to the funds of the Institution, and the first one did take place on the 19th of January, 1849, resulting in a profit to the Institution of 20*l.* 12*s.* 6*d.*, and from that time for twenty-four years an annual ball took place under the supervision of Mr. Joseph Bird. They have continued to be given. The next one will be held at Willis's Rooms, St. James's, on the 27th of January, 1881, and Mr. Keeble will be very glad to receive the names of any gentlemen willing to become stewards. On the 4th of December, 1849, it was decided that the pension should be 24*l.* per annum, and that as soon as the subscriptions reached the sum of 250*l.*, half that amount should be spent in pensions, and the rest funded. In May, 1849, Mr. Grubb, the secretary, resigned, and the late Mr. A. G. Harris (whose invaluable services to the Institution many of us remember) was elected to that position. On the 30th of July the second annual meeting was held, when Mr. Biers was re-elected president; an election for five pensioners fixed to take place at the end of October in the same year, and the amounts of the pensions settled to be 24*l.* per annum for males and 20*l.* per annum for females. On the 29th of November the election was held, when four men and one woman were placed on the funds of the Institution. From that time the progress of the Institution has been steady. Year by year men well known in the building trade have occupied the position of president,—Mr. William Cubitt, afterwards Lord Mayor of London, being the first, followed by Sir Samuel Morton Peto, Messrs. Charles and Thomas Lucas, Messrs. Lawrence, Mr. Trollope, Mr. Plucknett, and others. The money collected for the purpose of building almshouses, after many discussions was at last, with the approval of the subscribers and the consent of the Charity Commissioners, added to the Relief Fund, which now reaches the sum of 21,400*l.* The pensions, through the indomitable perseverance of my predecessor (Mr. F. J. Dove), have been raised to 39*l.* for men and 30*l.* for women, necessitating, of course, a much-increased outlay. One hundred and eighteen persons have enjoyed the benefit of the pensions, and there are now more than fifty on the books. For the next election, which will take place on the 25th inst., there are nine candidates,—five men and four women. Gentlemen, I have roughly sketched for you the rise and progress of the Institution on whose behalf I now appeal to you, and I am afraid I have somewhat trespassed on your time, but I have been told that from its formation no account of its origin has ever been given on such an occasion as this. The building trade, as those who are in it well know, is one exposed to enormous risks. Strikes and lock-outs,—those barbarous expedients with which it is attempted to settle disputes between masters and men; unhealthy competition, that bane of commerce in all times; accidents through the carelessness of workmen; bad weather, and many other things, combine to render the building trade one of the most precarious in existence. In proof of this I may mention that one of the present applicants for a pension is the widow of a builder formerly on the committee of this Institution, and a liberal donor to the charity, and we soon expect to receive a similar application from the widow of a late partner in one of the largest building firms in London, who was ruined in carrying out a large contract at the West End. I appeal, then, to the master builders of London to support this Institution, on the ground, partly, that they may, some of them, some day or other require the assistance which it is able to give. I appeal to them on the ground that those who are engaged in the same business as themselves have a prior claim on their charity. I appeal to the merchants connected with the building trade to do what they can for us; and lastly, I appeal to all to help us to make the Institution one of the largest and best charities of the charitable metropolis of the world. I beg to propose "The Builders' Benevolent Institution," coupled with the name of Mr. George Plucknett, its respected treasurer.

Mr. Plucknett, in responding, said he could only hope that the very enthusiastic manner in which the toast had been received was an augury that the company intended to enable him, as treasurer, to meet the Institution's liabilities for the coming year with ease. When their late president, Mr. Dove, expressed his desire to see the amount of the pensions increased, the proposal met with his (Mr. Plucknett's) cordial concurrence, and at the annual general meeting held in July, the question was fully discussed, and the increased pensions decided upon. At that meeting they had the satisfaction of receiving a communication from Mr. George Godwin,—a gentleman well known to almost everybody in the building trade,—saying that he entirely approved of the proposed increase in the pensions, and offering to subscribe ten pounds a year for ten years towards that object if nineteen other gentlemen would do the same, and so guarantee an increased income to the Institution of 200*l.* per annum. He hoped that Mr. Godwin's offer would not be lost sight of. Considering the vast interests of the trade which it represented, the Builders' Benevolent Institution ought to be one of the best-supported charities of the metropolis. When he stated that there were about 700 charitable institutions of a similar kind in the metropolis, with a yearly income of more than 3,000,000*l.* sterling, he thought it was not too much to hope that the builders of London would see to it that their charity continued to maintain its position. In conclusion, Mr. Plucknett said that the Institution had never had a president who had taken greater interest in it than Mr. Rider had done.

The Secretary (Major Bratton) then read a list of subscriptions and donations amounting, as we stated last week, to 1,014*l.* 16*s.*,—a larger sum than has been obtained for many years past.

Mr. Edward I'Anson, in proposing the toast of "The Chairman and President," said he had the greatest pleasure in proposing Mr. Rider's health. He had for fifty years or more known Mr. Rider's firm,—Mr. Rider and his excellent and respected father. The name of Rider in

* A full report of the proceedings at this dinner will be found in our volume for 1848, p. 356, and a report of the foundation-meeting, previously referred to by the chairman, in the volume for 1847, p. 352. In fact, the early history of the Institution can best be read in the *Builder*, without the advocacy of which at one particular moment the endeavour to found it would have collapsed. In the notice of the foundation meeting it will be seen the chairman, Mr. Biers, proposed a special vote of thanks "to the editor of the *Builder* for bringing this Institution before the notice of the public."

his (Mr. I'Anson's) office had always been a household word. There had never been a year for fifty years past in which Messrs. Rider had not been carrying out works for Messrs. I'Anson. He had not only known the Messrs. Rider for the long period mentioned, but he had learned to respect them. All that they had done had been done with the utmost ability and honesty, and he had therefore reason to speak in the most complimentary way of them.

The toast was very heartily received, and the chairman having briefly responded,

Mr. Glanvill proposed "The Vice-Presidents and Trustees," coupled with the name of Mr. F. J. Dove, who briefly replied, expressing his thanks to the President for the efforts which he had made on behalf of the Institution. It was satisfactory to know, from the amount of the subscriptions and donations announced, that those efforts had been crowned with a success which would not only make it easy for the committee to pay the increased amounts of the pensions, but would possibly allow of the election of more pensioners.

Mr. Ex-Sheriff Burt, in proposing "The Architects and Surveyors," said he was delighted to see so many architects present and taking an interest in the Institution. The architects and surveyors of the metropolis played a most important part in the life of the great city. They frequently were beset by apparently insuperable difficulties, but they generally succeeded in satisfactorily surmounting them, and, as a rule, builders and contractors had very little fault to find with the way in which they were treated by the members of those professions. With the toast were associated the names of Mr. Edward I'Anson and Mr. Franklin.

Mr. I'Anson, in responding, said it gave him very great pleasure indeed to meet so large a gathering of so important a community as the builders of London. The builders on the one hand, and the architects and surveyors on the other, were engaged in setting in motion a large mass of people, who were all, it was to be hoped, honestly and diligently seeking to promote the best interests of the great commonwealth to which they belonged by producing good and perfect buildings. He had been now labouring nearly fifty years as an architect, and he had never had any disagreement with any builder who had carried out works for him. Indeed, he had always found that his works had been excellently carried out by his friends, the builders.

Mr. Franklin also responded, observing that he was very pleased to hear Mr. I'Anson express himself with so much satisfaction as to the way in which the builders of London did their work. He (Mr. Franklin) would fain look forward, as many others did, to a very good time coming for the building trade; but it was his decided conviction that that good time would only arrive when builders would refuse to make tenders upon quantities that they could not possibly rely upon or understand. When that time arrived the trade would become so prosperous that it would think nothing of subscribing even a much larger sum than 1,000*l.* to the funds of the Institution.

The only remaining toast was that of "The Committee and Stewards," coupled with the names of Mr. T. G. Smith and Mr. Randall, who briefly replied.*

NEW CHURCH AT DUDDO, NORTH-NORTHUMBERLAND.

On Tuesday, the 9th inst., the new church that has been in course of erection since the autumn of the past year, when Louisa, Lady Waterford, laid the foundation-stone, was consecrated by the Bishop of Durham. About twenty clergymen, including the Archdeacon of Lindisfarne, the Hon. F. R. Grey, and the Vicar of Duddo, the Rev. Beverley S. Wilson, assisted in the ceremony, which was performed in the presence of a large congregation which completely filled the edifice. The church is placed on a slope by the roadside, near the vicarage-house, in a wide wild tract of country surrounded by hills, and is built of the excellent stone of the district which has in it many of the beautiful tints of Sandown. The church consists of a nave, 46 ft. by 25 ft., and chancel, 25 ft. by 20 ft. At the west end of the nave is a tower, capped by a hell-turret; and on the north side of the chancel is a chamber for the organ and a vestry. To this plain and simple outline satisfactory architectural effect is given by the details of the windows, which are enriched with tracery, and filled with lead patterned glazing. The niched doorways help the effect. In the interior the open-timbered roofs, each compartment of which gets richer as it approaches the east end, the columniated chancel-arch, the pulpit of open-panelled work, and the communion-table of similar perforated woodwork, add to the general air of unity. The chancel is furnished with stalls to seat twenty, and the nave is seated with rush-bottomed chairs for the accommodation of 158.

Owing to the low prices which obtained at the date of the competitive tendering, in consequence of the existing depression in the building trades, a church of some architectural effect has been produced at a very small cost.

Mr. F. R. Wilson, Alnwick, is the architect. The contractors were:—Mr. H. Elliot, mason, Hornclife; Mr. A. E. Burn, joiner, Spital; Mr. J. Turner, slater, Hornclife; Mr. R. Sidey, plumber, glazier, and smith, Tweedmouth; Mr. A. Robertson, painter, Alnwick. A bell, 2 ft. in diameter, wheel, and gear, were supplied by Messrs. H. Watson & Son, Newcastle-on-Tyne.

* We are pleased to be able to add that (as will be seen by an advertisement in another column), in consequence of the generous support accorded to the Institution at this dinner, four pensioners (two men and two women) will be elected on Thursday next, the 25th inst., instead of one man and one woman, as formerly arranged.

PALÆOGRAPHY.

There are in the British Museum Library, to which institution I referred in the *Builder*, No. 1,952, various collections of MSS. accessible and well preserved. Many of these, however, and MSS. in other collections, are difficult to decipher. Probably most of them can be deciphered only by experienced experts. Occasionally a rare MS. is construed and issued by the Camden Society, &c., or extracts are contained in some volume. The comparison of a printed translation with an original document clearly denotes the truth of this statement. See, for instance, the coronation speech of Henry VIII.,—MS., in vol. i. of Ellis's "Historical Letters," s. 2. It is a subject for regret that such should be the case, because these MSS. are interesting, rare, and valuable, probably. Some of them at least might be printed or copied fairly for public use, selected specially for the purpose, according to the plan adopted in the publication of the Harleian MSS. in 12 vols., 4to. As they are now, many MSS. in the British Museum Library are useless except to experts and the few persons who may be initiated in the art of palæography. Even when a document has been deciphered, it requires a special knowledge to understand the various abbreviations. A glossary generally is appended for this purpose, of which there are specimens in Cole's "Historical Documents," folio, 1844, and in Wright's "Court Hand Restored," &c. The ordinary reader would find it difficult to decipher even John Milton's "Common-Place Book," of which there is an autotype copy with a translation in the British Museum Library, and yet that is comparatively easy to unravel. The Hargrave MSS. in this collection contain various specimens of orthography, ancient and modern. Some of these are easy to decipher, while many of them are only to be unravelled by experts if at all. Hence many of these volumes are sealed books as to the public, and are likely to remain so, although bought at a high price. An intended work upon palæography some years since was expected from Mr. R. Sims, of the British Museum MS. department, but it has not yet appeared. I believe that the works extant upon this subject are (1) Astle's "Origin and Progress of Writing," reprinted recently by Chatto & Windus; (2) Madox's "Formulare Anglicanum"; (3) Casley's Collection of MSS. in the King's Library, British Museum Library; (4) Wright's "Court Hand Restored," ninth edition, 1878, by Martin, of the London Record Office, with additions; (5) Chassan's thin octavo volume in French; (6) specimens of inscriptions in churches, &c., are contained in "Bibliotheca Topographica Britannica," vol. vi, and in "A New Boke of Handwriting," 1590, press-mark 1268*a*, British Museum Library. The Palæographical Society of London have issued rare specimens in folio. In Wright's original preface it is stated that "few persons are to be found capable of reading or explaining old deeds and charters with satisfaction to themselves or others." So it was in A.D. 1773, and probably it is so now. Also, "the Reading of the old law hands is (1773) very nearly, if not altogether, obsolete, though useful." This author then showed the utility of jurists having this knowledge for several reasons, and he mentions several cases in which copies of records produced in Courts of Justice as evidence were rejected as evidence, the originals being extant. The fifth edition of this volume ("Court Hand Restored"), contains extracts from the Returns of Astle and Cayley. Wright's volume includes the old law hands. Some of the specimens are taken from Astle, and in the appendix are ancient names of places in the United Kingdom, and a table of ancient surnames, with an exposition of Latin words, &c. There are many MSS. of the Middle Ages and of more recent date which require additional aid for satisfactory interpretation by the inexperienced reader certainly.

Mr. Astle stated that "the characters introduced by William I. were called Lombardic; but soon afterwards acquired the appellation of Norman characters, generally used in grants, charters, public instruments, and law proceedings, with little alteration until the reign of Edward III. In that of Richard II. variations took place in handwritings of records and law proceedings; the characters used from that time to the reign of Henry VIII. are composed partly of characters called Set Chancery and Common Chancery, and of some of the letters called Court-hand. The Chancery letters were used for all records which passed the great seal; the court-hand in the Courts of King's Bench and of Common Pleas, for fines, placita, &c. These latter came into use about the middle of the sixteenth century, and were continued until about the middle of the late reign, when they were disused. (See 4 G. II., c. 26, and 6 G. II., c. 14, requiring all law-pleadings, deeds, &c. to be thereafter written in English.) They were originally the Lombardic or Norman, but corrupted and deformed so that they bore little resemblance to their prototypes. In the sixteenth century the English lawyers engrossed their conveyances and legal instruments in characters called Secretary, which are still in use."

"Many grants and charters, especially those written by the monks, were in letters called Modern Gothic, which took place in England in the twelfth century. From the latter end of the thirteenth to the seventeenth century, lawyers, when they wrote in the English language, made use of characters derived from Modern Gothic for conveyances, wills, &c., about the middle of the seventeenth century. I think the Set Chancery most durable and proper to be used for patents, charters, &c."

"The character of handwriting of ancient records," according to Mr. J. Caley, "has gradually degenerated from age to age. Thus, the records of the Saxon era, written in Saxon or Latin, are more plain and legible than those of subsequent eras, little obscured with abbreviations which have created doubt and ambiguity in after ages, particularly in that valuable record, Domesday Book."

From the Norman Conquest until the reign of Henry III. the character is plain and perspicuous. Of this reign (Henry III.) many records cannot be read with facility on account of the intricacy of the character and the number of abbreviations. "The same observations may be applied to records from this reign until that of Edward III. inclusive. From this period downwards, I have experimentally found that less difficulty occurs in reading and translating records; and that the hands used from the reign of Richard II., to that of Philip and Mary, may be read without much trouble. Hitherto each reign appears to have had a set or uniform character. In the reign of Elizabeth and her successors the clerical mode seems to have been in a great measure abandoned, and each transcriber to have written according to his own fancy; and the English records of the sixteenth and seventeenth centuries are in general more difficult to be read than the Latin records of preceding ages." Every word of these statements I believe to be correct; and it is according to my experience.

The remedy for the deficiency is to make palæography a science, like that of book-keeping and stenography: to encourage persons to study it, under advice, and to make it a remunerative profession. No doubt some persons would excel more than others; but that is the case in all employments. Where funds are at hand a selection of documents should be transcribed or printed for public use, and bound up from time to time with an index and a table of contents, in the British Museum, &c., the originals being preserved carefully. C. C.

cost of 30,000*l.*, in opposition to the strongly-expressed opinion of the ratepayers; yet they grudge the poor a decent lodging. Of course, the owner of the highly-rented slum, and the speculating builder with houses on hand he can neither sell nor let, will both oppose the Act, and these classes are well represented on the vestries; but I hope the Government, considering the urgent necessities of the poor, will turn a deaf ear to vestries and vested interests.

JAS. YOUNG.

STRENGTHENING EMBANKMENTS.

SIR,—In a foreign paper of the 7th instant I notice it is stated that, from actual experience on extensive railways in Prussia, the embankments are very much strengthened by planting in them a species of willow tree (*salix*), white *alba* being, it would seem, preferable.

It is stated that the roots of these trees form a thick trellis or lattice enveloping the whole surface, and thus imprisoning the earth. The nature of these trees permits them to grow very readily, requiring little or no care. As a kind of creeper for protecting embankments it is, by the same authority, said to merit the attention of architects.

E.

*** The use of vegetable growths to strengthen dykes in Holland is a practice of great antiquity.

MEASURING TAPES.

SIR,—In despair I write to ask you, as editors are supposed to know everything appertaining to the speciality of their papers, where can I get measuring tapes that are of any service after they have been used a few times? I have tried all sorts. There can be no doubt that the steel tapes would be the best if manufacturers would make them of more substance, and would link them say every 5 ft. and put two swivels in a 66 ft. tape. As they are made, all, or at least all I have been able to get, are warranted to kink and break the first or second time they are used, as the metal is so thin, and consequently so sharp, that you stand a good chance of having a finger or two cleanly cut through before you know where you are, which is not quite pleasant.

INQUIRER.

"DISTRICT MARKETS."

SIR,—A company is already in active working order, carrying out the various objects referred to in last week's *Builder*.

The name is "The Local Meat Markets" (Limited); the first one, called the "Dowgate Market," is in Upper Thames-street, and occupies the space under the Cannon-street Station, City; others will be erected in due course. I enclose full particulars, and as architect to the company, I should feel obliged if you could further the important problem of supplying good food at reasonable prices.

PHILIP B. LEE.

CHURCH-BUILDING NEWS.

Walkern.—The rood-screen in the ancient parish church here has, at the cost of the vicar (the Rev. J. C. Wright), been restored. The chancel was restored some little time ago. The ancient rood-screen had fallen into a deplorable and dangerous state of decay. Mr. Hugh Roumien Gough, architect, of Westminster, was consulted by Mr. Wright, and under Mr. Gough's immediate direction the screen was taken down, and having been thoroughly overhauled, is now once again *in situ*. It is an excellent example of Perpendicular Gothic woodwork, some 12 ft. or 13 ft. high, and reaching right across the chancel. The lower panels are filled with traceried and carved work of a vigorous kind. Above, a wealth of pierced open-work bursts out from the supporting standards, and exhibits much delicate and refined detail thereon. The main cornice above is deeply moulded, and has its hollows enriched by detached patera. A new moulded cill has been put in as a footing, and the main uprights, which were in a bad state of decay, have been scarfed and mortised. On either side of the central doorway are buttresses surmounted by carved pinnacles, and similar buttresses are in like positions upon the other uprights. The screen had been bedaubed with a variety of coats of paint, whitewash, varnish, graining, &c., by successive generations of churchwardens. These have all been removed by a chemical preparation. The work of restoring the screen was entrusted to Mr. Harry Hems, of Exeter.

Ealing.—The church of St. Stephen, Castlehill, Ealing, has just been enlarged by a new south aisle, south transept, organ-chamber (with choir-vestry under), and south porch, giving an addition of 224 sittings to the church. The work has been carried out from the designs and under the superintendence of Mr. Rovedino, architect, the builder being Mr. Nye, of Ealing.

VARIORUM.

DR. HENRY SCHLIEMANN'S expected new volume, "Ilios: the City and Country of the Trojans," has been published by Mr. Murray. It gives the result of researches and discoveries throughout the Troad in the years 1871, 1872, 1873, 1878, and 1879, and includes appendices and notes by Professors Virchow, Max Müller, A. H. Sayce, J. P. Mahaffy, Brugsch-Bey, and several others, illustrating, amplifying, and confirming the brilliant and astounding researches and discoveries made by Dr. Schliemann. The book has an interest and value beyond ordinary commendation, and will receive at our hands in due course the same amount of consideration that we felt ourselves bound to give to the previous works of its author.——"Japanese Pottery," being a native report, with an introduction and catalogue by Augustus W. Franks, M.A. (Chapman & Hall). This is one of the South Kensington hand-books, but differs somewhat from the others, in consequence of the circumstances under which it was prepared. The pith of it is translated from a report by a Japanese expert, and Mr. Augustine Franks has contributed much from his remarkable stores of knowledge to increase its value. The illustrations include a large number of marks.——Hardwicke's *Science Gossip* for November 1st includes an interesting and instructive paper, entitled, "A Wood-Carver's Experience of the Death-watch Beetle."——"The Arithmesis" (Dunton, 352, Clapham-road) is a superior kind of Ready Reckoner. It refers to marketings, wages, savings, interest, and victualling, and will be found useful by many persons.——The *American Architect* devotes a whole number (253, October 30th) to an illustrated account of the Museum of Fine Arts, Boston, and a very interesting number it is.

Miscellanea.

The "Inner Circle" Railway Completion.—A letter has been addressed to the City Commission of Sewers by the Joint Committee of the Metropolitan and District Railways relative to the Inner Circle Railway completion, offering 500,000*l.* in consideration of the Commission providing the railways with 60 ft. of clear space, partly under the surface and partly open, for the construction of stations and works between certain points marked in the plans, and a sufficient space, 37 ft. wide, for the construction of a double line and works under the property to be acquired between those points. In regard to any additional property required for station approaches, the Joint Committee were willing to purchase it and to re-sell to the Commission any surplus needed for street improvements at a price to be agreed on by arbitration. The letter was referred for consideration to the Improvement Committee, with power to confer with the Metropolitan Board of Works.

A Local Government Inquiry was held at West Bromwich on the 9th inst. before Mr. J. Thornhill Harrison, C.E., respecting an application made by the Improvement Commissioners for sanction to borrow the sum of 97,500*l.* for the following purposes:—60,000*l.* for the purchase of land, and carrying out the 1st section of the Main Drainage Scheme prepared by Mr. John T. Eayrs, C.E.; 25,000*l.* for the completion of the gas-works; 10,000*l.* for paving footpaths with blue bricks; 1,500*l.* for fire-hydrants; and 1,000*l.* for refreshment-room and shelter for public park. Evidence was given in detail respecting the various amounts to which there was no opposition. The inspector afterwards visited the site of the proposed sewage-farm.

Gateshead School Board.—At a meeting on the 10th inst. the plans of Messrs. Oliver & Leeson, architects, Newcastle-on-Tyne, for proposed group of schools at Durham-road, were approved. The same architects were instructed to prepare designs for another group of schools at Askew-road.

Dr. Siemens's New Fire-Grate.—Dr. C. W. Siemens describes in *Nature* a new modification of the ordinary fire-grate, by which all smoke is done away with, and all the heat is thrown out to the room, at a cost considerably less than the ordinary coal-consuming grate. Instead of the bars at the bottom, an iron dead-plate is substituted, and, instead of coal, coke or anthracite is used. To this dead-plate is riveted a stout copper-plate facing the back of the fire-grate, and extending 5 in. both upwards and downwards from the point of junction. The dead-plate stops short about 1 in. behind the bottom bar of the grate to make room for ¾-in. gas-pipe, which is perforated with holes of about 1-20th in. in diameter, placed zig-zag at distances of ¾ in. along its upper surface. This pipe rests upon a lower plate, which is bent downwards towards the back, so as to provide a vertical and horizontal channel of about 1 in. in breadth between the two plates. A trap-door, held up by a spring, is provided for the discharge of ashes falling into this channel. The vertical portion of this channel is occupied by a strip of sheet copper, about 4 in. deep, bent in and out like a lady's frill, and riveted to the copper back-piece. Copper being an excellent conductor of heat, this piece, presenting (if not less than ¼ in. thick) a considerable sectional conductive area, transfers the heat from the back of the grate to the frill-work in the vertical channel. An air current is set up by this heat, which in passing along the horizontal channel impinges on the line of gas-flames and greatly increases their brilliancy. So great is the heat imparted to the air by this simple arrangement that a piece of lead of about half a pound in weight introduced through the trap-door into this channel melted in five minutes, proving a temperature to exist exceeding 619 deg. F. or 326 deg. C. The abstraction of heat from the back has, moreover, the advantage of retarding the combustion of the coke there while promoting it at the front of the grate. In a large fireplace in a room of 7,200 cubic feet, facing the north, the temperature was easily maintained at 60 deg., and the result of one day's campaign of nine hours was a consumption of 62 cubic feet of gas and 22 lb. of coke, the total cost being 4·725d., or at the rate of about one half-penny per hour.

The Re-building of Whitechapel Church. On the 11th inst. a meeting was held in the church-room of Whitechapel Church, where the trustees of the parish and the committee for the building of the old church had been invited to attend. The rector, the Rev. J. F. Kitto, presided, and presented a report on behalf of the rector and churchwardens, who, with Mr. Gadesden, had been appointed to communicate with Mr. Coope, M.P., with a view to his undertaking the rebuilding of the church. The report stated that Mr. Coope had undertaken to make himself responsible for the rebuilding of the church, subject to certain conditions as to means being taken with the view to obtain better acoustical properties in the church when rebuilt than were found to be possessed by the church burnt down, as to the approval by the parishioners of the designs for the new building, and as to certain sums being set apart from the insurance-money in order to reinstate the font, lectern, pulpit, stained-glass, and other special features. The report was adopted, and Mr. Coope's offer accepted with gratitude.

American Institute of Architects.—A meeting of the Convention of the American Institute of Architects was to take place on November 17th, in Philadelphia. Several matters of great general interest were to be decided at the session. Several different schemes were to be offered for the remodelling of the constitution, which will, whatever plan is adopted, be a momentous event. Besides this business, special reports were to be presented upon colonial architecture and on the construction of tenement-houses, by committees appointed for the purpose at the last convention, and it was hoped that a number of interesting papers would be read and discussed.

Removal of a Church.—The church of St. Stephen, Edge-hill, Liverpool, is being removed from one side of the street to another for a railway improvement. It was built from designs by the late Sir Gilbert Scott.

North Woolwich Gardens.—The *City Press* says it is proposed to convert into a recreation-ground the well-known gardens at North Woolwich; and the Metropolitan Board of Works is to be asked to purchase them.

Electric Lighting for the City.—On Tuesday, at the meeting of the City Commissioners of Sewers, a report was brought up by Mr. Innes, from the Streets Committee, on the subject of electric lighting in the City. They stated that they had received a variety of tenders, in considering which they had been guided not only by the prices mentioned but by the effect produced by the different systems in actual operation, all of which they had seen. They had decided, for the purposes of the experiment, to divide the streets into three districts, each of them including one of the City bridges. The first district would comprise Blackfriars-bridge, New Bridge-steeet, Ludgate-circus, Ludgate-hill, St. Paul's-churchyard (north side), and Cheapside, as far as King-street. They recommended that the tender for this district of the Anglo-American Electric Light Company (Brush system) should be accepted, at a cost of 1,410*l.* for the twelve months. The number of electric lamps would be thirty-two, replacing about 150 gas-lamps. The second district would comprise Southwark Bridge, Queen Victoria-street, lower part of Queen-street, and Queen-street-place. They suggested the acceptance of the tender of the Electric and Magnetic Company (Jablochkoff system), at a cost of 2,930*l.* for the twelve months. The number of electric lamps would be fifty-two, replacing about 161 gas-lamps. The third district would comprise London Bridge, upper part of Queen-street, Cheapside (between King-street and the Poultry), King-street, Guildhall-yard, Poultry, Mansion House-street, the Royal Exchange, King William-street, and Adelaide-place. For this district they advised the acceptance of the tender of Messrs. Siemens Brothers, at a cost of 3,720*l.* for the year. The number of electric lamps would be 32, replacing 138 gas-lamps. On a rough calculation the cost, including the plant, &c., would be about four times the price now paid for gas-lighting, but, eliminating the expenses which would not recur, the cost would be only twice that of gas. The Commission unanimously adopted the report of the committee, and the experiment is to commence on the 1st of February next.

St. Mark's, Venice.—Under the auspices of the Society for the Preservation of Ancient Buildings, a committee has been appointed to endeavour to get some heed paid to its protest against the proposed works at St. Mark's, Venice. They say that, "the more the recent restorations of St. Mark's are examined, the more clearly does it appear that those who are responsible for their execution had quite determined to carry them further in the same spirit. It is impossible to doubt, for instance, from the evidence of the portion already executed at the south-west angle, that the architect who has just rebuilt the southern front of the nave contemplated rebuilding the western front also, and on new lines; whilst the mosaicists would undoubtedly be ready to carry on their works on pavement, and ceiling, and walls, with precisely the same justification as before. This being the case, and recognising the wide-spread and extraordinary love for this great church among educated men of all countries, specially among students of art, and the real and profoundly sad sensation which has been produced among them by these restorations, it is felt that the only course open to those who wish to prevent such a calamity as the completion of such works would certainly be, is to join themselves together in a committee, with the sole object of using all possible means for the preservation of the genuine character of St. Mark's. The exceptional nature of the danger seems to justify what is no doubt an exceptional proceeding. The object will be to use every means for promoting a sympathetic co-operation with those numerous and influential Italians who hold the same views. The committee, individually and as a body, being actuated by the most cordial and friendly feelings towards the Italian nation, extreme care will be taken to act as delicately as possible, by friendly representations, and with every determination not to wound any national susceptibilities, or to take exception to what are plainly necessary repairs." The honorary secretary, Mr. Henry Wallis (9, Buckingham-street, Strand) will be glad to receive the names of those who may be disposed to help them.

Institution of Surveyors.—At the next meeting, to be held on Monday evening, November 22nd, a paper will be read by Mr. Francis Turner (Associate), entitled, "The Law as affecting Quantity Surveyors."

The Roman Villa at Brading.—Sir: With reference to this subject, which has excited so much public interest, I am directed to acquaint you that, by the co-operation of the Society of Antiquaries and the Royal Institute of British Architects, an influential committee has been formed to continue the researches, protect and exhibit on the spot the discoveries, and suitably record them. The small preliminary committee which has hitherto acted, of which Mr. C. Nicholson, of Ventnor, was treasurer, has dissolved itself, to facilitate the new organisation, and the owners of the estate on which the discoveries have been made are represented on the new committee, which will not in any way supersede or interfere with the labours so satisfactorily performed by Messrs. John E. Price and F. G. Hilton Price, but will strengthen their hands and leave the executive with them. The committee hopes to be able to prepare its report in the early part of next month. Meanwhile, I shall be glad to furnish further particulars to any persons who may be desirous to promote the objects of the committee by contributing to the Roman Villa Fund. The committee consists of Major A. F. Leeds, chairman; H. C. Coote, John Evans, A. W. Franks, W. A. Glynn, George Godwin, Professor T. Hayter Lewis, Sir John Lubbock, H. S. Milman, W. Munns, F. C. Penrose, Major-General Pitt Rivers, F. G. Hilton Price, J. E. Price, Professor Rolleston, C. Roach Smith, Captain Thorp, J. Whichcord, and Alfred White. The treasurer is Lieutenant-Colonel Malone, Capital and Counties Bank (Limited), Ryde Branch, but subscriptions may also be paid to Mr. F. G. H. Price, at Messrs. Childs' Bank, London.—E. W. Brabrook, Hon. Sec.

The Steam Navvy.—The usual fortnightly meeting of the Liverpool Engineering Society was held at the Royal Institution, Colquitt-street, on the 10th inst., Mr. Alexander Ross, president, in the chair, when a paper entitled "Earthworks and the Steam Navvy," was read by Mr. H. O. Baldry. The paper chiefly consisted of a description of the steam navvy as constructed by Messrs. Ruston & Dunbar, and the method of its employment in earthwork excavations, followed by an estimate of the saving to be effected by its use in place of hand labour. The most effective mode of working is that in which the machine stands on a central line of rails, with a wagon-road on each side; but this is only available in excavations 40 ft. wide or more. So that in ordinary railway-cuttings, a single wagon-road has to be used. The machine requires about twelve men for its operation, and can excavate about 500 cubic yards per day of light clay or moderately-soft chalk, one cubic yard being lifted by the excavating bucket at each stroke. At this rate of working the cost would be at the rate of about 3d. per yard, as compared with 4½d. by hand labour.

Windsor Castle.—At Windsor Castle, preparations are being made for the return of her Majesty from Scotland, and in anticipation of the arrival of the Court from the North. During the absence of the Queen at Osborne and in the Highlands various necessary repairs and renovations have been effected by the Office of Works Department in the buildings used by the Royal Family on the east side of the Castle. At St. George's Chapel the upper portion of the extensive scaffolding, erected for the repairing of the west end, has been struck, and the work of refacing with Oxford stone, which is being carried out under the supervision of Mr. Nutt, clerk of the works to the Dean and Chapter, is nearly completed. The stones used have been dressed with a composition designed to preserve the masonry from the weather, the west front, owing to its lofty elevation, being greatly exposed to the elements.

Erith.—The Church of St. John the Baptist at Erith has recently received an addition in the form of two stained-glass windows. The first, situated in the west aisle (a three-light window), contains a representation of "Christ healing the Sick." In the north window are full-length figures of the Apostles Peter, James, and John. The windows were designed and executed by Mr. Geo. Rees, of Lamb's Conduit-street.

Presentation.—The workmen employed at Churchers College, Petersfield, met together at the Swan Hotel, on the evening of the 13th inst., and presented to Mr. B. K. Webber, the late manager, on his leaving, a token of their esteem and regard in the shape of a silver goblet. The chairman, Mr. G. Isaacs, spoke in warm terms of their late manager.

St. Etheldreda, Ely-Place.—Two large-size statues of St. Peter and St. Paul have recently been placed in position in this ancient chapel, on the carved stone corbels of the wall arcading under the arched gabling between the windows. It is intended to reinstate the whole series of the twelve Apostles and four Evangelists. The sculptor, Mr. Doherty, of Blackfriars, has followed, to a certain extent, the figures in the interesting Shrine of St. Sibald at Nuremburg, a casting of which is at the South Kensington Museum. It was at the suggestion of the late Sir George Gilbert Scott that the projecting corbels were restored by the architects from one which had escaped destruction.

TENDERS

For new stables at Smitham Bottom, near Caterham Junction, for Mr. James Watney, M.P. Mr. C. W. Bovis, architect:—

		Extra if built in Cement.
Rowland	£935 0 0	£50 0 0
Grant (accepted)	978 0 0	52 0 0

For building two houses and shops adjoining the New Cock Tavern, Holloway-road, for Mr. J. W. Jennings. Quantities by Mr. H. Worthington and Mr. L. Canning. Mr. W. J. Worthington, architect:—

Cowland, Bros.	£2,194 0 0
Phillips	2,165 0 0
Cocks	2,139 0 0
Morter	2,082 0 0
Beale	2,019 0 0
Lamble (accepted)	1,989 0 0

For erection of two shops, with dwelling-houses attached, in Front-street, Arnold, Notts. Mr. Fredk. Jackson, architect:—

Marriott & Wartnaby, Nottingham	£635 0 0
Bell & Son, Nottingham	628 0 0
Jew & Hickling, Arnold	525 0 0
Smith & Greaves, Arnold	518 0 0
Wayte, Arnold (accepted)	447 10 0

For alteration and enlargement of Upton House, Upton, Essex, for Mr. J. S. Curwen. Mr. George McDonell, architect:—

Becroft (accepted)	£350 0 0

For erecting new mission-hall in Villier-road, Willesden, for the Rev. J. Arthur Rawlins. Mr. W. Graves, architect. Quantities by Mr. W. Barnett:—

Tennant	£1,435 0 0
Marks	1,389 0 0
Hunt	1,381 0 0
Stimpson & Co.	1,362 0 0
Vears & Co.	1,344 0 0
Toms	1,339 0 0
Ward	1,325 0 0
Spencer & Co.	1,229 0 0

For pulling down and rebuilding the Crown and Anchor public-house, Brixton-road, for Mr. R. May. Mr. W. T. Farthing, architect:—

Kirk & Randall	£4,340 0 0
Sly	4,201 0 0
Patman & Fotheringham	4,185 0 0
Jackson & Todd	3,887 0 0
Spencer & Co.	3,880 0 0
Gill	3,767 0 0
Burge & Moore	3,731 0 0
Burman	3,677 0 0
Francis	3,670 0 0

For superstructure of warehouses, Farringdon-street Mr. George Vickery, architect:—

Hall, Beddall, & Co.	£15,970 0 0
J. & J. Greenwood	15,649 0 0
Colls & Sons	15,510 0 0
Crabb	15,320 0 0
Hart	15,244 0 0
Lawrance	15,176 0 0
Ashby, Bros.	14,900 0 0
Ashby & Horner	14,769 0 0
Conder	14,778 0 0
Brass	14,733 0 0

For mission premises, with shops, High-street, Hoxton. Mr. M. M. Glover, architect:—

Jarvis & Son	£5,939 0 0
Staines & Son	5,684 0 0
Williams & Son	5,530 0 0

For proposed alterations at Carpenters' Arms, Carpenters-road, Stratford, for Mr. Symes. Mr. H. J. Newton, architect:—

Strong, Bros.	£400 0 0
Brown	368 0 0
Cross	292 0 0
Hawkins	285 0 0
Walker (accepted)	205 0 0
New Counter.	
Warne	£118 0 0
Heath	109 0 0
Matthews	93 10 0
Mott (accepted)	92 10 0

For proposed alterations at the George and Dragon, for Mr. Bower, at York-road, Battersea. Mr. H. J. Newton, architect:—

Beale	£317 0 0
Taylor	312 0 0
Lamble	310 0 0
Godden (accepted)	283 0 0
New Counter.	
Heath	£157 0 0
Warne	151 0 0
Hellings	149 10 0
Moody (accepted)	127 10 0

For repairs, &c., to shops, City-road, for Mr. Mace:—

Taylor & Parfitt (accepted)	£472 0 0

For the erection of two shops and dwelling-houses in Mnch Park-street, Coventry, for Mr. E. Ralphs. Mr. Herbert W. Chattaway, architect:—

Brown, Coventry	£1,175	0	0
Worwood, Coventry	993	0	0
Storer, Coventry	980	0	0
Joyce & Harrison, Leicester	975	0	0
Frith, Coventry	965	0	0
Haywood, Coventry	950	0	0
Mayo, Coventry (accepted)	875	0	0

For alterations and additions to the Cancer Hospital, Brompton. Mr. A. Graham, architect:—

Maton	£30,894	0	0
Bull & Son	27,900	0	0
Higgs & Hill	27,840	0	0
Nightingale	27,781	0	0
Bywaters	27,555	0	0
Chappell	27,530	0	0
Shaw	27,500	0	0
Patrick & Son	27,318	0	0
Smith & Co.	27,285	0	0
Braid & Co.	27,200	0	0
Hall, Beddall, & Co.	26,850	0	0
Holland & Hannen	26,821	0	0
Brass	26,635	0	0
Lawrance	26,223	0	0

For shop front and alterations at Leighton Buzzard, for Mr. W. S. Page. Mr. Gotto, architect:—

Dawson	£290	0	0
Webb	277	17	0
Mead	270	0	0
Groom	249	10	0
Edwards	240	0	0
Garside	240	0	0
Cook	244	10	0
Gibbs (accepted)	193	0	0

For a new house in the Finchley-road, London, for Mr. Samuel Palmer. Messrs. Morris & Stallwood, architects. Quantities by Messrs. Henry Cooper & Sons:—

Hall, Beddall, & Co.	£13,674	0	0
Clarke & Bracey	12,667	0	0
Shaw	12,637	0	0
Braid & Co.	12,300	0	0
Lucas, Bros.	12,144	0	0
Brass (accepted)	11,769	0	0

For additions and alterations at No. 5, Forest-place, Leytonstone. Mr. G. E. Pritchett, architect:—

				Credit for old materials.		
Eaton	£568	0	0	£10	0	0
Day	537	0	0	5	0	0
Cains	534	5	0	10	0	0
Wood	480	0	0	10	0	0
Hosking	487	0	0	20	0	0
Body & Co.	476	17	0	15	0	0
Arber	467	0	0	5	0	0

For the erection of villa residence at Beulah-hill, Upper Norwood, for Mr. W. S. Black. Mr. Charles Bell, architect. Quantities supplied by Mr. H. Lovegrove:—

Jenkins	£2,485	0	0
Eldridge & Gee	2,400	0	0
Wright	2,332	0	0
Hobson	2,237	0	0
Woodward	2,250	0	0
J. & C. Bowyer	2,239	0	0
Castle, Bros.	2,200	0	0
J. & S. Bowyer	2,077	0	0
Smith & Sons	2,069	0	0
Ta rant & Sons	1,998	0	0
Goad	1,845	0	0

For alterations to Nos. 108, 110, and 112, Belvedere-road, Lambeth, for conversion into offices for the Anglo-American Electric Light Company. Mr. George Edwards, architect. Quantities supplied by Mr. H. Lovegrove:—

Green	£820	0	0
Goad	741	0	0
Richardson	710	0	0
Stimpson & Co.	706	0	0
White	630	0	0
Cullum (accepted)	580	0	0

For house and conservatory, South-hill Park Estate, Bromley, for Mr. J. H. Lepper. Quantities supplied. Mr. J. Sulman, architect:—

	House.			Conservatory.		
Higgs & Hill	£1,631	0	0	£89	0	0
Bolding	1,600	0	0	100	0	0
Bowyer	1,568	0	0	108	0	0
Stephens & Bastow	1,499	0	0	91	0	0
Arnold	1,443	0	0	85	0	0
Douglas & Payne	1,436	0	0	92	0	0
Smith & Sons	1,426	0	0	83	0	0
Crossley	1,376	0	0	83	0	0

For a Wesleyan Chapel, Addiscombe, Croydon. Mr. H. P. Bonner, architect. Quantities by Mr. R. W. Griffiths:—

Clark & Bracey	£7,266	0	0
Staines & Sons	7,184	0	0
Crossley	7,120	0	0
Marrinage	7,070	0	0
Perry & Co.	6,981	0	0
Smith & Sons	6,875	0	0
Higgs	5,993	0	0

For alterations to Beech House, Park-lane, Croydon, for Mr. J. Brown. Messrs. Podmore & Martin architects:—

Marriage	£326	0	0
Smith & Sons	291	0	0
Pearson & Myles	249	0	0

For shops, and alterations at the Pelicans, Peckham-road, for Mr. Hndson. Mr. Millard, architect:—

Macey & Sons	£2,995	0	0
Taylor & Parfitt	2,835	0	0
North, Bros.	2,585	0	0

For repairs at Copenhagen-place, Limehouse, for Mr. Gilling. Messrs. Gordon & Lowther, architects:—

Dye	£293	0	0
Taylor & Parfitt	285	0	0
Starkey	282	0	0

Richmond Baths.—Mr. Lucas writes to say that, in hurry, two important "hills" were omitted, and that he withdrew his tender on discovering the error.

TO CORRESPONDENTS.

A Young Engineer (seaside sand makes very good concrete for foundations, but should not be used in concrete for walls above ground without strict precautionary measures)—E. B.—G. R. W.—J. E—G. S. A—G. T. C.—A. A.—H. W. C.—O. & L.—S. W. H.—G. McD.—J. Y—S. R. L.—F. J.—H. & R.—W. H. G.—T. & P.—G. E.—J. S & Sons.—O. R. W.—R. P.—G. T. C.—J. R.—I. L.—H. M.—W. W.—A. A.—L. S.—W. P. B.—H. J. N.—Mr. E.—R. R.—J. & S. S.—J. H.—G. H.—S. & Co.—J. Y.—G. V.—Mr. H.—S. & Son.—J. W. P.—C. S.—E. L.—F. G.—J. B.—A. S.—C. R. S.—C. M.—W. C.—H. W.—W. F.—W. W.—E. P.—E. B. W.—G. M.—H. H.—H. A.—G. R. C.—S. W. (good wishes).—W. H. L. (next week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

The Builder.

VOL. XXXIX. No. 1973. SATURDAY, NOVEMBER 27, 1880.

ILLUSTRATIONS.

CONTENTS.

A Cultivated Traveller on Art Abroad.

BELGIAN man of letters, known on the Continent by his works on the rural economy of Belgium and of Holland, on the instruction of the people, and on the primitive forms of property, made a tour in Italy at the close of 1878 and during the early part of 1879. His object was, not to see the country and the works of art, with which he was already acquainted, but to study on the spot the changes produced by the recent political transformation of Italy. Notes of his journey were published at the time, and have been recently collected in a volume. The clearness of his views, and the beauty of his language, give a value to a work which in its form is essentially fugitive. Some of his pen-and-ink vignettes illustrative of Italian art will be welcome to many readers. Some of the remarks, especially those on the motives of architectural details, if not altogether novel, are well put, and admirable in their truth.

"The monument of Maximilian at Innspruck," says the letter-writer, "with which I was not previously acquainted, made a great impression on me. The bas-reliefs of the Mansoleum, in white marble, form a base too fragile to support the statue of the Emperor which surmounts it. But all around, and between the columns, are ranged twenty-eight colossal statues in bronze, which have an overpowering effect. They are those of the ancestors of Maximilian, the Dukes of Burgundy, Philip the Good, Charles the Bold, and the Archdukes of Austria; then Philip le Bel and his Queen, Clovis in the costume of a Hungarian magnate, and King Arthur as a knight sheathed in iron,—a true *chef-d'œuvre*. Elegance, force, grace, nobleness in pose, all are here united. It is equal to the 'Penseroso' of Michelangelo."

Let us now cross the Alps. The date is in the month of November, just two years ago. "Even," says the author, "at this season Venice is a wonder. It is the only town which no other town is like. The sea, raised by the wind, which drives it landwards, struggles with a strong current in the canals, breaking over the Place of Saint Mark, and penetrates even to the cathedral. It is transparent, pure, and of the most beautiful green, instead of being yellow and stagnant as in the summer. The water, clear, living, joyous, bathes and reflects the ancient and sombre palaces. It is a breath of youth in the old city.

St. Mark's is the only church in Italy which produces a complete and unmixed impression. The interior of the Duomo at Milan is very fine, but the exterior is overloaded and not in pure taste; one might call it a cathedral in alabaster or in sugar. At Rome, St. Peter's is overwhelming in its grandeur, but spoiled by the profusion of ornaments. The façade is a failure. The churches of Orvieto and of Sienna are jewels, but they do not awaken the religious sentiment. The Pantheon is a perfect monument; but it is a Pagan temple, not a church."

A month later the writer is at Rome. He visited anew, he says, St. Peter's throughout, from the peristyle at the entrance to the summit of the ball. "It is a prodigious, astonishing, monument, but in bad taste. Michelangelo has wrought a miracle; he has reared the Pantheon in the air, but with what result? I love far more the Pantheon solidly planted on the earth, with its low cupola, allowing the light to fall through its circular aperture, opening directly under the vault of heaven; a simple and beautiful idea. The side windows at St. Peter's resemble those of a palace, and are out of place in a temple. Architecture is an art over which Reason and Taste should preside. Every detail should have its object. The Greeks have admirably comprehended this; thus in the Parthenon there is nothing without a motive. Therefore their works are perfect. Michelangelo, in spite of his stupendous genius, was the great corrupter of taste. Everywhere he sought effort, the extraordinary, the violent. See his Sibyls and his prophets on the Sistine Chapel. Our architects too often follow his example. Their edifices do not correspond to the object for which they were built.

Look at the Palais de Justice at Brussels. It has great qualities; beauty of outline, force and harmony in its lines; but where is its symbolism? Where is the justification of the disposition? Nothing indicates for what purpose it was built. Why that dome or superstructure, whatever it be, that crowns the edifice? It is without use, and it impairs the general effect. The interior arrangements are detestable. The very aim of the building is sacrificed to the façade. It is unreason, that is to say, the antithesis of architecture, when, on the contrary, everything ought to have its reason. St. Peter's, opening above our heads at a giddy height its gigantic cupola, has at least the merit of giving an impression of the infinite which suits a church. The Gothic cathedrals are full of ideas, of symbols. They are books of stone, which set forth the doctrines of Catholicism to those who do not know how to read. It is the same with the temples of India and of Egypt. There, again, although in a form less perfect than that of Greece, the architect has understood his mission. The Roman monuments, the circus, the thermæ, the theatres, the amphitheatres, the forums, the aqueducts, correspond admirably to their destination. They display reason incarnate in marble. Both in exterior aspect and in interior decoration, the Pantheon is incomparably superior to St. Peter's."

We give these extracts, not as authoritative canons, nor as expressing altogether our own opinions, but as the original criticisms of a travelled and thoughtful scholar, which cannot be read without giving food for reflection. Here is another sketch.

"They talk to me much of an art-critic, well-known in Italy and in Germany, the Senator Giovanni Morelli. His special study is the art of verifying the authenticity of pictures. To arrive at the criterion, he studies with the most minute care, magnifying-glass in hand, the work of a master as to whom there is no doubt. If this painter has several styles, he takes a specimen of each. He examines the colours employed by preference,—each artist has his own, the touch of the brush, the particulars of design, the character of the figures, the drawing of the hands, the feet, the draperies, the landscape, the architectural traits. It is certain that each painter had, and still has, his own mode of seeing and of rendering objects. It is only necessary to understand this. Thoré, writing under the pseudonym of Bürger, has applied this mode of criticism to the pictures of the Dutch school with the most instructive delicacy of perception. The critiosims of M. Morelli have produced sensation and gained authority in Rome. Applying his process to the Borghese Gallery, he has demonstrated that the famous portrait of Cæsar Borgia, by Raffaelle, is not by Raffaelle, and does not represent Cæsar Borgia. A new road, in my judgment, is thus opened for the criticism of art. But to succeed in it demands long study, and a scrupulous patience, unwearied in the examination of details."

We reproduce with the more pleasure this account of the criticism of Signor Morelli, from the circumstance of having recently turned attention to the very subject. To become past master in such an art demands the study of a life. But even the time which can be spared from a busy life will accumulate much that is of value, if systematically employed. We are happy to be able to offer one original contribution to this mode of criticism, to which we shall be glad to call the attention of our readers and of Signor Morelli. Photography may be used to detect restoration or tampering with an old picture. We made the discovery by accident. Another Signor Morelli, a very admirable draughtsman, was some time since engaged in taking photographs of the pictures in our own National Gallery. Looking at the first proof of one of them, a well-known Madonna,—there was a disfiguring blur over the forehead. "Oh," said the photographer, "that is a first proof,—I will set that to rights in the negative." So, no doubt, he did. But it was the first proof that was of value. Visiting the Gallery to refresh remembrance of the picture, no such blur was to be seen,—to be seen at the first glance. But the magnifying glass showed, on careful inspection, that the restorer had been at work. He

had repaired some casual damage, and done it with a skill that reproduced the colour, the touch, and the texture of the painter. But he had not used the same pigments, and this was instantly detected by the subtle chemistry of light.

At a time when every study has a tendency to become so strictly special that anything like a knowledge of *ensemble* is regarded almost with suspicion, it is of unusual interest to collect the views taken by a man of general culture, a scholar and a traveller, on such points as those which we have cited. There can be little doubt that such opinions as those above quoted on architectural motives both represent the views of a certain and important public, and lead, in their turn, to extend and enforce these views. Unless the architect keeps in electric contact with such a current of thought, he will fall behind the age. The most lasting impression produced by such a work as we have been citing is the cardinal importance of general culture in the development of artistic excellence.

EARLY GREEK SCULPTURE.

The book which Mr. A. S. Murray, of the British Museum, publishes under the title "History of Greek Sculpture"* would perhaps be better described under the heading we have given; at least, most readers would not be likely to gather from the present title that they were taking up a book in which the works which make the great glory and fame of Greek sculpture are hardly mentioned. It may be questioned even whether the word "history" can quite correctly be applied to the treatment of a subject in regard to which hardly any basis for historical accuracy as to facts can be said to exist. A review of the known remains of Greek sculpture, the probable dates of the various examples that are preserved, and the conclusions to be drawn, from the varieties of style observed in them, as to the progress of the art and the culture of the artists and their method of working, is fully possible, and this is really the nature of the work put forth by our author. But it seems a misnomer to speak of history where almost everything which is advanced as such is more or less conjectural; where the character of the work of this or that artist, whose date even perhaps is only approximately attainable, has to be conjectured from what is said of his work, in vague and ambiguous terms, by some ancient writer, who himself is often only repeating a tradition from some one else; and when the nearest that can be got to illustrating his work is to endeavour to connect with his name some isolated example which seems to answer sufficiently to the description of one of his statues. This can hardly be called history at the best; and our impression is that of all the conjectures on these points nothing more than possibility is proved as to any definite fact; even probability is questionable. The book is a study of the remains of Greek sculpture, not a history; and as such is of much value and interest, especially for general readers. It brings together within convenient compass much of what is known and conjectured on the subject, combined with theories and suggestions of the author's which are calculated at least to set the reader thinking, and with a considerable number of well-executed illustrations of objects of art bearing on the subject.

The introductory chapter on the theory and general principles which limit the art of sculpture is pretty much what has been often said before, sometimes a good deal better said,—for perspicuity of literary style and logical progression of the argument are not very conspicuous in the author's writing, and the reader has at times to take a good deal of trouble to find out the relation of one statement with another, and the point towards which the author is progressing. There is, however, a good and practically useful generalisation in the opening paragraph, in the remark that in the earlier stage of Greek art, progress was chiefly in the way of acquiring facility in the use of the material, while in the later stage the effort was to obtain fulness of knowledge of the original from which the artist worked. This, though susceptible of question in some points of view, is a good working generalisation; perhaps impressing one the more as such from its appearing at the close of a somewhat clumsily-expressed exordium. "In language a thought, and the form in which it is expressed, must be conveyed through a new medium; while in art the essential character of the object is reproduced in a new material. For both there must be freedom, but not without these limits." What limits? We can guess, of course, what must be the meaning intended, but the sentence in itself conveys no meaning to any one who has not the idea in his mind already. In this and other parts of the book we seem to meet with repetitions of what are now almost commonplaces of artistic criticism, but expressed in a very unintelligible, or, at least, awkward form. The sentence on page 12, as to "physical and moral turpitude being so closely allied in the judgment of the Greeks, and both equally detestable," is rather surprising. It is the great charge against the Greeks that moral turpitude was not nearly as hateful to them as it ought to have been; and the fact was not that physical and moral turpitude were closely allied in their eyes, but that physical imperfection was regarded as so serious an evil that a man was liable to be as much depreciated on account of it as if he were morally base, or even more so; which is a different thing from regarding the two qualities as closely allied.

The second chapter touches on the evidences as to the degree of power in various handicrafts and in the working of various materials which had been reached at the epoch represented by Homer; *i.e.*, of course, the epoch when the author or authors of these poems lived, not those which they profess historically to describe. In the next chapter a curious attempt is made to reconstruct the shield of Achilles from antique remnants of art, the process having been to copy from the most ancient authentic source a representation of each of the incidents said to have been represented on the shield, and then combine the whole, we presume with some modifications in detail, into the arrangement of the shield-subjects as described by Homer. But, in order to afford a more natural suggestion, in the shape of the shield, for the grouping and separation of the subjects, the author adopts a form of shield not circular, but with deep indentations on two opposite points of its margin, which cut into and divide the subjects, so as to necessitate a grouping of them, and interrupt their progression round the whole circle. For authority for this shape the author quotes two vases, one in the British Museum and one at Berlin. We do not in the least question the validity of the authorities, but they are absurdly inadequate against the overwhelming number of representations of circular shields in existence, and against the positive impression of a circular shield which the Homeric narrative conveys to us. One point alone seems to us conclusive, the placing of the conventional representation of ocean round the rim of the shield. This is a most natural idea in regard to a circular shield, not only decoratively, but also physically, as the Homeric age believed that the sea encompassed and surrounded the earth: on the shield of the form conjectured by Mr. Murray, this decoration loses all its effectiveness and meaning. The designs on the shield form a curious piece of patchwork, but, no doubt, they are something more like what really was in the mind of the Homeric narrator than is Flaxman's beautiful reproduction; and it is well for readers to be practically reminded in this way that the art contemplated by the poets and people of the Homeric age was not the art of the complete Greek period. General readers are so apt to apply to anything with the name of "Greek" the ideas and forms most popularly connected with Greek art, that they do not recognise the fact that what passed for sculptural art in the Homeric time was something very different from the Parthenon frieze. Mr. Murray makes some good suggestions in favour of the idea of an Assyrian origin of the legend of the shield and its description. He observes that the incident which rendered the making of the shield necessary, the loss of his first shield by Achilles owing to his having lent his armour to Patroclus, seems not unlike an excuse for bringing in a familiar legend, and that the description was a traditional one. That would account, as he says, for the omission of any mention by Homer of ships as objects on the shield, if the description were originally invented by an inland people. The description of the Achillean shield has been an object of so much interest to all students of the history of art and art-workmanship, that no attempt to throw new light on the meaning of it can be considered as superfluous.

Among some remarks on what most of us regard as the more questionable elements in Greek sculptural practice,—questionable either historically or artistically,—we find it suggested that the use of gold and ivory for early statues of deities appears to have superseded an early custom of clothing them in actual drapery, doubtless richly embroidered with gold. "For these figures various kinds of wood were employed, such as ebony, cypress, cedar, oak, yew, lotos, olive, fig, and others, and from the pillar-like form of these figures it would seem that the trunk of the tree had been left unadorned, with nothing more than a head carved on it." We presume the author means to imply that the terminal figures so common in later Greek and in Roman art were merely the old trunk and head forms, as he supposes them, assuming a more definite sculptural shape, and without the actual drapery. The supposition appears not improbable, certainly, and gives an explanation of the origin of the terminal figure; though it is reducing the dignity of ancient sculptural art sadly to imagine any department of it, and that, too, the important department which consisted in the representation of the deities, as little better in principle than a modern milliner's lay figure. "Nor is it unlikely," he adds, "that the images often standing in country places to represent patron divinities consisted of trunks of trees left with their roots in the ground, and with a slightly fashioned human head and arms. As such appears the Dionysos Dendrites occasionally figured on painted vases." There may have been one excuse for treating the representations of the deities thus, one which often has influence over early ritualistic art,—namely, that as the mere representation or symbol of the god, the work gained an importance and sanctity which placed it beyond the necessity of attracting respect by a more elaborate attempt at artistic realism or effect. The use of ivory to supersede these draped statues might not unnaturally have also have been accompanied by realistic colouring, which would keep up the habit of expecting colour in statuary, and thus explain what seems to many of us the incongruous taste of colouring marble statues. Sculpture in marble, when it succeeded sculpture in wood and ivory, "was encumbered with this traditional use of natural colours. But sculpture in marble had no true opening till temples came to be built with splendour, calling for the same plastic enrichment on a colossal scale which previously had been developed, so to speak, on thrones and chests": and this is a very probable sequence.

In regard to the sculpture on the temple at Selinus, attention is drawn to the contrast between these sculptures,—archaic and almost grotesque as many of them are,—and the Egyptian type; to the rigid immobility of Egyptian sculpture, compared with the exaggerated forms and straining attitude of the limbs in the Selinus metopes, as in the well-known one of Perseus cutting off the head of a hideous Medusa. This exaggeration of forms and action the author regards as the effort of these early sculptors of the Greek school to realise life and movement in the figure. A remark which is made in the same chapter is worth bearing in mind; that Greek sculpture grew up chiefly under the practice of working in relief, and that consequently no difficulty would be experienced in representing violent action in such a medium, compared with what would be experienced by sculptors struggling with the imperfectly understood mechanism of the human form in the representation of figures in the round, which must necessarily be subject to conditions of mechanical balance that would not affect figures in relief. This serves, as he truly observes, to explain the contrast which may be noticed between the violent, if not very free or natural, action in figures in relief, compared with the stiffness and the cautious and tentative reserve of figures in the round belonging probably to the same period, and of which some examples are given.

We must refer the reader to the volume for the attempt to characterise the various schools down to the period of Phidias, as our author recognises them, and the characteristics of individual sculptors. Much of this is, as we have already hinted, little more than conjecture, and the balancing of one probability or possibility against another. The book can hardly fail to be useful to most of those who read it, by

* "A History of Greek Sculpture from the Earliest Times down to the Age of Phidias." By A. S. Murray, of the department of Greek and Roman Antiquities, British Museum. With illustrations. London: John Murray. 1880.

suggesting new ideas to them, bringing together a considerable number of old ones, affording a kind of summary of what has been said and suggested in reference to the subjects treated of, and also giving in the foot-notes useful references to standard works which may be consulted. But we must regard the work as a *résumé* of the thoughts and fancies of an archæologist, rather than as proving anything material in relation to the subject of which it treats.

ART AND ARCHITECTURE IN GERMANY AND AUSTRIA.

THE above is the title of a paper from the pen of M. A. Turnei, engineer and architect, published in Germany. It reviews the architectural activity and the art efforts during the last few decades in Germany and Austria, and we on that account translate such portions of it as are likely to interest and possibly benefit students of Continental art and architecture in this country.

The author says that the efforts made in respect of art throughout Germany bear witness to a zeal which manifests itself not only in the establishment and development of collections, but extends its operations also to the localities in which they have been placed. Thus Frankfurt-on-the-Main has recently completed the almost monumental edifice holding the Städel Gallery, in Sachsenhausen; Hamburg, Stuttgart, Leipzig, Cassel, &c., have erected new buildings for their collections, which, it is true (as, for instance, the gallery at Cassel), do not always answer to the requirements which might be made with regard to arrangement and light. Those who have had occasion to inspect the old picture-gallery at the Belvedere at Cassel, and observed the inadequacy of space and light, will be agreeably surprised by the judicious arrangement and suitable lighting effect in the new gallery building.

The picture-gallery in the Neckarstrasse at Stuttgart suffers also from defective light, especially in the side cabinets. In the Museum at Berlin, and more particularly in the National Gallery, it is at certain times of the day simply impossible to examine the pictures hung in the smaller rooms, on account of the great reflection. The rooms in the Dresden Gallery which are lighted from above suffer likewise greatly from disturbing reflection, although otherwise this gallery, independent of its intrinsic value, must be classed among the most judiciously arranged collections. All these defects show how difficult it is to come up to all the requirements respecting lighting which must be insisted on in the case of a picture-gallery if its effect as a whole is not to be permanently injured. In Berlin a remedy has been supplied in the skylighted rooms of the Old Museum by screens, which are suspended free under the lantern, and which aid in neutralising the differences of light during the various parts of the day.

It is the same principle as that applied by King Ludwig I. of Bavaria in the case of the Rottmann landscapes in the New Pinakothek, Munich,—of course, here in a more complicated, more luxurious form, as an inserted porch; but the effect produced by this projecting roof in the lighting is extraordinary, as it is not easy to obtain by the direct operation of light. But the steady endeavour to take the practical requirements in this respect more into account than was formerly the case is becoming general, so that in a very short time Germans will possess a number of art institutions which may not only be described as excellent as regards their contents, but will be striking with respect to their interior arrangements.

There has been great architectural activity during the last ten years in the various capitals and smaller towns of Germany. Dresden has obtained in the Nicolai School (see *Builder*, March 8, 1879) a very healthy basis for a better development of architecture, and a series of new buildings in the English Quarter of the Old and New Town are excellent specimens. We need not especially refer to the Picture Gallery, nor the new Theatre, by Semper; they are specimens of architecture which, like his other works at Zürich, and the two Imperial Museums and the Hoftheäter at Vienna, will continue to be monuments of the first order.

Dresden has an advantage over other towns in possessing in the Elbe sandstone a cheap and excellent building material, but it is the custom to use it more for the walls themselves than for the facing of buildings. Notwithstanding the abundance of sandstone, the practice of cementing prevails largely in Saxony; visible brickwork is also very little represented.

Compared with Munich, the architecture of Dresden is in a more advanced state; the beautiful situation of the Saxon capital, the large influx of strangers, and also the great number of wealthy inhabitants, admit of the employment of larger means for secular architecture than on the average is the case at Munich.

The modern architecture of Dresden, compared with that of Munich, is more uniform,—nearly throughout in the Italian Renaissance style; while in Munich it is of the most motley description. Upon the Classic period of Ludwig I. followed the endeavour to produce a new style in the Maximilianstrasse, and upon this the period of Italian Renaissance of the Neuerather school; and at present there is an attempt at making German Renaissance the dominant style.

With respect to the latter experiment, Munich is not alone. At Vienna, such experiments have been more or less successfully made in the Reissnerstrasse, and at the new Justizpalast (see *Builder* of September 14, 1878), and by Domhaumeister Schmidt at various private buildings; but a more general introduction or supplanting of the prevailing Italian Renaissance has not been effected; the attempts have been isolated.

Such buildings have been more extensively erected in Berlin, where the undertakings in the Beuthstrasse, the Passage, and more recently in the Leipziger and Friedrichstrasse (see *Builder, passim*) have called into existence very excellent structures, which can no longer be classed among mere experiments. This cannot be asserted of Munich architecture, the works in the domain of German Renaissance, so far as they can be really included in that style, being merely experimental.

A very happy result has been effected in the façade of the Kunstgewerbehaus, Munich, and the endeavours to bring the interior into stylistic harmony with the outside deserves recognition, even if we do not agree with the mode of architecture which constructs vaulting and pointed arches of wood, and lines them with boards, as has been done in the large hall. But for the remaining undertakings in the province of German Renaissance at Munich, this could be generally admitted; they are far behind the Berlin works, and are devoid of a uniform character, which ought to be especially pronounced in this style of architecture. The *motifs* have not always been very well selected and carried out, and as far as the high-gabled façades (which seem to be greatly preferred) are concerned, they cannot be recommended for imitation; they are inferior to similar Middle-age gabled houses, as they may still be seen in Cassel, Cologne, and the Rhine towns, as well as in many other cities of Germany. Those fretwork gables are not praiseworthy specimens of German Renaissance, and, if they were more fully developed, would lead us back necessarily to the Rococo period; while, again, there are a whole series of really beautiful Renaissance buildings of the older period in Germany, which, like the Castle of Heidelberg, may be recommended. We need only look round among the older towns; the Castle of Offenbach, Aschaffenburg, a number of beautiful objects in the Rhenish cities, part of the Rathhaus of Lübeck, buildings in Berlin, and even in Eastern Prussia, for instance, in Görlitz and Breslau, deserve notice in this respect.

As far as the development of the German Renaissance is considered in its general typical features, it would, if truly and intelligently understood, be capable of fertile changes, and it would thus have a future; but as matters stand at present, and especially with regard to Munich undertakings in this department, much would have to take a turn for the better before it could compete successfully with the Italian Renaissance.

At present, and for a long time to come, the latter will retain the upper hand, and has found a home, in all small and large towns,—not, it must be admitted, to the disadvantage of art and its development.

In any case, it is desirable that in Munich architecture should emerge from the stage of mere experiment which has become chronic; that in that city not only builders and contractors, but also architects, should receive commissions from its citizens, a matter difficult to carry out in practice. At any rate, buildings such as we see in the Hessstrasse, which are devoid of the alpha and omega of architectonic ideas, would become scarcer, and thus a state of matters avoided which cannot recommend Munich, the first art-home of Germany, very much in the domains of art and architecture. If Munich did not possess the beautiful structures from the times of Ludwig I., the works of Neurenther, the Rathhaus of Haubrieser, and some of the better works of Schmidt, the city would be especially poor in striking specimens of architecture.

How different is the impression made by Stuttgart with regard to secular architecture. True, it has no imposing residential barracks, but the private residences are throughout of a pleasant and tasteful exterior, and their characteristics show that their owners think more of a better class of house than is the case in Munich.

In the same manner, if we walk through the villa-suburbs of Frankfurt-on-the-Main, Wiesbaden, Hamburg, &c., we gain the conviction that in those cities secular architecture assumes more and more a monumental and pleasing character, that the citizen is growing more select in his taste. Frankfort especially makes an agreeable impression in this respect (see *Builder, passim*); its villas of the outer periphery, and the buildings in the Kaiserstrasse, the new Exchange, the Opera-house, the Städelsche Institut in Sachsenhausen, represent to a large extent striking architectural objects. They are less structures run up by speculators than buildings demanded by modern requirements. They are the villas of rich merchants, such as we find them at Bremen, but especially in Hamburg. The latter city, which after the great fire of 1842 had such a splendid chance of carrying out the regulation and suitable reconstruction of the town, let this opportunity pass by, although there were present all the conditions required for a magnificent reconstruction, a desire expressed by Semper fifty years ago.

Notwithstanding, the rebuilding took place in the old angular fashion, narrow and rarely straight streets cross each other, and these are again enclosed as in a frame by residences of the ordinary type of older cities. As a contrast, the immediate neighbourhood outside the Public Grounds is of a more agreeable character. The whole series of villas along the Alster-Basin as far as Uhlenhorst and the immediate neighbourhood cause an excellent impression; they are mostly in the Italian Renaissance; the features of the city and neighbourhood would be much more imposing if changes had been effected in its interior and on the ramparts, and the Grounds of the Alster had been run round the whole town, as has been done in such excellent manner in Frankfurt-on-the-Main and at Leipzig. In this respect, Frankfurt has outstripped Hamburg; it does not possess such beautiful and riverine surroundings as the latter city, but it has spent more upon the town and its neighbourhood.

The greatest architectural stagnation prevails in Lübeck; everywhere else, in Wiesbaden, Coblenz, Cologne, Düsseldorf, Brunswick, Hanover, Cassel, &c., a greater or less activity has set in, and even smaller towns are not behindhand in proportion. Lübeck, on the contrary, has remained the town of the Middle Ages; all that is wanted to make the picture perfect is to replace the old inclosing walls, and to join them to the still existing gates. The number of modern buildings in Lübeck is limited, and even its surroundings show less of the suburbs of our time than we find them in all older cities, even at Nürnberg. In proportion to its sister towns, Frankfurt, Bremen, and Hamburg, this city, formerly one of the principal ones, has remained far behind in the race; but as a town proper, with its historical monuments and sign-posts, it is more interesting than those less modern, yet retaining the old healthy core and character.

There is a far greater number of towns which have preserved their architecture of the Middle Ages in Northern Germany than in the south. South Germany still possesses in Rothenburg on the Tauber, Markbreit, Ansbach, Nürnberg, especially in the latter, interesting types of old towns; but vandalism in modern garb is making sad havoc among the rare examples of Middle-age architecture,—pulling them down one after another; and tedious and uninteresting streets and houses take the place of romantic "Gassen" and buildings of a bygone age and departed art.

In North Germany also, though at present in a less degree, modern barracks push aside the best buildings of olden times. In Danzig, Königsberg, Breslau,—everywhere this ten-

dency shows itself in a dominating manner. Frankfurt-on-the-Oder and Görlitz have become quite modern towns, and although in the latter a great number of more ancient and highly interesting buildings have been preserved, the new town predominates.

On the whole, there exists in Germany a tendency to modernise, not always accompanied, however, by a happy result. The fact by itself would have incontestably to be declared a success if at the same time something better with regard to artistic progress were to more generally take the place of the old buildings; but in all the towns, large and small, with few exceptions, the work of building is in the hands of speculators and builders who have never, or very rarely, received a competent technical training, and whose talents are insufficient, in most cases, to replace by natural abilities what they are deficient in by study. It would be an idle attempt to try to teach the general public a better understanding. They do not possess the required judgment, and the freedom of trading in its most extensive application is nothing less than a preventive against relative excesses, and of the decadence in the art-domain of architecture,—and, as a further consequence, of the mechanic arts and art-industry.

In Vienna more caution has been used in this respect. The trade of the builder in that city, which has achieved most striking results in architecture and art industry, has never enjoyed such liberty as that any speculator without the necessary training and ability would be permitted to undertake building on his own accord. A special concession is necessary, which depends upon the capacity of individuals, and even builders by trade are compelled to employ an architect. These licences are withdrawn as soon as the builder offends in the matter of construction and safety of the buildings he erects, or when accidents happen through such neglect or incapacity; and it may be asserted that this system works wonderfully well, and deserves imitation elsewhere. What is wanted is not theoretical examination, which has sometimes very little practical value, but proof of capability, by showing that proper schools have been frequented and independent work executed in the special branch which has been selected.

It is only upon these lines that the right way for improvement in architecture and art-industry can be pursued. But this mode of progress may be aided very much by the assistance rendered on the part of governments, and especially of representative bodies. The latter more particularly often retard their development by withholding, from motives of false economy, the necessary funds required for the promotion of art and science, for the erection of public buildings, &c. These bodies, as a rule, do not consider that the means thus granted benefit the whole community, and that the state is bound to provide ways and means for future development, to remove obstacles, and to erect such landmarks as will direct a nation in the right way of progress. A rational and productive political economy, an increase of general prosperity, and the advancement of art and science, are practicable only on the basis of such principles.

VALUE OF BUILDING LAND AT MUSWELL HILL.

A BUILDING estate at Muswell Hill, consisting of about twelve acres, was sold at the Auction Mart, last week, by Messrs. Driver & Co. It is situated close to the Muswell Hill entrance to the Alexandra Palace, and within a short distance of the Hornsey and Crouch End Stations on the Great Northern Railway. It was described as well adapted for the erection of villa residences and shops, for which there is a great demand in the neighbourhood. After some active bidding, the estate was sold for 10,000*l.*, representing nearly 900*l.* an acre. This is said to be a larger sum than the average price which similar land in the locality has hitherto fetched. It was stated in the room that one of the metropolitan companies was the purchaser.

Sion College and St. Alphage's Church.—Mr. Charles Smith, vestry-clerk to the parish of St. Alphage, denies that the question of light as affecting the church has been arranged, and the parish is determined to maintain its rights. We simply reported what was stated at the auction. A model was, we believe, exhibited showing the way in which the difficulty would be surmounted.

NOISES.

RECENT revelations of science have shown that noise is a more comparative term than was previously supposed. So far as the special business of the builder is concerned, the word has been applied to what must now be looked upon as a very mediocre kind of vibration, when contrasted with the efforts of science to produce a really great noise. The consecutive system of architecture, which must necessarily prevail in large and densely-populated areas, has many disadvantages, and not the least of these is the conveyance of irrelevant sounds through the thin partitions that divide one building from another. The strains of a piano or the murmurs of conversation are seldom an acquisition when they come from a neighbour's house filtered through an ill-"deafened" wall. But the devices that are employed to avoid annoyance from causes of this sort are often sufficient if they are properly applied. The dirty mixtures of soot and other abominations are perhaps not very consistent with the highest conceptions of sanitation, but they are nevertheless sufficient in many cases to serve the purpose aimed at. The life of the tenant, however, would be a burden to him if his neighbour were given to making experiments with a steam-syren. We mention this instrument because it is constructed for the special purpose of making a "big" noise. It would be sufficient, under ordinary circumstances to keep a whole street from enjoying the blessings of sleep; and those of our readers who have heard it booming loud above the uproar of a storm, to warn ships from a dangerous headland in foggy weather, would probably be inclined to admit that its capacity for wakefulness would extend over the whole area of an average London parish. But if we take this as the maximum of noise which science has been able to produce, our wonder is exceeded by revelations as to what is going on around us that the ear unaided is not able to detect. The world of sound has just had its boundaries marvellously enlarged, with regard to vibrations that require special appliances in order to be heard. The microphone has been, in many respects, eclipsed by an instrument recently invented by Professor Graham Bell, to which he has given the name of the photophone. The general result of both instruments has been to show a mobility among the component particles of so-called solids that had never been more than suspected previously. The most teuable theories on the subject of heat seemed to demand as their foundation a certain kind and amount of atomic motion which appeared to be the only rational way of accounting for the phenomenon. Now it not only has transpired that such molecular movement does occur, but the vibrations even of light acting upon, or rather, to speak more correctly, among the particles of solid metals, have become audible to the human ear. It seems, in fact, that electricity, by reproducing the most delicate vibrations on an enlarged scale, is capable of doing for the human ear what the microscope has already accomplished for our organs of sight.

It can hardly be said that the vibrations are exactly reproduced. What reaches the ear is not an intensified continuation of the air vibrations originally set up by the movements of the molecules, but all the same we have, if not an exact copy, at least an audible proof of their existence. For several years the effect of light upon the metal seleuium has been the subject of investigation among men of science, who have severally and separately contributed a number of facts with regard to its behaviour under the influence of various kinds of vibrations. These experiments have been conducted principally in relation to the effect of light upon the metal as a conductor of electricity. It appears that rays of a particular kind, falling upon seleuium, increase its electrical resistance. This fact suggested to the mind of Professor Graham Bell that alterations in the intensity of light falling upon a sensitive surface of this kind might be reproduced as sound through the medium of another substance vibrating in accordance with the rapid alterations going on in the electrical conductivity of the seleniun. This has been accomplished, and it now transpires that only a simple set of apparatus is required in order to convert the rays of the heliograph, which has already done such good service in the late campaign in Afghanistan, into the channel of actual speech.

This is, indeed, a startling announcement, and means that when the apparatus is perfected two persons, separated, it may be, by many miles, will be able to hear each other speak with nothing but a beam of light passing between them as the medium for reproducing the sound of their voices. Not contented with this marvellous application of known facts to practical purposes, the Professor has generalised the scope of his experiments, and shown that noise in the microphonic sense of the term is going on among solid bodies in a way that the microphone in its original form could have scarcely led one to expect. Light falling on selenium leads to a commotion among the particles of the metal which is alleged to be audible. There is no reason to suppose that other solid substances are proof against similar disturbances.

Such discoveries open up an almost new conception of what the world is made of. Truly there are "more things in heaven and earth than are dreamt of in our philosophy." No sooner has man removed the imaginative charm of the unknown from his every-day life by the exploration of every nook and cranny of the world he lives in than a new world is revealed to him that can only be groped into by the aid of scientific instruments. But what shall we say of organisms infinitely below ourselves in the scale of creation to whom, for all we know, this world of sound is as familiar as the vibrations of every-day life to the ears of ordinary humanity? Who knows but that the hearing organs of insects may be sufficiently delicate to detect the sounds which are quite beyond our power of perception?

In this view of their capabilities, perhaps the rising sun is to them the herald of an uproar among the particles of the surfaces upon which they move. The walls of a house or the panes of glass in a window may, during the continuance of daylight, be in a constant condition of audible vibration which only ceases with the advent of darkness. The effect of moonlight upon the electrical resistance of selenium has already been proved to have a character peculiar to itself. Who knows, then, but that the rising moon brings about a new order of sounds for the delicate organisms that are capable of detecting them? So long as we are startled by discoveries that call upon us to recognise the mystery of the infinitely little, we need not complain about the want of great additions to our knowledge of the infinitely great. Nevertheless, our acquaintance with the wonders of both seem to move on together. The revelations of the spectroscope informing us of the composition of distant planets is not less wonderful than the revelations about sound which are now engrossing the attention of the scientific community.

SOME CANADIAN INDUSTRIES.

To allay the anxiety of political economists, who know not how to dispose of surplus populations, retaining intact the body social, Emigration springs to the front and challenges attention. To this sharp remedy for the "frettings, aches, and cares" which beset the worker in old countries, statesmen and speculative people in general are growing resigned; statistics show that, spite of the enormous increase in emigration latterly, populations advance. As regards a large number of emigrants, their choice sways between the United States and Canada, peculiarly, just now, falling upon the latter country. Ten years, spent in numerous vocations in Canada, have naturally afforded the writer of this sketch opportunities for observation above the average.

Although timber and grain are the chief products of Canada, mining interests now assert themselves; material is there in plenty; capital and labour are needed to develop it.

It is no question, now, of royal alliances or delicate political adjustment. Fine feeling and cultured prowess in the field soon grow imbued with the common tarnish of smoke. Nations that have coal and iron, with sinew to the good, rule the world. In all these Canada is rich. Iron ore of high quality is, under various forms, found in almost all the provinces, though mining is yet in its infancy. Nova Scotia, perhaps, takes the lead, her furnaces having produced 20,000 tons of iron for a year recently elapsed. This old colony has long shared with New Brunswick the prestige that may accrue from being the greatest ship-building countries in the world, in proportion to their populations; so that the impetus which must be given to the iron maritime industries of the New Dominion's eastern sea-board by the development of mines

can scarcely he over-rated. Twenty years ago, ths writer served an engineer's apprenticesship at the enormous establishment of Messrs. Charlss Mare & Co., at Millwall. Day and night there arose the din of steam-hammers and the glare of furnaces, rendering visible dark hulls upon the stocks hy the river's sids. The "hands" were counted hy the thousand. Mors yet; the entire hend of the Thames engirdling that dreary marsh known as the "Isls of Dogs" was aglow and at work. Most of those yards are closed now, their work "gone to the Clyde." Ths fierce spirit of competition presses Northern shiphnilders not a little. It nsds hut a less doubtful Colonial policy than now holds, when, Canada heing formally confirmed in the advantages of imperial union, recognised as forming an inalienahle part of the empirs, men of the Clydo will establish hranch industriss in Nova Scotia.

In the province of Quehec, iron is sven mors plantiful, but mining has scarcely hegun. The French natives have little energy and less wealth, so that an immigration of both capital and labour must aid the fusion of existing social elements which confedsration must hring about.

Canadian iron-ors is, in the older districts, fonnd together with markstahle yellow-ochre, of dark-red colour when hnrnsd; somstimss as red hrematite imbsdded in crystallins limsstone of Silurian formation. The joint produce of the three oldor provincss for a recent ysar was 40,000 tons, of which two-thirds were charcoal-iron, owing to ths absence of coal from Ontario. It was not that railway communication was bad, bnt rather that timber for fuel purposes was so plentiful; year hy year, however, wood grows more dear and coal more cheap. The "Steel Company of Canada" produced, according to official accounts, in the year 1876, 15,274 tons of iron, employing nearly 200 men. Charcoal was used as fuel, hut is giving way to coke made on the premises. Charcoal pig-iron was shipped to England at the low freightage of $0 50 per ton.

British North America, Canada now, was first settled upon the coasts and along the margins of the lakes. It was long known that British Colnmhia had iron, hut the strata containing it have only recently hesn localised to the "Cascade" regiou, heyond which it is not found. It is in contiguity to extensive coal deposits.

Coming from the Pacific coast across the Rocky Mountains, we find iron and lignite ahundant hetween the Lakes Superior and Huron, as also in the district lying hetween the Georgian Bay and the Ottawa River. Further inland, altogether removed from the lakes, are coal-heds larger than any which are known elsewhere; there is at present, however, no communication with them either hy land or hy water. The completion of the Canadian Pacific Railway will open up the prairie-lands of the north-west, both to plough and pick-axe, rendering profitable the tracts of iron-stone reaching from the U.S. houndary-line to the Arctic Ocean itself.

Having glanced at the mines of Canada, and realised their undoubted importance in the future, some account of cnrrent iron-industries may interest. Vast in size as is Canada, the circle of actual manufactnro falls necessarily within the limits of settled occupation. There, next to the mason, the hlacksmith reigns supreme over the host of toilers, commanding steadiest wages; his harvest is gleaned from the peaceful cavalry of the country, the farmers and their teams of well-shod horses. In addition to this, ploughshares aro hreaking against stump and stone, reaper knife-guards becoming unriveted, while the maker of agricultural implements is not always within reach, so that Vulcan's sturdy son is "in clover" during harvest-season. Winter, again, sees him employed upon sleigh-runners, so that at no season is he idle.

Canadian hlacksmiths evince ingenuity and quickness rather than mnsonlar power, hut there is many the wayside forge, in very remote districts, from beneath whose pent-house shed heams the honest, ruddy face of the English smith. Always glad to greet a conntryman is he, and has stories to tell, leaning upon his sledge-hammer, of his distant hamlet in "Merrie England." Smiths' pay (jonrneymen's wages) ranges from $1·50 to $2 00 a day. "No very high rate, after all!" some one may cavil. No, hnt helives cheaply and well; his children are well edncated, and are worth money to him; and he has bought his house and "building lot." He may yet become Reeve or Mayor, or even expand into a rohust, if not hrilliant, member of Parliament.

No man, hlacksmith or else, works for others, in Canada, longer than he nsed; independencs is at once ths charm and monsy-winning secret of that free life. The hlacksmith is a pioneer rather than a followsr; so much have times changsd from the romantic cast of olden times, that hs precedes the missionary, running a neck-and-nsck race with even the zealous French Jesuit in the vangnard of civilisation. He hnilds his shanty, sets his forge agoing in charge of his hoy, and bimself, axe in hand, makes intermittant war upon the Titans of pine and oak.

Scarcely second to ths hlacksmith is ths maksr of agricultural implements: an important functionary in both civil and social circles. His profits are large, his work not particularly delicate, and he gives employmsnt to many raw hands, who, thrown idle by the inclsmsncy of ths ssasons, are ready to turn themselves to anything. In the smallest shop, howsver, one good mschanic, in the ssveral branches of wood and iron, is retained at high wages. He fesls himself at least as useful to ths world as his master,—a bearing which, far from aronsing bad fesling, wins esteem. If ths "hoss" havs marriagoahle daughtsrs, prospects of partnership improve.

Towering above the herd of lesser ones are some half-dozsn notahle makers, whose goods would, for lightnsss and finish, do credit to any country. Exigencies of Canadian farming, such as the shortnsss of harvest seasons and high price of labonr, have borne colonial makers of agricultural machinery to a height in their profession, whence they look down with compassion upon "Old Country" rivals, with their cnmhrous appliances. This is presumptuons; for the heavy clays of England demand different treatment from the light cleared soils of Canada; while, there, the extents of land only partially cleared of stumps snggest important modifications in ploughs and harrows. In Manitoha and mnch of the vast North-west territory, the soil is heavy and adhesive, so that steel ploughs can alone be used; parts, indeed, are made of glass, exceptionally. There are, as yet, no resident mannfactnrers thero, although iron is plentiful, and some enterprising Englishman with a few hundreds of pounds is much wanted. Wire fencing would be sure to pay, for timher is expensive.

Reverting to "Old Canada," the inference, from what has been said, that machinery nsurps hand-lahour, is enconraged. Steam and horse-power play a far more active part than here. The scythe is used in places where machines cannot penetrate, it is trne, and there are yet to be found settlers whose pride is their "cradling" prowess. Harvesting is disociated from the rnral and poetic surroundings that invest it at home. A sickle is viewed as a ouriosity, and maidens are too busy making cheese to find time for weaving wreaths of corn-flowers, which, indeed, are less common than the terrible Canadian thistle. Another of those old implements that have, by association of ideas, hecome the subject of chaste apotheosis, is the flail. The horse-power thrashing-machine has dethroned it. Go where you will, during the months of Jnly and August, you hear its humming. This, as well as the "root-cutter" and "reaper," is a dangerous machine, swelling the annual list of farm accidents. Smartly got up, they are christened by fanoy names, snch as the "Acme," the "Forest Queen," and the "Climax." Bright paint, however, does not always cover the hest work. At the yearly provincial exhibitions, held in rotation at the various towns, makers are well represented; nor are their reputations merely local. Many have taken medals at European exhibitions. Giving work to hoth wood and iron workers, the opening of a factory is an event to a hamlet. Clustering around it are houses, library, town-hall, chapel, school, and surgery; the yonthful town soon aspires to civic rights, this heing the dearest hope of the Canadian corporate mind.

If machineries used to gather in the harvest he elaborate, those for the opening of new territory are simple. Most characteristic of Canadian implements are axe and "buck-saw." With the former, the pioneer fells trees, squares timbers, splits fencing: his axe is his capital. The other, disdained by hackwoodsmen as a tool of effeminate luxury, is invalnahle in the preparing of wood for the stove. There are professional travelling huck-sawers, often negroes, and the saw proves a source of livelihood for those who are, in the griping rigours of winter, so unfortnnats as to lack work. Anyhody in whom the consciousness of having enjoysd an academic sducation does not outweigh mors solid considerations, may make tolerahle wages hy contracting with families to cut thsir "cord-wood."

The manufacture of saws and axss is naturally largely prossc utsd, the Canadian axs heing a modsl of elegance, and superior to English ones. Axe factories are somstimes vsry extensively built, arranged with small steam-hammers and shearing-machines, work heing found for the clevsr blacksmith in wslding the iron hody of the hlade with its steel-cutting edge. The "Galt Axe Factory" has a more than Amsrican celebrity, Australia heing a heavy customsr.

Among the necessaries of modern life, and high in the list of Canadian iron industries, is the sewing-machine. Though the largest factories are in the United Statss, Canada has many lasser onss: some of famous make. The "Osborn" and "Raymond" are at Guelph, Province of Ontario, forty-five miles from Toronto. The "Little Wanzer" is at Hamilton. Some ysars of piecework upon the "Osborn" enahle the writer to sstimate hoth the advantages and the defects of that system. Piecework to commence with, without any previous standard of day-lahour, snrsly leads to exorbitant prices for work done. This was the case there. By the vigilance of smployers, a "cutting-down" process was inaugurated by-and-by, which carried matters to the other extreme. There might, it is trne, bo worse luck than that of being obliged to work hard in order to make $10 per week, were it not that we had often to "lie off" a fortnight at a stretch, there being more stock on hand than could be at once sold. The work upon sewing-machines is of no great delicacy from the engineer's point of view, although a tact in adaptation is needed, only to ho attained by practice.

Tool-making is the choicest mechanical department in the iron hranches, nor can any hut good blacksmiths hold their own, hecause of the precision demanded in tempering the many little cutting-tools employed.

Most money is made, however, not hy the skilled mechanic, hut hy those for whom interest has secured a drilling or planing machine, or lathe. Either a pattern-shop is upon the premises, or woodworkers are employed at a distance, to make the boxes and tables. Machines are japanned also, so that an oven is needed, and the neighhouring fonndry placed nnder contribution for "castings." Sales are chiefly effected through travellers and agents resident in the varions towns of hoth continents; speculative canvassers frequently buy machines at redneed prices on their own account, finding their markets themselves. Capital being often scarce in the firm, this latter plan finds favonr. Business heing prosperous, ready money is coming in, while, the reverse happening, production is slackened, or the works even temporarily closed. The factories are modern, tastefully hnilt, and well furnished with plant. Proprietors are mostly men from the United States, who, leaving their country to evade the excessive taxation consequent upon the Civil War, settled in Canada, where they grow attached to her, and make good citizens.

Canada has several high-class engine-shops. Messrs. Goldie & McCulloch, of Galt, Ontario, make engines quite equal to any of the English makes. The men are in hulk Scotch, for party-feeling runs high, and factories acquire the national *bouquet* of their owners. Famed throughout the Dominion, this firm has constant and reliable employment to give; the huildings are upon as large a scale as most engine-shops at home. Wood is used as fuel, yet signs are rife throughout the land of speedy change in the direction of coal. Upon such extensive railway lines as the Canadian, there are, of course, well-ordered locomotive shops. There is not so much "hright work" about Canadian as about English locomotive engines; still, essential parts are as carefully looked after as here. In Toronto and Montreal there are rolling-mills, with puddling-furnace and tilt-hammers, bnt nothing heavier than rails can he made. Boiler-plate is imported. "Pont-y-pool" is largely used. Good tool-making factories exist,—a recent direction taken by native enterprise; but, both pig and malleahlo iron being fetched into the country, prices of material and lahour are high.

It must be long ere Canada exports finished material, hut ores have been profitably exported already, if upon a small scale. Nova Scotia, Quehec, and Ontario sent out, in 1876,

60,000 tons. Canadian independence does not threaten at the moment; thoughtful Colonial minds desire closer alliance with the mother country. It is, however, a possible episode in the future, nor to be feared, except on broad Imperial grounds. England would not cease to be the market for raw mine produce. British capital is invested far deeper in the secondary applications of metals than in the primary one of ore extraction. The former will increase, the latter decrease, as the colonies unearth their treasures.

What may prove to be the character of those vast coal-beds underlying the prairie regions of the North-west must determine the future of Canadian manufactured iron. To cover small orders at special prices, charcoal-iron is unrivalled, but, to enter the stream of foreign competition upon equal terms, Canada must use coal. This is no place for the discussion of Transatlantic fuels. Suffice it, that the coals of Canada differ much in quality, and one extensive tract at least, — the "Smoky River," — is contaminated by the presence of sulphur, the ruin of reducing operations and forge-work.

The axe and saw excepted, cutlery is brought from England, together with the various articles of farm and home use falling under the generic heading of hardware,—all but a long list of small matters, at once useful and ingenious, such as locks, window-fastenings, apple-parers, in which line the astute Yankee is supreme. The foundry is an institution of deserved standing in Canada. It generally stands alone, unattached to an engine-shop. Few towns,—and Canadian towns would be villages in England,—but have such an industry, where rough castings are turned out to suit prices and occasions. Here resorts the shrewd patentee to put his pet scheme into shape, for the cost is not great, and the proprietors are sure to be interested in a "new wrinkle." At such a little foundry, the writer, having ordered a weekly relay of window-fasteners from his own pattern, fixed his base of operations for an extended canvassing tour. Partly on foot, partly by land and water conveyance, he traversed the greater part of a province, penetrating into the forest fastnesses of Muskoka, whose depths had never echoed to the pioneer's axe, nor a window existed to fasten. Lake upon lake, river upon river met his gaze, all connected and navigable, while a prescience whispered of a day when many factories and men shall be at work there making engines for the fleets of steam craft destined to plough those waters. The business of fastening windows growing unlucrative, he retraced his steps, making up for lost time in the hamlets fringing that new district.

Iron ship-building is practically confined to the maritime province of Nova Scotia, where coal is accessible; yet upon the chain of fresh-water seas stretching inland from the Upper St. Lawrence to the foot of the Rocky Mountains is "verge and room enough" for a large iron mercantile marine.

Docks will one day be found upon these prairie-reaches, and forests of chimney-stalks rise from the flowery sward, as nature yields her desolate sovereignty. But, at present, the feverish anxiety to "better themselves" that animates Canadians strikes at the roots of mechanical efficiency. Everybody covets the possession of land, and most attain their ends in time. There is not in all the Dominion a trained body of shipwrights able to build fleets; and if there were, the labour would be too costly. New Brunswick is, perhaps, foremost in engine-building: she burns wood-fuel, and therein is the secret.

A word now at the close. A small iron capitalist must do well in Canada, if only he can adapt himself to the exigencies of the country, beginning with repairs. Wire-fencing, corrugated iron buildings, mill-machinery, are needed. The intelligent mechanic with some means can also succeed, if he can unlearn his home-lesson and place expedition before excellence; let him join the two qualities, and it will be so much the better for him. Inability to raise himself out of the accustomed rut is what keeps back very many mechanics abroad. No man should resign good prospects at home in the vague hope of bettering his lot; for, as the world goes, he who gets good wages for a fair day's labour has cause to be thankful: as views widen responsibilities accumulate. If independence be easier gained, toil is far more severe than at home; perseverance and integrity make their marks in England.

A CHRISTMAS REVERIE.

TIRED and weary during a long journey, I sat ruminating in the corner of a railway carriage, when gradually a change seemed to creep over everything; my travelling companions had altered their attire; fashions strange and queer supplanted the homely garments of a few moments ago; the carriage seemed much loftier, the window had stopped its rattling, the draft from the ill-fitting door had ceased, a fresh pleasant atmosphere pervaded the place, although the windows were closed. A narrow table which occupied the space between the travellers was filled with books and papers all stamped with the seal of the railway company, and a Morocco-bound time-table, with the date 1900 in gold letters, lay amongst them.

I turned to my companion, with whom I had been in conversation a few moments before, and asked the meaning of all this. "Surely," said he, "you have not travelled much of late, or you would have known what improvements have been made." I suppose I looked somewhat puzzled, so he proceeded to enlighten me.

"You must know," said he, "that about Christmas time some fifteen years ago things had become so bad that a week of abstention from railway travelling was appointed, and offerings of fuel and water were made to King Steam, with prayers to relieve us from the difficulty. A strange thing then occurred. In the new year all the boards of directors, on assembling as usual, found their places occupied by shadowy forms. The bravest tried to take their usual seats, but were thrown with some violence on the floor and against the wall. One chairman, a gentleman of immense energy, fetched the police, but when the bâtons of those officials were wrenched from their hands, and recoiled with force on their own heads, the inspector said it was a private matter, with which he declined to interfere, and withdrew his men. Each of the directors went post-haste to his solicitor to consult him as to what had best be done, and the shadows remained masters of the situation. Writs were issued, but have not yet been served, although years have elapsed, and even now the energetic officers of the law may be seen entering every house where 'spirits' is written over the door in hopes of doing their duty.

Next morning the travelling world were sorely puzzled. On applying at the ticket-offices, the little iron grilles were closed. Travellers knocked and listened for the customary civil response. Silence reigned within. Outside the stations, in the windows of tobacconists, stationers, everywhere, placards met their gaze with 'Coupons 1900' legibly inscribed. Entering a shop our traveller asked for a ticket. 'We don't sell tickets,' said the shopman. 'We sell coupons.' 'I want a first-class return available for a week,' said our traveller. 'We have no classes,' said the shopman, 'and no returns, and all our coupons are available for a year.' 'Tell us all about it,' said the traveller. 'I will,' said the shopman. 'This little morocco case contains a book of coupons. Each leaf is perforated, and contains ten coupons, and each coupon enables you to travel ten miles, first-class. Each coupon is also divided into ten parts, and each part is equal to one mile, so that each leaf enables you to travel by any railway 100 miles, or any part of the distance, first-class. If you prefer to travel second-class, each coupon is available for twice that distance; and if third-class, three times the distance; so that only one kind of coupon is issued, available for any class. No season tickets are now issued, and excursion trains, which caused many accidents, are done away with. These coupons are available for a year. At the end of the year they must be exchanged for others of a similar value, dated for the year following. This is necessary for book-keeping purposes. A traveller, in presenting his book at the gate, has it stamped with the mark of the station he starts from, and the class he intends to travel, and the collector at the other end tears out the requisite number of tickets, and they go back to the clearing-house, where they are exchanged for cash.'—'How,' said the traveller, 'do you get your profit?'—'I will easily show you,' answered the shopman. 'Formerly a great discrepancy occurred in the cost of tickets. The first-class season-ticket holders often travelled at a rate below the third-class ordinary traveller. This was unfair. The cost of the booking-offices is now saved; the company get their money in advance. They do not sell less than 100*l.* worth of tickets, from which they allow us a discount. That discount is our profit; and the companies also reckon on a certain per-centage on coupons lost or accidentally destroyed, which they do not replace. People travel when, how, and as far as they like, and all pay the same rates. Large employers of labour keep tickets by them, and give them to their workmen when they send them to country jobs, and, in fact, the advantages are so great that no one will now propose to return to the old system.'"

I thanked my companion for his interesting communication, and we stopped at a station. The name was legibly written in twenty places on a level with the eye, and the whole length of the train. Every one, without looking out of the window and inquiring what station it was, could easily see. Porters came and civilly asked if we wanted to get out, or had any packages for them. They were a most intelligent-looking body of men; and on my remarking it to my informant, he explained that no paid porters were now employed. "It was found," he said, "not to work well to pay all men alike. The idle and disagreeable men did least work; the civil and industrious men did most; so that it became a premium on idleness, which was unfair. The present men are paid according to the work they do,—so much a package, if put on a cab, so much more if taken to your house. The signalmen and drivers are put in at twenty-five, and pensioned off at forty. They are very well paid during their fifteen years of active service, so that if they have been careful they can live very comfortably on what they have saved and the amount of their pension. If they desire further work, they have always the preference for light-porter's work, and are a very happy and respected body of men, and the companies have found the freedom from accidents this has brought about more than compensate for the extra cost."

I noticed a box with the word "complaints" written on it, affixed to the wall, provided with a lock. "That box," my informant said, "is for dropping your card with any complaint you may wish to make at the back. The travelling inspector has the key, and the advantage is the complaint is investigated on the spot, and often within a few hours after it is made. Your name is not divulged, and as complaints, as a rule, are not made without some cause, it has a most wholesome effect on all concerned,—so much so, that the knowledge of the facility it gives the public to bring their complaints before the proper authorities, prevents cause being given for them."

The floor of the carriage, I was pleased to see, was level with the platform, and no space was left between the platform and carriage. This had been urged so often, that I was glad to notice those appeals had at last been effective.

The carriages were also much loftier than any I had before seen, and my informant explained this great advantage was obtained at a small additional cost.

My companion also explained to me the use of a pipe about 3 in. in diameter, that passed under the carriage, and was connected with another upright pipe in each compartment, terminating near the roof, and provided with a valve just over the head of the passengers; an india-rubber junction between each carriage made it continuous. "This," he said, "is for the admission of air without draught into each compartment, and can be used at night, or in wet weather, when the windows are closed." At the back of the tender I saw a carriage, the front compartment of which was fitted with several bright copper vessels, of which I could not understand the use. "You will see by and by," said my friend, "but the box in the corner is an ice-box. In warm weather the air is carried round a coil of pipes inside the box, and is thereby cooled before it enters the carriages, and in the winter the box, which is made of strong riveted iron, is filled with steam from the engine, when the air is warmed, so that by this simple means, and at a nominal cost, the carriages are kept at a comfortable temperature, and the air sweet at all times." The insides of the carriages looked in good taste, and the cushions were covered with a pretty washing material. I noticed an absence of the bits of looking-glass and cheap gilt mouldings I had always associated with first-class carriages, and when I sat down the cloud of dust one is usually enveloped in was not to be seen.

The cause of the first improvement he explained was that the railway companies no longer trusted to their own efforts in decoration, but had instituted a yearly exhibition at which prizes were awarded for improvements in railway matters, and as those prizes were large, they were enabled to avail themselves of the best talent obtainable. The cleanness of the cushions was owing to the system of summer and winter fittings having been adopted; in the autumn all the carriages are cleaned out and washed, the cushions with their gay covers are taken out, and others with more sombre coverings substituted. The horsehair with which the cushions are filled is turned out and washed, as well as the cases containing it; by this means the stuffy mangy effect of the old carriages was removed, and the carriages always looked clean and inviting. I noticed there was no refreshment room at the station we had just left, and inquired the reason. "The directors," my friend explained, "became at last ashamed to sell their customers refreshments they would neither eat themselves nor offer to their friends." "And what have they substituted?" said I. "I will show you," said my friend; and, touching an electric bell I had not before noticed, the window was almost directly opened by a man dressed as a cook. After a few whispered sentences he withdrew, and returned in about fifteen minutes with a dish of cutlets and fried potatoes, most appetising and nice, which he handed in at the window with a bottle of claret and a decantor of water. I thought I had observed for some minutes a smell of cooking, but fancied I must be mistaken, although now I at once divined the cause, and I at once saw the meaning of the copper vessels which had so puzzled me. "Don't you think a little cooking-apparatus carried with each train is better than the old refreshment-room"? said my friend. "There can be no doubt about it," said I; "and I wonder it was not adopted before."

"Why," said I, "are the papers and periodicals all stamped with the railway stamp?" "They belong," said my friend, "to the railway company, and are provided for the use of travellers without charge; when done with they are sent to the hospitals. Why," he continued, "should hotel-proprietors provide their customers with reading free, and not railway companies?" "I cannot tell," said I. "Why is the time-table bound in morocco, and printed on such good paper? It is very nice, but to purchase it monthly must be very expensive." "It is not published monthly, but yearly," said my friend, "the monthly time-tables, owing to the constant changes and the difficulty of making arrangements in advance, became such a plague that they were abolished, to the loss of no one but the publisher, and to the gain of the whole travelling public. It is as easy for a company to make its arrangements twelve months in advance as one month, and we have now a well-bound well-printed book instead of the flimsy old time-table, always out of date, of years ago."

"Why are the carriages different colours?" I inquired. "To distinguish the class," said my friend. "When a train draws into a station it is annoying to travel all along the train looking for the class of carriage you require. It is better to be able to tell from where you stand where your carriage is. The smoking-carriages are all placed behind, so that the smoke cannot annoy any one whose window may be open."

"The carriages with lace curtains and upholstered so prettily are for ladies; you will see 'Ladies only' on the doors and windows, on the Continental system. You will notice they are first, second, and third class, to suit all wants, and are much appreciated."

"Where are the arms that used to divide the seats?" I asked. "They are done away with," said my friend; "they took up a certain amount of room, and when a compartment contains only four passengers, which is often the case, they can make themselves much more comfortable when there are no arms than when there are."

"You will notice," said my friend, "the windows do not rattle; the little crank at the side of the sash works up and down with a vertical motion like a French bolt, which is much better than the slovenly old strap and the loose sash. The door fits air-tight, like a jeweller's case. You will notice the keen draught that cut your knees in winter is done away with."

"Why," said I, "is the back cushion hung at top and the lower edge fixed to the seat, and why does the cushion draw out with a frame?" "This," said my friend, "is for long journeys and night travelling. By this simple contrivance, which only costs a trifle, each seat is converted into a couch, and by putting one-half the passengers it will hold into a carriage, which is quite as many as we usually have of a night, each traveller gets as much comfort as if he were lying on his couch. It is most gratifying after riding some hours to alter the position. This can now be done, and it is, I assure you, much appreciated."

"How pleasant it is to read by this electric light," said I. "Yes," said my friend, "it is generated by the engine, and costs little. How people put up with those dirty, miserable, old oil-lamps so long I cannot think."

"But where are the papers?" I asked. "Oh," was the response, "they are all journals now; news is condensed, sensation articles don't pay; advertisements are much dearer, so advertisers condense their matter; the public like it better, and the journals pay better than the papers, and they are handier and much better for keeping and reference."

"But how do all these improvements affect the dividends? I fear they must reduce them." "Not at all," said my fellow traveller. "People have not the objection they once had to travelling; you are as comfortable now in a railway carriage as in your own room. The number of travellers has very much increased, and the dividends are higher than ever in spite of the extra expenses. You will find," he added, "that whether a man directs a railway or keeps a shop, it is all the same, he never loses any thing by studying the comforts of his customers."

At this point the word "Tickets" was shouted in my ear, and starting up I found myself, with all my bones aching, put back twenty years into the old musty carriage, with its low ceiling, its rattling windows, its draughty doors, its stifling atmosphere, its wretched lights; and when the train stopped, and I was begging a stolid porter to have the kindness to put my luggage in a cab, I found to my cost, as the girls sing,—

"It was a dream, it was a dream."

W. H. Lascelles.

THE ORIGIN OF THE POINTED ARCH DISCOVERED.

More theories to explain the origin of pointed architecture! and this time so profound, so philosophical and unassailable, as to remind us of the immense advances in knowledge that we moderns have made, and the great elevation at which the nineteenth century stands as above all other centuries.

A book has been recently published in London, illustrative of some Arabian matters, and the author, in speaking of the camel, confers on that very venerable and useful beast a distinction which we are not aware it has hitherto enjoyed. In fact, he traces the origin of the pointed arch to the hump on the camel's back. The common camel, as every one knows, has two humps, but the Arabian camel, or dromedary, the chosen animal, only one. Architects should look up this, if only for "the fun of the thing." The volume in question is published under a *nom de plume*, but the real name of the author is understood to be Falkenhergh. If the conclusions of this gentleman are sound, the whole of our Gothic class-books, manuals, and glossaries will have to undergo a thorough revision, to make room for the "camel-back theory." About the antiquity of the "ship of the desert" there can be no mistake; for if the animal has not existed through all geological time, it is sufficient for all reasonable people to know that it was contemporary with Adam and Moses. Notices of the camel will be found in the Book of Genesis, and we know camels formed a considerable portion of the property of Job, who is said to have possessed 3,000 of these animals. Surely a domestication extending even over 4,000 or 5,000 years will satisfy reasonable folk that the hump on the camel's back must have well impressed itself on the minds of the early builders. Euclid, Thales, and others, who worked out such forms geometrically, were, doubtless, inspired by the hump. Echo says "Humph!" But *place aux dames*. Here we have a delicate *brochure* in lilac and gold which settles the matter entirely,—"Architecture and how it arose. With a Model for the Gothic,"* by Charlotte A. Pound. The illustration on the cover tells the whole story. Put the tips of three fingers on each hand together, separate the lower part of the hands as far as this will allow of, hold the two first fingers erect, to take the shape of pinnacles, and there you have it! What can be simpler or more conclusive? Not only the ground-plan, but the whole structure (says the writer) may be tested by the human figure as to its principles of symmetry and proportion; the Hand which forms the Arch is itself the perfect model for that Arch." And then the fair enthusiast goes on to teach how the proportions are to be obtained, in that sweet dogmatic tone which belongs to the sex when they happen to be talking of what they have no knowledge of. The braceletted arms of a lady upraised with the bent fingers touching, form an arch "which gives the altitude of the Chancel Arch and Roof, and distinctly defines the form." The hands are to suggest arches of every size, and will give the proportion for the window. The thickness of the wrist will determine the space between the windows for buttresses; and "the knee upraised to the height of the elbow, gives both altitude and form for the Entrance Porch." This last piece of information is too subtle for us, we are bound to confess, but it is evidently quite as true and useful as the rest, or as the statement immediately following that the feet side by side turned up show the relative size for the Great Door. Strange to say, all this is written as if with a conviction of its entire truth, and with a good sprinkling of Biblical quotations; the kind intention of the lady being, after "study of the laws of symmetry and proportion," to supply to modern architects the deficiency caused by the loss of the laws of Gothic architecture!

* London: Marlborough & Co. 1880.

THE JORDAN BAROMETER.

It is impossible to foresee the result of the perfecting of any scientific instrument. It is rarely the case that such an instrument is,—like the spiders among *insecta* and their allies,—born in the form which it will maintain through life. Such, however, was the case with the weather-glass of Pascal. The best mercurial barometers of the present day are in principle, and almost in detail, identical with the tube which that great genius carried up the Puy de Dôme for his memorable experiment. The great defect of the mercurial barometer is the narrow limit of its movement. A difference of ten per cent. in the atmospheric pressure, which is about the maximum to be obtained at any fixed point on the surface of the earth, only causes a difference of 3 in. in the height of the column of mercury, and it is difficult to read the barometer more closely than to the tenth of an inch. The ball-like, or cup-like, form of the top of the mercury gives some indication as to the actually upward or downward tendency of the barometric movement,—but the desirability of a more visible display of the force of atmospheric pressure is undeniable.

Extreme delicacy, no doubt, is obtained by the use of an aneroid, furnished with vernier and magnifying glass. But the aneroid is better suited for observations involving change of place than for those made successively on the same spot. Like the old-fashioned wheel barometer, the aneroid usually requires a tap, to see that the needle is freely moving; and this is but a clumsy means of making a delicate observation. Years ago we remember, in the window of an optician in Liverpool, an inclined barometer. The upper 3 in. or 4 in. of vertical tube were replaced by 5 ft. or 6 ft. of inclined tube, so that by placing the graduation at right angles to the latter, the intervals of change were magnified from twelve to fifteen times. We are not aware how the ingenious modification acted. Those of our readers who were at the meeting of the British Association in Birmingham some fourteen years ago may remember that one of the lions of the place was a water barometer, erected in the house of an amateur, which seemed almost to breathe like a living being. A water barometer was made by Professor Daniell for the Royal Society in 1830. The indications given by this instrument (the movement being about twelve times as great as that of the mercurial column) are very distinct. But the variation of temperature exerts such an influence on the vapour rising from the water within the tube as to interfere with the accuracy of the instrument. In fact, it is not a barometer, pure and simple, but a combination of barometer and thermometer.

Mr. Jordan, of the Museum of Practical Geology in Jermyn-street, has met, and it seems safe to say has overcome, this defect in the water barometer. He has substituted for water, pure glycerine, the specific gravity of which is 1·26, —or only one-fourth more than that of water. And glycerine possesses the unusual advantage of combining perfect fluidity with a boiling point of 44° Fahr., and a correspondingly low freezing point. Thus, it raises no vapour to be affected by heat in the top of the tube, nor will it be injuriously affected by frost. The only defect of the substance is the readiness with which it absorbs water from the atmosphere. This has been met by Mr. Jordan by the ingenious device of giving the glycerine a waterproof coat, or, in other words, floating a layer of petroleum on the surface of the glycerine in the cistern. Thus, a barometer of extreme delicacy, and as little liable to get out of order as the mercurial barometer itself, has been placed at the service of science.

One of these barometers has been constructed at Kew Observatory; a second at the Museum of Practical Geology in Jermyn-street; a third at the South Kensington Museum; and a fourth at the office of the *Times* newspaper. This journal has commenced the publication of two hours' readings of the instrument, plotted on the natural scale. The unusual weather which has prevailed during the first week of these graphic indications has been illustrated by the very visible movement of the surface of the glycerine. What is now most to be desired is the erection of an adequate number of these instruments at certain well-selected points in the island, and the publication of the contemporaneous movements of the column. The strong accentuation of the variations already published is such as to raise the hope that much valuable information may be secured by the proper multiplication of these delicate observations.

ON SOME POINTS ARISING IN BUILDING CONTRACTS.

The case of Goodman *v.* Layhorn, which we reported in our last number, p. 628, raised a question of some importance to those engaged in building contracts, as regards the extent of the clause relating to the power of the arbitrator over disputes as to extras or the plan or specification of the work. The clause, or rather part of it, there ran, "In case and as often as any dispute shall arise touching the plan or specification or the work mentioned in the second stipulation of this contract, it shall be determined by the architect, and his certificate thereon, and any and every other certificate given by him, shall be final and conclusive between all parties concerned, except only by his final certificate he may correct any error in any former certificate." It was argued before Mr. Justice Lopes, in chambers, unsuccessfully by the counsel for the employer, that this was a submission to arbitration within the 11th Section of the Common Law Procedure Act, 1854, and that that being so, all proceedings in the action could be stayed by the Court, and the dispute referred to the employer's architect. But the late Lord Chief Justice Cockburn, and Mr. Justice Bowen, before whom the appeal came, adopted the view taken by Mr. Justice Lopes, or rather, they decided the case on one of the grounds presented by Mr. Roscoe, the counsel for the plaintiff (the builder), that the architect was not an impartial person, and that, therefore, even assuming this clause to be a submission to arbitration, the Court would not exercise its discretion and stay the proceedings so as to refer it to him; and there can be little doubt that the Court took the proper and most desirable view of the question. When once a writ has been issued, and the parties have become antagonistic, it is obviously undesirable that the architect, who is the agent in many respects of the employer, should settle the disputes. It is perfectly certain that if he were invested with this power, the builder would not be satisfied if he did not recover all he asked for. If questions as to certificates arise, which are matters closely touching the manner in which the architect has discharged his professional duties, it is obviously unseemly that this very architect should have to settle questions in regard to certificates given, or not given, made properly or improperly, by himself. In the case of Goodman *v.* Layborn also, the application was made after the pleadings had closed, whilst the section of the Common Law Procedure Act states that the application is to be made before plea or answer. As the Lord Chief Justice pointed out, it is obvious that the party who desires to avail himself of a clause by which disputes are to be submitted to arbitration, and of the statute, should do so with expedition, and not let the case drag its slow length along through various stages of pleading.

Apart, however, from these what may be called preliminary though conclusive points, it seems pretty clear that the clause which we have quoted, and others of a like nature, are not submissions to arbitration which can induce the Court to stop legal proceedings, or which can be made a rule of Court under the seventeenth section of the Common Law Procedure Act, 1854. In the case of Wadsworth *v.* Smith (40 *Law Journal* Reports, Queen's Bench, p. 118, and "Roscoe's Digest of Building Cases," p. 8) it was decided that a very similar clause was not a submission to arbitration. The late Chief Justice of England, who was a party to the decision in question, said that the statute had only reference "to submissions by consent of the parties, and where it is intended that the matter shall be judicially inquired into and shall not be left to the uncontrolled decision of some third person." The essence of a submission to arbitration seems indeed to be as the Lord Chief Justice put it, that "the matter shall be *judicially* inquired into." Now it can hardly be that the decision of an architect as to whether 20*l.* or 30*l.* is to be paid for extras is a decision arrived at after a judicial inquiry. A judicial inquiry obviously means one in which both sides are to be heard, and which, though not necessarily very formal in character, yet should partake somewhat of the nature of a legal trial. Again, Mr. Justice Hannen remarked, "I think the clause in question is not a submission to arbitration, but only an expansion of the usual provision in building contracts that on the question of extras, &c., the certificate of the architect shall be conclusive." No doubt, the words in Goodman *v.* Layborn, "as often as any dispute shall arise," may give some countenance to the view that the architect was to be invested with the functions of an arbitrator, especially having regard to Lord Blackburn's words in Wadsworth *v.* Smith,—"Where it is intended that the referee shall determine some dispute, there his decision amounts to an award." But having regard to the general tenor of building contracts, no disputes in fact can arise about extras, nor could they, properly speaking, have arisen in Goodman *v.* Layhorn, as the employer, when extras were charged for, had only to refer them for computation to the architect.

Another point in regard to building contracts arises upon a clause somewhat unusual in character, it is true, but which is found in some agreements. It is something to this effect, "that the payment of the balance does not free the contractor from any liability which he may justly be subject to." Suppose the building completed and payment made, some real or supposed defect is discovered several years after, and the employer thereupon commences an action for damages against the builder. We understand that, in the opinion of some contractors and builders, such a claim is an inequitable one. But there can be no doubt that if such a clause is placed in a building contract the house-owner may, with perfect legality, avail himself of it. As a matter of fact, as the case of Davis *v.* Hedges shows (L. R. 8 Q. B. 687, Roscoe's "Digest of Building Cases," p. 10), an employer may pay the full price for a building, may then find out that the work has not been efficiently done, and may then bring an action for damages without there being any such clause in the agreement, as we have mentioned above. So that, in fact, the introduction of such a clause is only to formulate and put into so many words a legal right which, in any case, exists. But it is perfectly clear that an employer who commences an action for damages against a builder for bad work or bad materials, some considerable time after the building is completed, would have to show, with great clearness and certainty, that what he complains of really and proximately arises from these causes, and not from others which do not concern the builder at all. Clearly, therefore, builders have nothing to be alarmed at in such a clause as the one now under discussion, and it is most desirable that they should not be under the impression that by receiving payment they are quit of all responsibility in connexion with the building which they have erected. Some short explanatory observations, and the essence of the case we have mentioned, will be found in Roscoe's "Digest of Building Cases" (p. 10), where a portion of the French Code Civil is also given, showing that in France architects and contractors are liable for ten years from the completion of the work for any faults in plan or construction. If there is any false impression as to the effect of payment, the sooner all builders and contractors learn by heart the case of Davis *v.* Hedges the better. If they are dissatisfied with their present legal position, the only course open to them is to insert in contracts some kind of statute of limitation, such as is the law of the land in France, though for a shorter period. But, considering the keenness of modern competition, it is more than doubtful if the public would employ builders who insisted on such a clause.

ST. LEONARD'S TOWER, WEST MALLING.

Sir,—Mr. Parker's remarks upon St. Leonard's Tower at Malling, printed in the *Times*, and more recently in the *Builder*, induce me to send you the following notes taken eight or ten years ago during a visit to Malling, and which may interest some of your readers.

This tower, apparently the earliest built and the latest part remaining of the residence of Bishop Gundulf, is probably one of the first Norman keeps, perhaps one of the earliest military towers in masons' work, after the departure of the Romans, constructed in England. With these pretensions, it deserves more attention than it has hitherto met with.

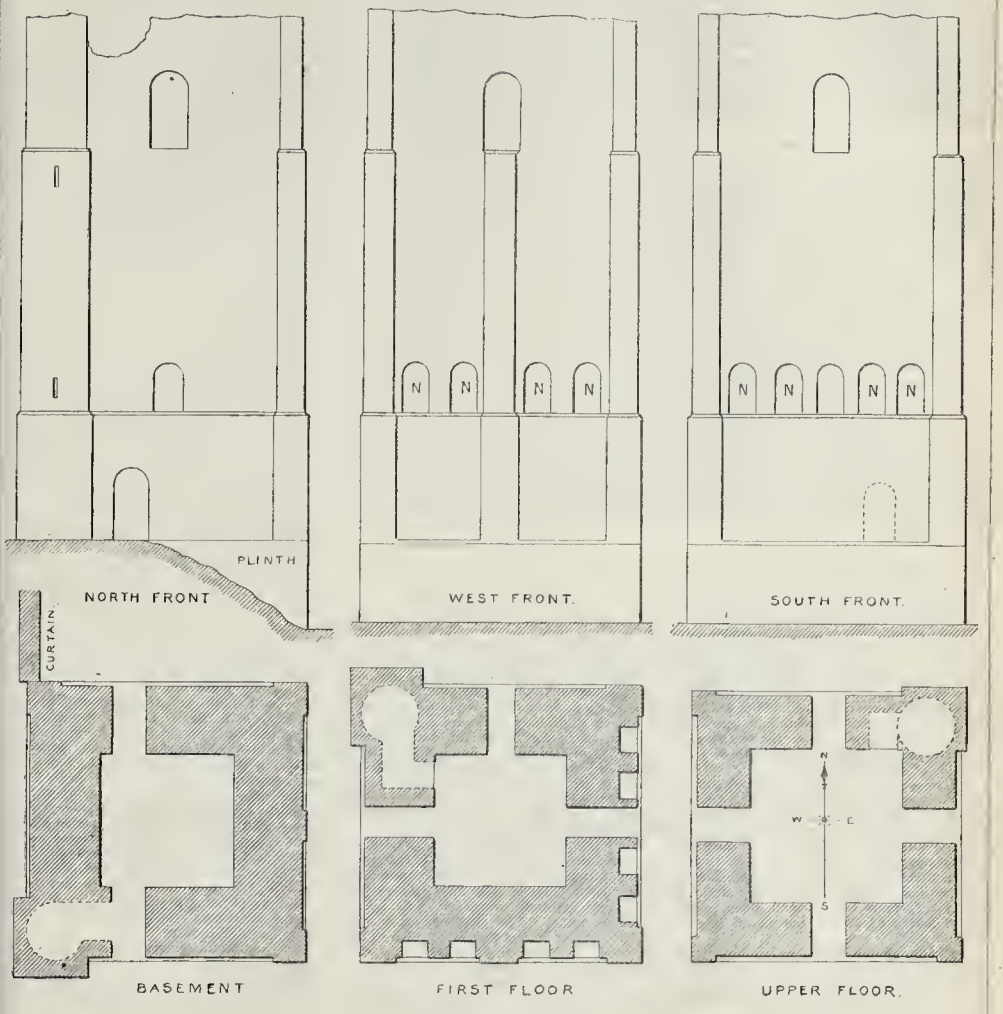
It stands about a quarter of a mile south-west of the parish church of Town, or West, Malling, in Kent, the plain heavy tower of which is also attributed to the bishop; and a little further from the remains of the religious house founded by the same skilful and magnificent prelate, and a remaining part of which seems also to have been his actual work.

The tower stands upon a ledge of horizontally-bedded sandstone rock, of a friable character, which juts out from and forms the east side of a short narrow combe, the defence of the castle on its western front, and which opens upon a stream tributary to the Medway, which stream receives a further addition from a spring which rises from beneath the rock about 100 yards south of the tower, and has been employed to strengthen the defences of the place on that side.

The tower is a very plain rectangular structure of the Early Norman type, about 32 ft. square at its base, and about 60 ft. high on its northern and eastern, and about 70 ft. on the two other faces, the difference being produced by the greater depth of the rocky shelf. The walls rise from a plain plinth, the top of which is at the ground level on the east face and north-east angle, and 10 ft. above the level on the south and west, so that the plinth is on these sides 10 ft. high. The tower is flanked at the end of each face by a pilaster strip, which rises from the plinth, and each adjacent pair meet and cover the contained angle. At three of the angles these strips have 6 in. projection, and are 3 ft. 6 in. wide, reduced by two sets off to 2 ft. 6 in. at the base of the parapet, into which they probably died. The pilasters covering the fourth, or north-east angle, are 7 ft. broad, and of 18 in. projection. These also have two sets-off. This increased breadth and projection is to accommodate a turnpike-stair, which rises from the base to the roof, and was evidently crowned by a square turret, but whether there were turrets at the other angles is doubtful, though, if present, they must have been of rather smaller dimensions. In the centre of the west face is another pilaster, 3 ft. broad, and of 6 in. projection. This also rises from the plinth; but stops at the level of the uppermost floor, at the base of a window, of which it forms the cill. Of the sets-off, that at the level of the first floor is carried round the tower; the upper one is confined to the pilasters. The parapet is gone, and the wall at the head of the staircase, being weakened by it, is somewhat broken down. The tower wall is described as battering, or inclining inwards; if so, the degree must be very slight, for its appearance is vertical, the set-off reducing it by about 6 in. or 8 in., so that at the summit the dimensions cannot be less than 30 ft. square, and the wall appears, from below, to be about 6 ft. thick.

The basement is without windows, but in the south face, near the east end, was a round-headed doorway, quite plain, without a portcullis or any moulding, and of about 3 ft. 6 in.

ST. LEONARD'S TOWER, WEST MALLING.



Scale, 16 *ft. to an Inch.*

opening. This is now, and evidently has long been, walled up, so that any rebate it may contain for the door is concealed. It opened on the top of the rock, and probably was approached by a wooden exterior stair, which must have been 10 ft. high. The present entrance is opposite to it at the same level, which there is that of the ground. This seems to have been a later opening, broken where the wall was reduced in thickness by a sort of lobby at the foot of the staircase. This is a very common treatment with Norman keeps, the ordinary doorway becoming inconvenient, and the times ceasing to demand extraordinary precaution.

The first floor has a plain round-headed flat-sided opening, that is, without splay or what in the North is called flanning, placed in the centre of the north, south, and east faces. On the south face this window is in the centre of a plain arcade, having on each side of it two similar arches, about 3 ft. broad and 2 ft. deep. The singular thing is that these niches are in the outer face of the wall, not, as would seem natural, and as occurs at Chepstow, in the inner face. In the west wall are four similar niches, but the central space is solid, occupied by the pilaster. There are two narrow round-headed loops on the north face, lighting the staircase at two levels.

The second and upper floor has four windows, one in each face. These are round-headed, quite plain, flat-sided, of about 4 ft. opening and 8 ft. high to the springing. The three floors seem to be,—the basement, 15 ft. high; the first or main floor, 30 ft.; and the upper floor, 15 ft. The floors were all of timber. There is no visible fireplace, nor do there seem to be any mural chambers or galleries. The walls at the base are 8 ft. thick. The staircase communicated with each floor, and with the roof. The line of the lower floor cut off the head of the original entrance doorway, as at Chepstow.

The masonry throughout is of a very sound and solid, though of a rude description. It is evidently original, and does not appear ever to have been repaired or even pointed. It is of rubble, the stones being pretty much as they came from the quarry, of all shapes, but rarely containing more than a foot cube. The work is roughly but decidedly coursed, with a slight tendency to the herring-bone pattern. The joints are very open, and the mortar has been very freely used. The quoins and window-dressings are of ashlar, apparently of some local ragstone, with wide joints.

It is difficult to form any safe conclusion as to the plan or area of the castle, of which this tower was certainly the keep. No doubt it lay to the north-east and east, where the ground forms a table-land a little above the keep level, and where there are traces of some rather extensive earthworks. There is a short piece of curtain-wall projecting a few yards from the south-east angle of the keep, and pointing eastwards. It looks of early masonry, but of rather later date than the keep, against which it is built without bond. It is about 25 ft. high. According to this evidence the south and west faces, at the least, must have been exterior, which, considering the arcades on their faces, and the position of the entrance-door, is curious. Probably the other end of the curtain abutted upon the north-east angle, but if so it did not bond, and has been destroyed, leaving no trace of its presence. This keep stands in three separate premises, two of which are, or rather were when these notes were taken, jealously closed. The only entrance is by the modern

door, which was fastened and the key judiciously mislaid; nor, at that time, was there a ladder to be found within reach of the tower. The garden, containing the earthworks, and within which probably stood the ball and lodgings, was attached to a private lunatic asylum. It is much to be desired that the Kent Archæological Society should take this tower in hand, and obtain proper plans and elevations of so very remarkable a building, with a good photograph of its masonry.

THE CHURCH TOWER.

A furlong or so from the castle is the parish church, the western tower of which is also attributed to Bishop Gundulf. This is a square, solid, heavy structure, about one diameter in height, very plain and simple, and without any ornament or set-off. The two western angles are capped with pilaster strips, which rise, not as usual from a plinth, but direct from the ground. There is a third pilaster, of much bolder projection, at the south-east angle. This stops short of the summit, and is mixed up with a buttress, apparently of Decorated date, and connected with an early south aisle, now removed. There is a west door, of late insertion, and above it a window, probably representing an original opening. The walls are thick, and there is an opening into the church. The tower stairs are of timber, as are the floors. In the south wall of the basement chamber is a small round-headed window, the exterior loop of which has been altered and made square-headed. The wall is rubble work, coursed and very open jointed. Though rough, it is rather superior to that of the castle, probably from respect to the character of the structure.

THE ABBEY.

The Abbey, or Nunnery, a Benedictine House, also founded by Gundulf, is about a quarter of a mile from the parish church, and just on the verge of the town. The remains are not considerable, and include a good and rather large Perpendicular gatehouse, with an earlier chapel attached. The west part of the church is standing, and the south wall, and a building connected with the south transept, probably the refectory. There are also some domestic buildings of Early English and Perpendicular date, now converted into a dwelling-house. These, the south wall of the nave, and the refectory, form three sides, probably of the cloister court.

The west front is mainly Norman, and the lowest stage is of very early work. On each side of the door are two round-headed recesses like those on the keep, and the character and material both of the rubble wall and the ashlar dressings correspond sufficiently closely to those of that tower. Of a similar character are the south wall of the nave and the walls of the refectory. There is also a small, plain, round-headed door that led from the church into the cloister.

The keep, church tower, and abbey church afford, within a narrow compass, an excellent study of Early Norman masonry, unaltered, or altered only by the effects of time and weather. All are to be attributed to Gundulf.

Gundulf was a native of the Vexin, and educated at Rouen. While there he visited the Holy Land, and must have had ample opportunity during his absence of studying Roman military works. On his return he became a monk of Bec, and was thence transferred to Duke William's newly-founded abbey of St. Stephen, at Caen. He was well known to Lanfranc, and, no doubt, to the Duke, for he was sent for to England, and in 1077 consecrated Bishop of Rochester. His first architectural work in England was, no less than the keep, known from the first as the "Tower," of London, and built probably in 1077–8. His next care would probably be his own cathedral, which he rebuilt, and of which a part of the west front is considered to be his work. He founded Malling Abbey about 1090, and it seems to have been completed or consecrated about 1106, and no doubt during these sixteen years he also built his castle. In the reign of William Rufus that king consented to his building a castle at Rochester, "*quia in opere cæmentarii plurimum sciens et efficax erat castrum sibi Hrofense lapideum de suo construeret.*" It cost him 60*l*. Where this keep stood is not known. It could scarcely have been the tower bearing Gundulf's name, and no doubt his work, attached to the north transept of the cathedral, for a tower so strong and so placed would, in the hands of the king, be more than inconvenient to the church, and it certainly was not the great and noble keep, of late Norman work, which rises so majestically between the cathedral and the Medway. Possibly this was the successor to the Gundulf tower, which, however, could scarcely have been in decay, though it might have been inconveniently small for so important a position. Gundulf died in 1108.

Mr. Parker is justified in regarding St. Leonard's Tower as one of the earliest Norman keeps in England, though I incline to think it probable that it was built when the Tower of London was completed. So narrow a question cannot be decided by the internal evidence of the work. I incline also to the belief that no keeps in Normandy are of earlier date than the reign of Duke William, though whether there are not one or two there earlier than his conquest of England has not, I think, been made clear. Arques, one of the earliest known, is a magnificent structure, for a beginning, and so, for that matter, is the London keep. Grand earthworks, lofty mounds, and deep and repeated ditches exist in abundance in both countries, of far earlier date than the eleventh century; but these were intended to be supplemented, and were, for at least two centuries, supplemented, not by works in masonry, but in timber, and certainly the shell keeps which are found in connexion with these features are never earlier than the close of the eleventh century, if so early; but the rectangular keeps were of somewhat earlier introduction, and the problem as to their first appearance can only be solved by a very close examination of those that remain both in England and Normandy, and of the square Roman towers in the south of France, by some person possessing the knowledge of detail, and the vast English experience of Mr. Parker.

G. T. C.

DECORATIVE SUGGESTIONS FROM NATURAL FORMS.—No. 7.

The natural specimen sketched here, *Masdevallia Lindenii*, is a flower remarkable for grace and elegance, in the symmetrical form of its long narrow leaves, which have a great resemblance to some common forms in Greek ornament, and the manner in which the flower rises up from among them on its tall stalk, which usually displays a slight bend backward in its rise, as if to compensate for the weight of the flowers in the opposite direction. The peculiar design of the flower, with the long tendril curving upwards from it, or, in a less developed state of the flower, overlying it in a sinuous bend, will be noticed. The flower is of a very delicate purplish tint, with a bright yellow tip.

Many things might be done in decoration with so suggestive a type. One point in the growth of the plant is, that the leaves seem remarkably independent of the flower-stem; they grow up separately around it, and it rises from the midst. The character of the two designs derived from it here is intended to keep this point in view: in each case long stems spring from between groups of leaf-forms. In the paters, which is intended as painted porcelain, the three portions of the design are grouped in relation to the three portions of the surface: the leaves cover the flat centre, the stems run round the curve or hollow leading up to the rim, and the flowers decorate the rim. The other design is intended for very light and delicate wrought-iron work arranged between standards—such work as might be used for a chancel-screen, or in some similar position. The tendril springing from the base of the flower is in this case twisted into small spirals, the treatment most suited to the character of the material.

LIVERPOOL ARCHITECTURAL SOCIETY.

The second ordinary meeting of the thirty-third session was held at the Royal Institution, Colquitt-street, on the evening of November 3, the president, Mr. C. Aldridge, F.R.I.B.A., being in the chair. There was a good attendance, and the paper of the evening, entitled "Two Faces under a Hood; or, Hypocriticism in Art," was read by Mr. Joseph Boult. A discussion ensued upon the merits and demerits of the Queen Anne style of architecture, in which Messrs. J. F. Doyle, Wm. Parslow, Joseph Boult, and the President took part.

Previously to the ordinary meeting, a meeting of the Class of Design and Construction was held in the small library, under the guidance of Mr. C. E. Deacon and Mr. J. F. Doyle, when thirteen sets of designs for a sideboard were handed in. The second meeting of this class was held on November 17th, when Mr. C. Aldridge, F.R.I.B.A., delivered the first of a series of lectures on Construction, the subjects being, the Local Building Acts; choice of site, soil, aspect, and levels; excavation and concrete.

MESSRS. CHILD'S NEW BANKING PREMISES, TEMPLE BAR.

We give a view in our present number of the front of these new buildings, recently completed. The work was executed in three divisions, to provide for the banking business being carried on during the rebuilding; the first division comprising the rear buildings, and containing a portion of the strong rooms and the servants' accommodation, thus leaving the old banking department and residence standing for use until the new was completed. A temporary banking-room constructed in Child's-place, of quarter-ing, covered with corrugated iron, the whole lined and specially framed to meet its intended purpose, was provided for occupation during the erection of the main front and the new banking-room. The latter has now been occupied about three months, the upper stories of the front main building having since been nearly finished.

The arrangement of the entire buildings necessitated great care to avoid infringements of the ancient lights with which the site is surrounded, and schemes for the improvement of the property adjoining, to the south and east, have been considered, and definite agreements negotiated. The plans have also been considerably modified as the work progressed, the original intention being to light the whole building (except in front) from two large internal courts, (faced with white glazed bricks) and to enter in front from a central doorway, the eastern portion of the main front building not then being proposed to be used for bank purposes; but the whole extent of the site is now devoted to the buildings of the bank.

The frontage of the building is about 73 ft., 50 ft. of which is within the City boundary, now defined by the western face of Temple Bar Memorial. A portion of the old City wall was removed in the course of the excavations, when other objects of interest were discovered, as have been from time to time noted in our pages, as were also particulars of the widening of the street at this point.

The entire front is of Portland stone, and the building is 57 ft. high from the pavement to the top of the main cornice. The carving to the front includes the bank's arms and emblems, combining the marigold and rising sun. The roofs generally are slated.

The front and only entrance is through a mahogany folding and swing-fitted doorway into a stone-built lobby, and through another similar set of swing doors into the banking-room, which is the whole width of the front, and 48 ft. from front to back, divided into bays by columns and pilasters; the large central square bay being formed by columns supporting beams to carry the superincumbent weight of the brick-arched ceiling and stories over.

The front and side windows are fitted with mahogany sashes protected by iron balance-weight shutters externally. The heating is effected by two open fireplaces, supplemented by a thorough system of hot-water piping and coils, and a sunburner partly supplies the artificial light and necessary ventilation, for which latter purpose extracting-flues are also provided.

At the back of the banking-room are fanlights, and a specially constructed ceiling light, amply lighting this spacious and lofty room, the fittings of which are specially designed and framed of picked mahogany. The gas-lighting is further provided for by standards, in some cases specially adapted to suit the desk arrangements. In the rear of the bank are the partners' three rooms, accessible from each other, and the principal staircase adjoins; these and the other principal rooms throughout are fitted entirely in wainscot oak. The ledger, chest, lift, and other strong rooms are very large, lofty, and spacious, solidly constructed and groined, in fireproof materials, rising from central columns, which latter were found in the excavations, and fitted with iron doors, gates, and other appliances by the best makers. The iron shelving is also constructed to design. A special feature in these rooms is that they are lighted through glazed grilles of wrought iron, and protected internally by massive iron shutters. Dining-rooms for the partners and clerks are also provided, on the ground-floor, with the requisite service arrangements, the building from front to back extending a distance of about 150 ft.

The basement is further devoted to very extensive groined strong-rooms and voucher-

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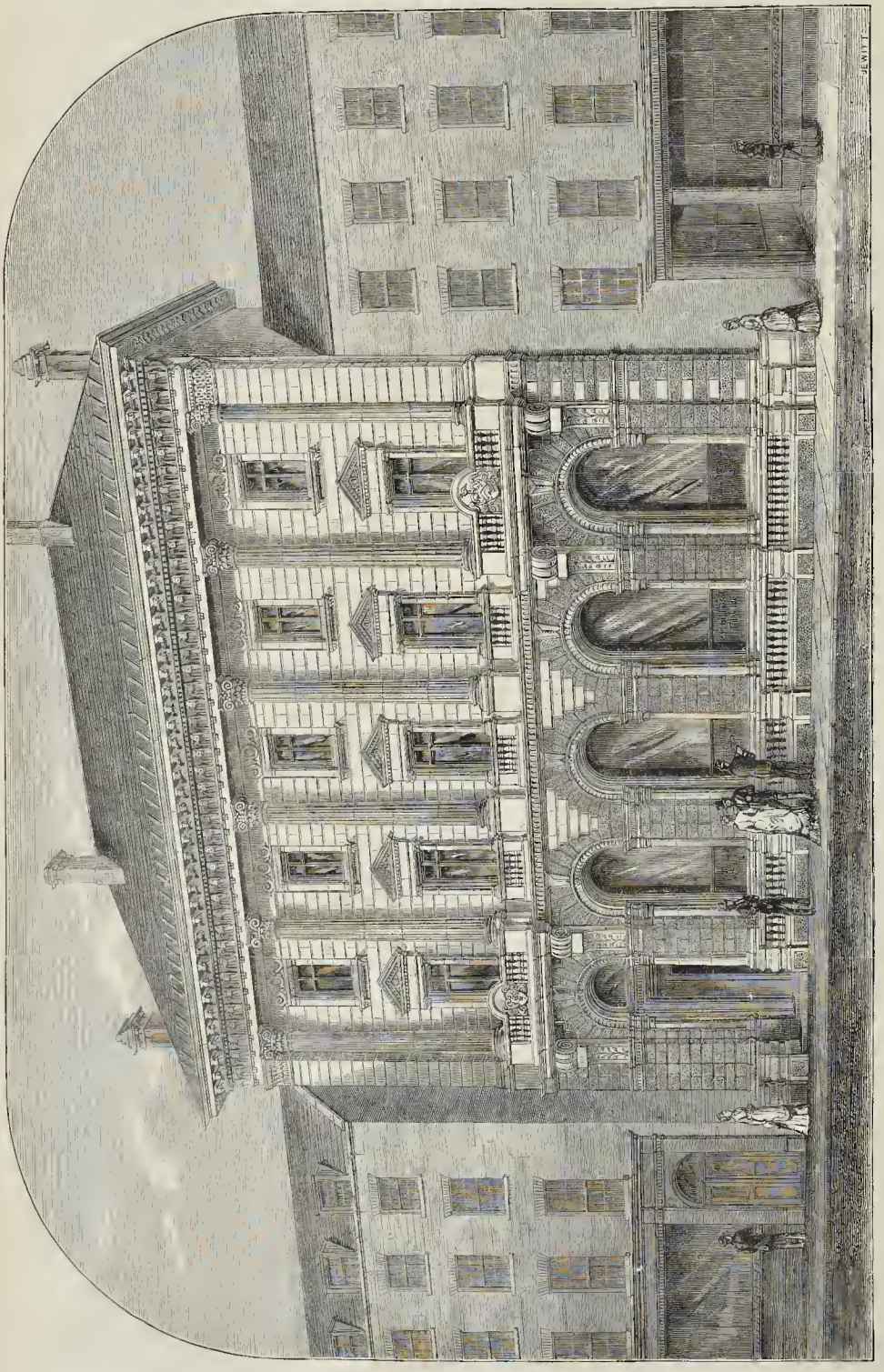
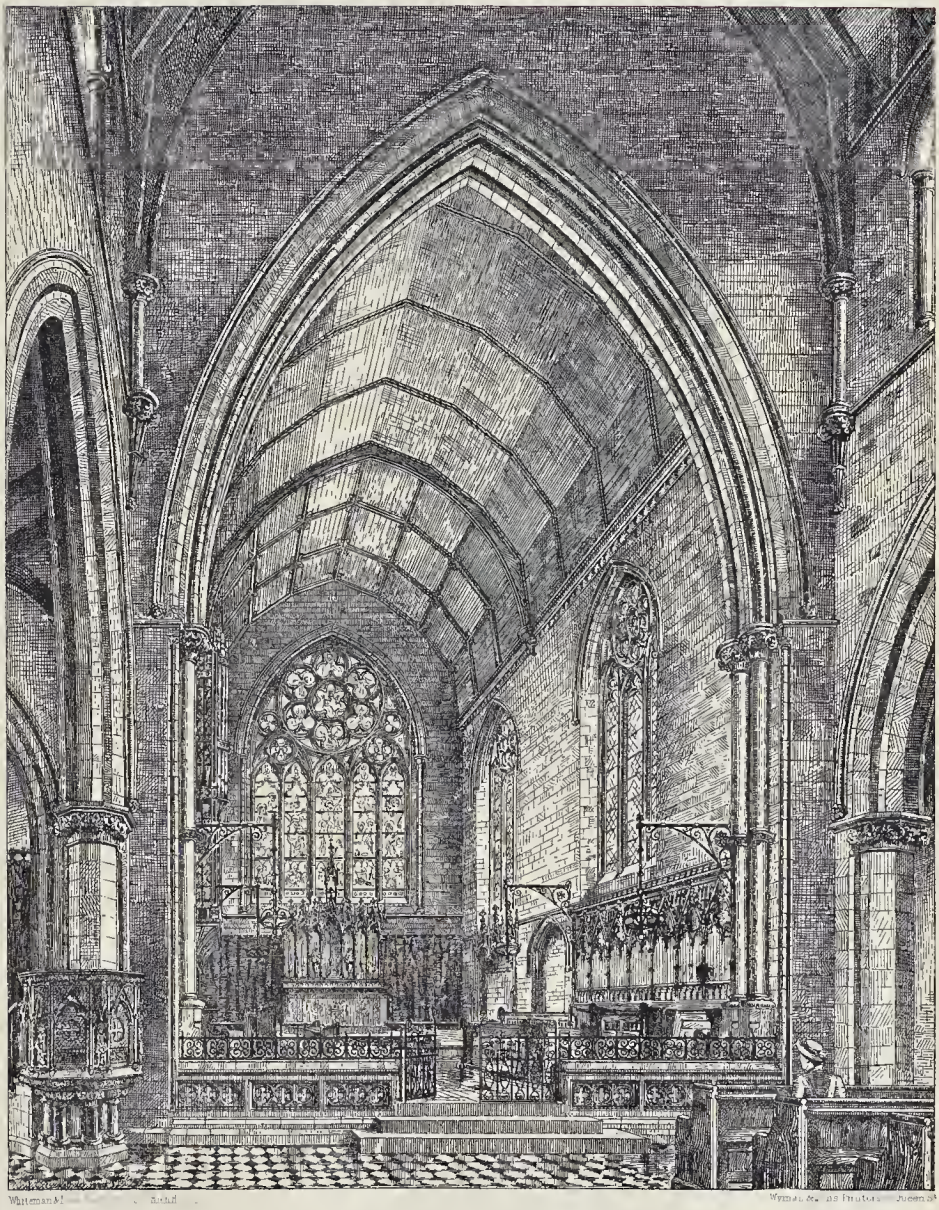
DECORATIVE SUGGESTIONS FROM NATURAL FORMS. — No. 7.



CHILD'S BANKING HOUSE, FLEET STREET.—Mr. John Gibson, Architect.

PROPOSED MONUMENT IN COMMEMORATION OF THE FRENCH REPUBLIC, PARIS.



Whiteman & Co. Build. Wyman & Sons Photo-Litho Queen St.

CHANCEL OF S. SWITHIN'S CHURCH, LINCOLN. Jas. Fowler F.R.I.B.A. ARCHITECT LOUTH, LINC.

rooms, clerks' lavatory accommodation, kitchen service, and cellarage, the latter extending under the whole of Child's-place.

The large central front room on the first floor is furnished with dado and book-cases, &c., to design, and this and the other front rooms on this floor will be occupied as sitting-rooms by the residents, for whose accommodation, on the first, second, and third floors, a large number of bedrooms, with other rooms, are provided. An electric bell service is fitted throughout, also appliances in case of fire.

The works have been principally carried out by Messrs. George Smith & Co., contractors, from the designs and directions of Mr. John Gibson, architect, of Westminster. The proportions of the front are very agreeable, and the work throughout displays the same knowledge of detail that distingnishes other works by the same architect. Some account of the banking firm, which is the oldest in London, has been given in another volume of the *Builder*.

MONUMENT IN COMMEMORATION OF THE FRENCH REPUBLIC, PARIS.

Among the new monuments about to be erected in Paris is one intended for the adornment of the "Place de la République" in place of the fountain Château d'Eau, which has been cleared away. On the occasion of the late July *fêtes* a model of the new design in plaster was set up on the selected site, and of this we give an engraving. The sculpture is the work of M. Leopold Morice; the architecture, of M. Charles Morice.

ST. SWITHIN'S, LINCOLN.

The first stone of the new church of St. Swithin, Lincoln, was laid on Easter Monday, March 29, 1869, by the Bishop of the diocese. The nave and aisle only were built at that time, and the building remained in that condition until a little more than a year ago, when the first stone of the chancel was laid by Mr. N. Clayton. That addition to the edifice being completed, on Easter Monday last it was consecrated.

The Bishop on that occasion pointed out that the following churches have been built, rebuilt, restored, or enlarged between the two dates named, namely,—the Training School Chapel, new; St. Peter's-in-Eastgate, rebuilt; St. Paul's-in-the-Bail, rebuilt; St. Michael-on-Mount, beautified; St. Martin's, rebuilt; St. Peter's-at-Arches, restored and beautified; St. Mary's-le-Wigford, restored and enlarged; St. Swithin's, new church; St. Mark's, rebuilt; St. Andrew's church, new; and St. Botolph's, enlarged; while the church of St. Mary Magdalene is about to be restored. The sum of 9,000*l.* has already been expended on St. Swithin's Church, and about 5,000*l.* more is required to complete the design.

The new chancel is about 40 ft. long, 24 ft. wide, and two bays in length, each bay containing a three-light window, with wheel-tracery in the head. The east window is a very fine one, with five lights. Externally the bays are divided by buttresses, the double buttresses at the angles being surmounted by lofty pinnacles, and with the crocketed gables form a handsome termination to the church.

On the north of the chancel is a large organ-chamber, with a commodious vestry attached. The roof is polygonal-shaped, turreted and panelled, with a timber arch marking out the eastern bay. A stone sedilia, handsomely carved, occupies the south side of the sanctuary, while the northern side has an arch opening to the organ-chamber, with a doorway to the vestry. The chancel is raised above the nave by three steps, and has a panelled wall surmounted by light iron railing, with gates in the central opening. The stalls and prayer-desks are of carved oak. The cost of the alterations just completed is about 2,500*l.* The architect is Mr. James Fowler, of Lonth; and the buildor is Mr. C. Baines, of Newark. The east window is the gift of Mr. J. Shuttleworth, in memory of his late wife. The interior of this church has an air of quiet dignity which elicits many expressions of satisfaction.

The Photophone.—Professor Graham Bell has promised to read a paper before the Society of Arts upon his "Photophone," at the ordinary meeting on Wednesday, December 1.

THE USE OF CEMENTS.*

There is probably no more deeply-rooted conviction prevalent among architects than the belief we cherish in the excellence of Roman mortar. The Romans distinguished themselves among all the conquering nations of antiquity as mighty builders, and throughout every country which they snbdued we find the remains of public works and buildings, more or less perfect, as evidences of their occupation and monuments of the skill and enterprise of their architects. The builders of Rome undoubtedly made use of the limestones of the countries in which they worked, and sometimes they came across good limes of a cementitious character, and at others they found only fat or rich limes. In the former case we find the structures which have escaped destruction at the hands of man still extant; in the latter, where the mortar was made of bad or unsuitable lime, the buildings have crumbled away and have become obliterated by natural causes. The secret of the excellence of Roman mortar, so often and so laboriously sought after, is to a great extent a delusion, and we praise the mortar of the ancients only because all the bad mortar has long since perished. It is nevertheless a fact that we owe indirectly to the Romans the discovery of all our modern cements, for it was in consequence of researches made respecting the dnrability of ancient mortars that the reasen for what has been termed the hydraulicity of limes was explained early in the present century. To our own countryman, Smeaton, the builder of the Eddystone Lighthonse, and to Vicat and others on the Continent, must be assigned their due share of credit for these discoveries; and tbeir labours have since been ably supplemented hy the investigation of Pasley, John, Fuchs, and Pettenköfer. I will not occnpy yonr time with more than a brief record of the gradual growth of [our knowledge concerning cements, and I propose only to glance at the history of these materials, which is one of much interest. I wisb rather to treat of the employment of cements for practical prrposes, and to invite your attention to a brief consideration of the manner in which we have availed ourselves of the knowledge we have acquired concerning cements and cement action. I must first dwell for a few moments, however, upon the use of mortar in London in times past, hecause my argument will involve a clear appreciation of this part of the subject. After the Great Fire in 1666, Londou, as we all know, sprang up, by royal enactment, as a brick city, and the quaint wooden buildings which bad been the characteristics of the London of the past, were no longer recognised hy the new Building Act, and were condemned, as they still are, by the district surveyors. There must at once have been a great demand for lime, and the quarries adjacent to the metropolis were placed, no donbt, under heavy contributions for the necessary materials. The chalk nearest to Loudon, on the hanks of the estuary of the Thames, and north and south,—at Watford and Croydon,—is the white, flint-hearing, or, as geologists term it, "the upper chalk,"—one which yields a fat, pure lime, having little or no cementitious properties, and furnishing, therefore, a mortar of the worst possible kind. Further away,—on the hanks of the Medway, and on the chalk ranges of Dorking and Gnildford, or northwards, in various parts of Buckinghamshire,—we find the grey chalk, a totally differont substance, and one capable of yielding a lime of good quality. But it is impossible to examine the mortar of two hundred years ago without being convinced that it was white lime whioh onr ancestors prized, and mixed with the smallest possible quantity of sand. Tbe mortar of those days speedily dried, or obtained a false set, owing te the absorption of the water by the porous bricks, but it never became truly indurated, and, after all these years, it is found in the joints of many an old house in the City as a mere orumbling cake, which can be orushed into dust between the fingor and thnmb, and has no cohesive strength whatever. Just listen to what General Trenssart says concerning this kind of lime: "Thus chalk-lime mortar, when wet, is a pulp or paste, and when dry it is little better than dust." No wonder at the clonds of fine powder which half-blind us when any work of demolition is in progress in the older parts of London; the only strange thing is that the brickwork holds together so long as it does.

It seems somewhat astonishing in these days of rapid building to read the specifications of even one hnndred years ago only, and to learn the amount of labour then bestowed npon the preparation of even such mortar as this. Let me read you a passage from the "Builders' Price-book" of Batty Langley for the year of grace 1748. Speaking of what he terms "terrice mortar," probably trass, as he says terrice is a kind of sand brought from Holland, he tells us "the heat terrice mortar is made with two hushels, &c., of hot lime, and one bushel, &c., of terrice, well incorporated by beating, and which quantity to heat well is a good day's work for a labonrer." Think of this, poor overworked larryman, three hushels of mortar per diem "a good day's work"!

It was, I think, ont of no diarespect for the white chalk lime, hut rather from some strange belief in the colonr of the grey lime, that about the middle of the last century a fondness arose in London for what was called stone lime, such as that of Dorking or Merstham,—that is, a lime of stone-colonr,—for I can see no other reason for calling this chalk lime a stone lime, which it certainly is not. It was a fallacy dating hack to the time of Vitruvins, that the harder or denser the stone from which the lime was hurned, the harder the mortar made from it would eventually hecome. Smeaton was, perhaps, the first engineer to demonstrate this to be a mistake. So strongly was the truth of this fact believed in, however, that some have thought that an opportnnity was taken of this error, to introdude the Surrey and Medway limes, under false plumes, by terming them stone-limes, to convey the impression that they had heen hurned from limestone rock; indeed, Smeaton tells us such was the case. My own opinion is that certain grey limes had gained the reputation of being strong limes, that is, capable of uniting large volumes of sand, and that it was the colonr which gave the name, in this instance, of stono lime.

Pasley says, respecting this commonly-received opinion of the strength of grey lime, "We found by repeated experiments at Chatham that one cubic foot of Halling lime (very similar to that of Dorking) weighed nearly the same when fresh from the kiln; and by the gradual addition of water, that it dilated to the same increased bulk in the state of quicklime powder; but, when worked up into mortar not too short for use, that it would not bear qnite so large a proportion of sand as the common chalk lime had done: this experiment leading to a result in opposition to the common opinion amongst the builders in the motropolis, which is that the Dorking and Halling limes, as being stronger (limes), will, when made into mortar, bear more sand than common chalk lime."

We may assume that this rise of the grey lime in puhlic favour was partly due also to the increased facilities of oarriage, hy means of which the better limes were ahle to compete with the fat limes, which had been hitherto more readily obtained around London. Whatever may have been the reason for this preference, practical huilders doubtless soon found that the grey chalk lime yielded a far better mortar and would set harder with more sand than that made from the white ohalk and pure lime; but "Dorking stone lime" continues to this day a favourite piece of specification idiom.

The natural cement stones of the neigbbourhood of London were discovered by Dr. Parker, and specified for cement-making hy Messrs. Wyatt & Parker, in 1796. They patented the mode of making what was called Roman cement, by means of calcining the septaria or masses of nodular limestone found in the London clay. In course of time it became known that very similar results could be obtained by combining mixtures of olay and lime or chalk mechanically, and artificial cements, such as those of Vioat and Pasley, became largely employed. This mannfacture paved the way for Aspdin, with his Portland cement, patented in 1824, but it was not until 1847, or thereahonts, that tbe manufacture of Portland cement was perfected, and that what we now regard as Portland cement was made nse of upon any scale.

I bave said thus much on the history in order that I may prepare the way for my inquiry into our mode of using these cements, and glance at the extent to which they have supplanted lime. This may enable us perhaps to ascertain the causes of our failure, and properly to appreciate

* A Paper read before the Architectural Association on the 19th inst. by Mr. Gilbert R. Redgrave, as elsewhere mentioned.

the advantages we should gain from the more extended use of cements.

I am going to maintain that in good Portland cement we possess the best building material of the day, infinitely better than half the rubbish we make our houses of or pave our streets with, and a hundred-fold better when used as mortar than the compound we still go on specifying, as if we knew no more than our grandfathers of the properties of limes and cement. I trust I am not heretical in these matters, but I am so firmly convinced that lime, as now employed, will shortly become obsolete, or nearly so, as a building material, that I am able to speak out boldly in favour of cements. This brings me to my subject,—the use, or, rather, the uses, of cements; for we are almost daily adding to our store of knowledge concerning the numerous constructive purposes for which cements may be made available.

Before going further, I wish to be clearly understood in respect to the meaning of the term "cement." By the word "cement," as it is now used in building, a substance is implied which, when treated with water, will set or indurate without change of form. Limes of every variety show more or less energy to change their physical condition when water is ponred over them. Pure limes, such as those made from Carrara marble or white chalk, instantly unite with the water or become hydrated, expand to two or three times their bulk, develop intense heat, and fall to a powder. Very hydraulic limes, under the influence of water, show at first hardly any sign of action. They are termed by builders very "dead," and only after the lapse of hours, or even days, crumble into coarse, gritty fragments. Such limes, if ground or mechanically reduced to an impalpable powder, may solidify without heat or apparent expansion, and acquire a set of the same nature as Portland cement. These limes are true natural cements. Between the active pure limes and the natural cements are an infinity of hydraulic or partially hydraulic limes, some of which, namely, those of a dangerous type, will at first set under water, which is what the term "hydraulic" really implies, or in air, and gradually fall to pieces; while others, on the contrary, will at first crumble to a fine powder, which powder, however, on being worked up with more water, will set, after the manner of cement. Limes of this kind are termed by Vicat "intermediate limes," as they partake of the character both of limes and cements, and are intermediate in their action between the two. The eminently hydraulic limes of the lias formation, which are ground and sold as "lias cements," are natural cements of the former class; while all argillaceous limes, which will go abroad when treated with water, and subsequently set when made up with sand, belong to the latter class.

It may be useful here to point out that Portland cement (which is one of the very highest quality when properly made) sometimes, owing to defects in its manufacture, presents more the characteristics of an intermediate lime than those of a true cement. Thus it may, from imperfect calcination, faulty proportions, or undue admixture of the ingredients, blow and fall to pieces, after having become set, or it may crumble and fail to acquire cohesion when mixed with water; or, lastly, it may set so slowly as to be scarcely capable of being used for cementitious purposes at all. Portland cement, in fact, although the manufacture has now been brought to great perfection, is not wholly free from fluctuations in composition, which, in former times, brought great discredit upon the material, and which during the early days of its employment, caused it to suffer by contrast even with Roman cement.

The next consideration is the cause of cement action, that is, the explanation of the facts I have just been describing. Why do some limes swell up and fall to pieces when treated with water, while others remain wholly inert? The cause of hydraulicity was, to a certain extent, explained by Smeaton, who found by exposing the Aberthaw lime to the action of acid, that he obtained a residue of clay, and that all good "water-limes" examined by him left this sort of residue, while the pure limes, which were devoid of hydraulic properties, were entirely dissolved. He therefore rightly attributed this peculiar action to the presence of the clay. In his own words, he says, "In burning and falling down into a powder of a buff-coloured tinge, and in containing a considerable quantity of clay, I have found all water-limes to agree." Smeaton, who owned that he was no chemist, does not appear to have known the true reason for this action. It remained to Saussure to announce that this property depended solely upon the presence of the clay, while Descotils, in the year 1813, pointed out that the cause of the phenomenon was due to the presence of a large quantity of silicious matter, disseminated in very fine particles throughout the texture of the mineral. The chemistry of the action of cements and the formation of silicates in the kiln, which silicates become hydrated and rearrange themselves in consequence of the difference of their affinities, in the presence of the water, was first thoroughly explained by John, and the theory was perfected by Fuchs, of Munich. The study of this branch of the subject is one of great interest, and those who wish to pursue it further may do so by consulting the essay on lime in Knapp's "Technology."

It is strange that, although this action is in the main a chemical one, it can be greatly influenced by purely physical causes. To illustrate this, I will quote a recent and curious experiment of Dr. Knapp's in the laboratory at Brunswick. The avidity of quick-lime for water is one of the strongest we know of, and the rapidity of the combination of the lime causes so much warmth to be evolved that the particles are immediately raised to a red heat. Conflagrations, we know, often occur from what is termed the slaking of lime. Now, if quick-lime be reduced to powder in a pestle and mortar, and this powder be tightly rammed into a hollow cylinder perforated with minute holes, and fitted with screw caps to close the ends; on placing this lime cylinder in water, the moisture can only reach the enclosed quicklime very gradually and in very small quantities; the result is, that instead of slaking to a powder, the lime becomes converted by its hydration into a very hard and solid mass, as different as can well be imagined from ordinary slaked lime. Here a well-known chemical action is changed by purely physical means. Some chemists have thought that in the case of mixtures of lime and silicates, that is, in those limes which are more or less hydraulic, the particles of quicklime being coated over with an envelope of silicious matter, the water is only permitted to approach the lime very gradually, as was the case in the cylinder experiment I have described, and this theory has also been put forward by a German chemist to explain the reason for the peculiar action of General Scott's cement, or selenitic cement, as it is termed. I am afraid I am devoting more time than you will care for to these chemical questions, but I think they will enable us to appreciate better the action of cements. To sum up briefly the foregoing facts,—Pure limes, which after falling into a powder are made up into a paste and mixed with sand, yield mortars which have no inherent setting power, and can only become indurated by the slow and gradual recombination with carbonic acid. This re-formation of the carbonate can only proceed where atmospheric air, or water charged with carbonic acid gas, can penetrate, and the centres of thick walls, even after centuries, are often found with the mortar still in the state of putty, as when first used. Cements, on the contrary, owe but little to the atmosphere; indeed, true cements indurate better beneath the water than in the air. They possess in themselves the power of solidifying or becoming indurated, and attain their greatest strength in a few years at the most. It is a question which can scarcely be said to have been finally settled how long cements continue to harden; indeed, cements vary so much in this respect that the time differs in almost every sample, according to the composition and the degree of firing. Cements of the Roman type stand at one end of this scale, for many of them attain their full degree of hardness or tensile strength in from twenty to thirty days; while dense, well-made Portland cement of the highest quality would seem, from Mr. Grant's experiments, to continue to improve for seven years, and constitutes the other extreme of the scale.

In speaking of cements, I have purposely avoided all mention of that class of substances which, when added to rich or fat limes, impart to them hydraulic properties. These materials are puzzuolana, trass, arenes or volcanic sand, and many kinds of calcined argillaceous earth. There can be little doubt that all these substances owe their influence on mortars to the soluble silica contained in them. By soluble silica, I mean that variety of silicic acid which when treated with acids will gelatinise. Silica when heated to bright redness in the presence of bases acquires this soluble form, and most calcined clays, and volcanic minerals, which have been exposed to high temperatures, are more or less rich in gelatinous silica. Mortars compounded with pure lime and a sufficient quantity of substances capable of converting them into cements become, for the purpose of the arguments I am anxious to place before you, equivalent to cement mortars. Unfortunately, however, these mortars are rarely employed, except by engineers for docks, foundations, and other similar purposes, where the solvent action of water is dreaded. Occasionally, when, owing to the difficulty of obtaining good sand, the builder employs with fat limes burnt ballast or broken bricks, which are artificial puzzuolana, a mortar which sets surprisingly hard is obtained. Such good mortars are, however, exceptional, and their excellence is due only to the action of the "aggregate," and not in any way to the quality of the lime.

I now return to my subject, and propose to place before you the arguments in favour of employing cements instead of limes for mortar-making. First, cements will unite much larger quantities of sand and building materials into a homogeneous mass than limes, and they are therefore more economical to use than limes. I am sure that the plea of economy is one of the very strongest arguments of the present day, and therefore, though this is not my best plea, I introduce it first. Rather than take the price-book values of lime, cement, and sand, and with them construct an imaginary set of tables to show how the prices would work out, I will avail myself on the present occasion of the admirable series of experiments recorded by Mr. Colson in a paper presented to the Institution of Civil Engineers in 1878, in which this subject is most fully and ably dealt with. I am the more tempted to place before you Mr. Colson's figures, because he has with the painstaking care and accuracy which mark all his observations, not only given us the cost of different mortars, but also the actual strength of each of the various mixtures. His experiments will be all the more interesting, I think too, because the paper containing them was not read and discussed at a meeting, but formed one of the selected papers, published in Vol. 54 of the Proceedings of the Institution of Civil Engineers. It has, therefore, hitherto, not attracted that share of attention from architects and engineers which the importance of the subject demands. I will convey to you Mr. Colson's observations as far as possible in his own words.

"The object of these experiments," he tells us, "was to ascertain what proportion of Portland cement and sand would produce a mortar equal in strength to, and as convenient to work as, grey lime mortar, mixed in the proportions ordinarily adopted for constructive purposes." I may here observe that the difficulty in the use of cement mortars with large quantities of sand is their want of plasticity, and it is necessary to contrive means to overcome this, or the workman will not employ them, except in a very liquid, and therefore very objectionable condition. This tendency to shortness can be obviated by introducing chalk, lime-dust, loam, or other substances which produce a fat unctuous paste when treated with water, but all these materials tend to weaken the mortar. Still, it has been found, from careful experiments, that within certain limits it is possible to introduce even clay (which is, perhaps, the cheapest diluent which can be obtained) without reducing to any very serious extent the tensile strength of the mortar. The following series of experiments is very interesting, bearing as it does directly upon this point. The mortar was, we are told, in each case mixed to a workable consistency, equal, in fact, to the condition in which it could be used in the work. Mr. Colson's testing was carried out by means of briquettes, similar to those used in ascertaining the strength of Portland cement, having a neck of 1½ in. square, equal to a sectional area of 2¼ square inches. The mortars remained in the moulds until sufficiently hard to admit of removal. At the expiration of six months the blocks were tested for tensile strength, the results being shown in the first table. Mr. Colson says, respecting the samples of common lime mortar, that "the induration or chemical set had penetrated only to the extent of ⅛ in. to $\frac{1}{16}$ in.; but, in the majority of instances, only ¼ in. The remainder of the area of the fracture had only dried, and could be

TABLE I.—*Comparative Strength of Grey Lime and Portland Cement Mortars; also Portland Cement Mortar with the addition of Lime and Loam.*

No.	Number of Tests.	Proportions. Sand.	Cement.	Lime.	Water.	Breaking strain on 2·25 square inches in lb.	Breaking strain per square inch in lb.	Ratio compared with lime mortar.	Ratio as compared with cement mortar.	Remarks.
1	17	2·00	—	1·00	1·33	61·06	27·13	—	—	Three samples of Grey lime. Water includes that required for slaking lime.
2	27	2 00	—	1·00	1·33	106·07	47·09	—	—	
3	27	2·00	—	1·00	1·33	82·00	36·14	—	—	
1	15	6·00	1·00	—	1·25	233·53	103·79	2·81 to 1	—	Cement taken from bulk in store.
2	20	8·00	1·00	—	1·66	154·80	68 80	1·86 to 1	—	
3	35	10·00	1·00	—	2 00	112·88	50·16	1·36 to 1	—	
1	70	6·00	1·00	0 50	1·50	165·31	73·47	2·00 to 1	0·70 to 1	Water includes that required for slaking the lime.
2	74	8 00	1·00	0·66	2 00	132·62	58·94	1·60 to 1	0·85 to 1	
3	85	10·00	1·00	0·83	2 50	95 27	42 34	1·14 to 1	0 84 to 1	
				Loam.						
1	21	6 00	1·00	0 50	1·00	136 80	60 80	1·64 to 1	0·58 to 1	Yellow loam, fresh dug and rather damp.
2	25	8 00	1·00	0 66	1·33	86 48	38·43	1·04 to 1	0 55 to 1	
3	19	10 00	1·00	0 83	2·00	64·50	28 66	0 77 to 1	0 57 to 1	

TABLE II.—*Statement of Approximate Cost of Mortars.*

DESCRIPTION.	Proportions in cubic yards. Portland cement at 45s. 6d. per cubic yard.	Grey lime at 14s. 6d. per cubic yard.	Loam at 2s. 9d. per cubic yard.	Sand at 2s. 9d. per cubic yard.	Cost of material.	Cost of labour and water.	Total cost.	Produce of mortar in cubic yards.	Cost per cubic yard.
					s.	s.	s.	cu. yds.	s.
Grey lime mortar	—	1·00	—	2·00	20·00	6·62	26·62	2 25	11·83
Portland cement mortar No. 1	1·00	—	—	6·00	62·19	6 81	68 23	5 90	11·56
Portland cement mortar No. 2	1·00	—	—	8·00	67·69	7·80	75·49	7·60	9·93
Portland cement mortar No. 3	1·00	—	—	10·00	73·19	9·57	82·76	9·30	8·88
Portland cement and lime mortar No. 1	1·00	0·50	—	6 00	69·44	8·68	78·12	6·40	12·20
Portland cement and lime mortar No. 2	1·00	0·66	—	8·00	77·27	11·20	88·46	8·25	10·72
Portland cement and lime mortar No. 3	1·00	0·83	—	10·00	85·22	13·78	99·00	10·15	9·75
Portland cement and loam mortar No. 1.	1·00	—	0 50	6·00	63 56	6 23	69·79	6·10	11·44
Portland cement and loam mortar No. 2	1·00	—	0·66	8·00	69 53	8 05	77·58	7·90	9·82
Portland cement and loam mortar No. 3	1·00	—	0.83	10·00	75·47	9·97	85·44	9 75	8·76

crushed in the hand without any great exertion of force." The cement mortar with six, eight, and ten parts of sand, was, we are told, of "such a raw, harsh character, that it would be practically impossible to use it in a satisfactory manner. In order, therefore, to render it somewhat more convenient for working, a small quantity of lime or yellow loam was added, thus rendering the mortar more plastic and tenacious."

"The result of further experiments shows that the addition of lime and loam reduces the initial strength of cement-mortar considerably, the reduction due to the addition of loam being more marked than by the addition of lime. The quantity of unslaked lime or loam, viz., one-twelfth the bulk of the sand, was found to be as small a proportion as could be used to give the necessary tenacity."

Mr. Colson tells us that the experiments made with these mortars in brick joints "were not altogether satisfactory, inasmuch as the appliances at hand were not sufficiently accurate and delicate to justify a ratio of comparison. It may, however, be stated that the general result went to prove that the adhesive power of mortar mixed in the proportions of eight of sand to one of cement, with the addition of loam, was superior to grey lime mortar mixed in the proportion of two of sand to one of lime."

The second table shows the comparative cost of these different descriptions of mortar. As Mr. Colson points out, "such estimates must be received with caution, because difference of locality would exert a great influence upon the cost of production. The following statement is a close approximation of the cost of the several descriptions of mortar, the charge for labour and water, and also the bulk of mortar produced, being in each case the mean result of experiments."

The second argument in favour of using cement in lieu of lime is that cement possesses an inherent chemical set, or power of induration, whereas fat limes can only become indurated either by the slow and gradual influence of the carbonic acid contained in the atmosphere, or in consequence of the materials mixed with it to make the mortar. I have already, in the earlier part of this paper, dealt with the setting power of cements and the re-carbonation of limes. But it may be as well to glance at the facts again, to see what they imply. Cement mortar has everything necessary in itself, in whatever position it may be placed, to become hard: all that it requires is a reasonable amount of moisture. In the centre of walls, in trenches and foundations, and even under water, the induration of cement compounds proceeds steadily, until in due time the mass acquires the hardness of stone. Lime mortar, when fat limes are used, soon gets a thin skin of carbonate formed at the surface and joints, and the very formation of this exterior skin or coating at once presents a formidable obstacle to the induration of the lower or interior layers of the mortar. These merely dry into a crumbling porous powder, with little or no strength, and which, if the air cannot reach them, are no harder in 100 years than in a twelvemonth. Alberti states that he had seen lime in an old ditch that had been abandoned about 200 years "which was still so moist, well-tempered, and ripe, that not honey, or the marrow of animals, could be more so." What a contrast to this is presented by the fact that a week or two back, while a barge at some works upon which I am engaged in Staffordshire was being unloaded, a sack of Portland cement fell into the water: it could not be fished up for a day or two, but when recovered it had become converted into a stone-like mass moulded to the exact form of the sack.

Perhaps I shall be reminded that mortar joints are not by any means generally such worthless affairs as cement advocates are wont to describe them, and that even when white chalk lime or mountain limestone is used, the crystallisation of the hydrate of lime round the particles of sand presents the appearance of some slight induration. I will grant that such is to a certain extent the case, but I believe it will more often be found that this trifling amount of induration is due to the sand employed in forming the mortar. Lime has the power of slowly attacking silica, even in the form of quartz, and most sands present other bases favourable to the formation of compound silicates. We thus get in very old mortars a small percentage of silicate of lime, which can only be accounted for by some such action as this. Of course, when the lime is presented with a sufficient quantity of a substance of the nature of pozzuolana to enable it to form silicates in the work, we obtain a cement action differing but little from what would result from the use of true cements. Some writers seem to have thought that it might be cheaper, and more generally convenient, to form the cement in the work by compounding a mortar of a fat lime with the requisite quantity of calcined silicious clay; but this plan, after having been tried on the Continent, has been abandoned in favour of the mode patented by Vicat and St. Leger of making an artificial hydraulic lime from a mixture of chalk and clay. This manufacture is still carried on upon a considerable scale round Paris, at Issy and Meudon, and the use of pure lime, so vigorously denounced by Vicat, has since his time been to a great extent abandoned (at any rate, upon public works) in France. It cannot be said that here in England we have taken to heart the lessons we have learned, and the unscientific use of lime burned from the hard limestones of the North of England, and from the white chalk in our southern and eastern counties, still continues unchecked.

A third reason for employing cements in preference to limes is that a method has been discovered by General Scott by which limes can be converted into cements by a very simple process, and at a very moderate cost. Perhaps you will allow me to glance briefly at this invention, as it is one imperfectly understood. About twenty-five years ago General (then Captain) Scott, of the Royal Engineers, found that a sample of grey lime, burnt in a common fireplace, with a smothered fire, had acquired properties very different from those of the same lime if prepared in a clear bright fire. He at first thought that this peculiar result was due to the formation of a sub-carbonate of lime, owing to the imperfect combustion of the fuel, but subsequent experiments caused him to abandon this view, and to adopt the theory, which he ultimately found to be the correct one, that the change in the character of the lime was due to the presence of sulphur which had been absorbed from the ashes of the coal. This fact led to the invention of what was called Scott's cement, a material which was prepared as follows:—Tender-burnt grey chalk lime, made from a lower chalk, containing from 10 to 15 per cent. of silica and alumina (as, for instance, that of Lewes, in Sussex, or Burham, on the Medway), was re-heated to bright redness in shallow kilns or ovens, having perforated floors or hearths. When the lime was sufficiently hot, pots of sulphur were placed beneath the floors, and this sulphur was at once set fire to by the heat of the kilns. The fumes of the burning sulphur thus rose around the lime, and a coating of sulphate of lime was formed over each of the lumps. The lime was then ground between mill-stones, and Scott's cement ready for use was obtained. As it appeared that this cement owed its peculiar properties to very minute quantities of sulphate of lime, intimately mixed with it, General Scott thought it might be possible to prepare it in a cheaper way, as, for instance, by sprinkling lump lime with sulphuric acid, or mixing ground lime with plaster of Paris; but though each of these plans was tried most carefully, it was found to be impossible to secure uniformity by any other than the gaseous method before described. Many years later, during the building of the 1871 Exhibition, General Scott found that if the selenitic lime, however prepared, were first ground in a mortar-mill to a creamy paste, and the sand then added, a very good cement action was secured, and he made a selenitic cement, as he has termed it, from a careful mixture of ground hydraulic lime and sulphate of lime. This cement, if used as

directed by General Scott, will bind together six parts of sand into an extremely hard mortar, and will make a good concrete with nine parts of ballast. My argument in favour of the use of cement is therefore greatly strengthened by my being able to point to such a material as selenitic cement.

The question of the kind of sand to be employed hardly enters into my present subject. I may mention, however, that in using cements, in order to secure their utmost strength, clean sand is eminently necessary. Sharp large-grained sand makes better work than fine sand, and there seems scarcely any objection to clean sea-sand, except that for internal plastering it is liable to become damp on changes in the weather, as the salt absorbs moisture. Salt sand makes stronger cement-mortar than pit or river sand, provided all are equally clean.

I wish, in conclusion, to say a few words about the use of cement in concrete. In this direction I am convinced that hitherto very little has been accomplished, and we plod on here in London with bad bricks and bad mortar, as if there was no escape from a thoroughly vicious system of building, which ought to have been abandoned with the building of the Tower of Babel. Concrete-making and the numerous uses of cement concrete is a subject in itself for a long paper, and I can only point to a few directions in which the applications of concrete appear to deserve attention. I am disposed to affirm,—at any rate, I will do so for the purposes of argument,—that as London, from its peculiar position, is and must continue a brick city, we ought, with our present knowledge of the properties of cements, to make our bricks much smaller, to serve as mere "aggregates," or, what would be better still, we should calcine our brick-earth in heaps, as ballast is made, and unite this burnt clay into monolithic structures with Portland cement. I cannot perceive any legitimate argument in favour of selling under-burned, mis-shapen, discoloured lumps of calcined clay at so much per thousand, in order to enable builders to charge 1*d.* and upwards per rod for sticking them together into walls. Far better would it be to burn the bricks into clinkers, and then incorporate the fragments of them into solid homogeneous structures with good cement, at less than two-thirds the cost of brickwork. I sincerely hope I may live to see the day when bricks will be discarded, and I trust that the New Zealanders, when they explore the ruins of London, may find it necessary to dig very deep down into the *débris* before they find any "genuine, sound, square, hard-burned stock-bricks" for the ceramic museums of the future. The days are past when the colour of cements must ever be thrown in our teeth as a reproach. Mr. Lascelles has shown the possibility of so colouring Portland cement as to render it scarcely distinguishable from red brick or terra cotta, and the house he sent to the Paris Exhibition, designed by Mr. Norman Shaw, formed a new departure in concrete building. Mr. Lascelles is able to prepare mouldings and dressings in this material at a less cost than the same work in cut bricks or terra-cotta. In point of natural colour, selenitic cement, which is a warm buff, leaves little to be desired. Another direction in which cement concrete may be used with advantage is evidenced by the manufactures of Messrs. H. Sharp, Jones, & Co., of Poole. This firm has succeeded in making excellent drain-pipes of Portland cement concrete. The manufacture is a very interesting one, and as I have recently been permitted to examine the works, you will perhaps allow me briefly to describe the process. Cement of high quality is mixed with crushed pottery in the proportion of 1 of cement to about 3 of pottery. The concrete is made in small quantities in a special mixing-machine, the materials being first turned over dry, then sprinkled with water from a fine rose and made into a very dry concrete. The mixture is next lifted into a hopper, which feeds it automatically and very gradually into the moulds. These are made as cylinders of sheet-iron, the proper distance apart to form the thickness of the pipe, from 1 in. to 3 in., according to its diameter. This mould rotates slowly on a turn-table, while an iron rammer, worked up and down like a beetle, compresses the concrete into the mould as it falls from the hopper. When the pipe is full, it is wheeled away on a truck, mould and all, and stands for from 24 to 48 hours to set. When taken from the mould, the newly-made pipe is steeped for a week in a bath of silica, to indurate it more effectually, by the ingenious process invented by Mr. Highton, and used by the Patent Victoria Stone Company. The pipe may remain in the bath for about a week, when it is removed and stacked in the open air for some months before it is sent out for use. The Victoria Stone Company, just mentioned, make excellent paving slabs of granite chips and Portland cement. These slabs appear to be very durable, and they are not so costly as common York paving. Mr. Drake has recently shown me some interesting specimens of the marble and granite mosaic work and concrete his company are now producing. I have only now, in conclusion, to express the hope that I may have succeeded in showing that "the use of cement" is a subject well worthy of the careful attention of the architect.

In the discussion which followed, the President (Mr. Ernest C. Lee), while expressing his sense of the great practical importance of the subject treated of by Mr. Redgrave, said he was no great admirer of the homogeneous monolithic bonese the erection of which had been advocated.

Mr. W. H. Lascelles (of Bunhill-row) exhibited a number of specimens of bis moulded and coloured concrete work, and in response to an invitation from the chair, made a few remarks about them. One moulded or coffered slab which he produced was, he said, designed by a well-known architect, as part of a new method of getting ornamental though fireproof ceilings in rooms. Iron joists were embedded in concrete, and upon these concrete-covered joists the slabs were laid direct, leaving the joists and the under surfaces of the slabs to form the ceiling of the room below, the upper surfaces of the slabs forming the floor of the apartment above. This simple mode of fireproof flooring had received the approval of several architects of distinction. The objection that such floors would be too resonant or noisy when walked upon to allow of their coming into practical use had been falsified by facts. He had built some small houses with floors of that construction, and the tenants made no complaint of noise. Such upper rooms, it should be remembered, being bedrooms, would mostly be carpeted over on the portions walked on. He was now engaged (in connexion with one of the companies who made it their business to erect dwellings for artisans) in seeing whether he could not devise a floor of that kind for such buildings which should be cheaper as well as better than floors of the ordinary kind. The fireproof qualities of the floor had been tested at the Croydon Exhibition of the Sanitary Congress, with conclusive results in their favour. A remarkable property of the concrete material of which these floors were made was that it would bear the driving of nails into it not only without cracking, but would hold them most tenaciously. So well recognised was this quality of the material becoming, that bricks or blocks of it were now used for building into interior walls, instead of wood blocks, for fixing the joiners' work to. The first discoverer of this kind of concrete was the late Mr. Matthew Allen, but it had been much improved upon from time to time, and it had now been found possible to impart to it a good and durable red colour. It could be moulded to any form, and was hardly distinguishable from, though much cheaper than, the best cut brickwork.

Mr. Drake thought that the difficulty of giving concrete work a good aspect externally was now being solved. It had been very difficult to obtain reliable colouring matter for concrete work, and of late he had turned his attention to making the natural surface of the material sightly and even beautiful in itself. Many of the aggregates used, such as marble and granite chippings, were beautiful in themselves, and he had succeeded in making a concrete with a smooth and semi-polished surface in which the pieces of marble and granite forming the aggregates were shown in their own colours, forming a sort of natural mosaic work. (A door in this material, made for the Theatre Royal, Manchester, was exhibited.) The same material was also capable of large and effective use in the shape of small slabs or tiles for flooring purposes.

Mr. J. S. Quilter, in proposing a vote of thanks to Mr. Redgrave for his paper, said the more experience he had of the use of Portland cement, the more reason did he see to use it more largely than ever, and he was glad to see that its use was becoming common on the better class of building estates in the neighbourhood of London. On an estate at Streatham (entirely a clay district) houses were being carried up of concrete made of Portland cement and of burnt-clay ballast in the manner suggested by Mr. Redgrave.

The motion was duly seconded and carried, and Mr. Redgrave having briefly replied, the meeting terminated.

ARCHITECTURAL ASSOCIATION.

At the ordinary general meeting held on the 19th inst., Mr. Ernest C. Lee, president, in the chair, the following gentlemen were elected members, viz.,—Messrs. F. H. Tullock, A. Richards, C. Hunt, W. Cooper, W. M. Mitchell, F. H. Goddard, W. Bennett, W. Mills, J. R. Smith, G. G. Woodward, R. Astley, J. Adkins, A. Clapton, A. Crow, W. P. English, F. P. Pulham, G. H. Sale, G. W. Ward, A. T. Walmisley, H. H. Kemp, E. H. Selby, R. H. Tebb, H. F. A. Chidgey, F. R. Oglesby, T. A. Andrews, R. Barker, E. J. Ram, B. A. Colley, A. B. Few, A. K. Stephens, F. W. Mincey, A. W. Tribe, A. C. Houston, G. F. Byron, A. Huntley, W. Gilruth, E. H. Pritchett, P. Vernon, F. S. Capon, B. F. Simpson, F. Rowntree, F. Wilcox, T. M. Roberts, J. R. Younger, R. M. Kearns, H. Ling, F. L. Lee, W. Parker, and E. E. Carpenter.

Mr. Quilter, honorary secretary of the "Sharpe Memorial" committee, announced that the "Sharpe Memorial Volume" was now nearly ready. The whole of the plates (sixty in number) had been lithographed, and the letter-press was nearly ready. The number of subscribers up to the present time was 134, but it was desired to raise that number to at least 250 before the work was printed. The amount of the subscription was a guinea and a half.

The Chairman announced that in consequence of a domestic affliction Mr. C. G. Vinall would not be able to read the paper on "Furniture" promised by him for the 3rd prox. In its stead, a paper on the "Architecture and Architects of the Sixteenth Century" would be read by Mr. W. Hilton Nash.

Mr. Gilbert R. Redgrave then read a paper on "The Use of Cements," which we print under its own heading.

SCIENTIFIC AND ARTISTIC ASPECTS OF POTTERY AND PORCELAIN.

The first of a series of five Cantor Lectures on "Some Points of Contrast between the Scientific and Artistic Aspects of Pottery and Porcelain" was delivered on Monday evening last in the hall of the Society of Arts, by Professor A. H. Church, F.C.S., who commenced by observing that there were several opinions current as to the effect of scientific knowledge upon the artistic value of the products of manufacture. Some persons argued that the evidence afforded by the consummate beauty of certain Greek vases of what was known as "the period of perfection" would suffice to prove, not only that a rational and intimate and exhaustive knowledge of the chemistry and physics of ceramic materials and processes was not needed, but also that it was almost certain to end in what might be termed artistic disease, if not in the death of true beauty. The idea of such persons was that knowledge,—full, exact, and unbending, fettered the imagination and crushed all the poetry out of the handiwork of man. Quite on the other side were ranged the devotees of science. Science, they said, must be master. Nothing satisfactory, they would urge, could be obtained without mathematical precision. Not content with explaining, by means of all kinds of analytical processes, the causes of the beauty of any product of human skill, these rigid disciplinarians permitted no departure from established rule. But happily there was a third, and, it was to be hoped, an increasing class of persons concerned in ceramic and other manufactures, who took a broader view, and who were prepared to welcome any kind of aid from whatever quarter it might come. They called in the chemist to analyse old materials, and to analyse by synthesis for new ones; but, on the other hand, they would be always on their guard against the dull uniformity, the complete stagnation, consequent upon a mere mechanical routine. They would endeavour to find a scope for individual originality, remembering that a man could not be expected to be always producing the same pot any more than a great painter could be expected to endure the weary labour of continually painting *replicas* of even his best pictures. The energetic director of ceramic works would en-

deavour to learn from the best productions of other countries and other times. He would endeavour to introduce every improvement in grinding and washing the materials used, and in all kinds of glazes or finishes; and with excellence of materials he would do his best to combine good proportion and beauty of outline. It was abundantly clear that if the pottery of to-day was to stand the test of time, not only must it be good in material, but the highest art-knowledge and the highest art-power must be affiliated to the management of our potteries. The continual experimenting of Wedgwood, untrained as it was to a very great extent, would have led to no very great results had not the sweet neo-Classic art of Flaxman been available. In suggestion more fertile, in taste more eclectic, the spirit of to-day, if more exacting than the spirit of yesterday, should endeavour to obtain that quality of all-round perfection which inspired the efforts of the modern potters, though it but too often condemned them. The potters of the present day enjoyed greater and far better opportunities of education and execution than Wedgwood had, and they would certainly fail if they did not take full advantage of them. These were points which had been before urged on various occasions by many minds. In an address which he delivered eleven years ago before a local school of art, he conveyed very nearly the same ideas in very similar words. In the address he pointed out that when Bernard Palissy was at work, no knowledge, or very little indeed, as to the chemical and physical properties of the materials with which he worked was to be had. But during the last hundred years every problem which puzzled Palissy in glazing his ware had been solved by science. Mr. Soden Smith, in his report on the ceramic wares in the Philadelphia Exhibition, speaking of the English productions, contrasted their want of variety in new methods and descriptions of pottery as compared with the inventiveness of Wedgwood, and insisted upon the need of increased art-efforts in connexion with English pottery. To return to his own mode of treating the subject, the lecturer said that the title of the course indicated its scope, but not the limits which many causes combined to place upon his treatment of it. He purposed noting the relations subsisting between the chemical and physical qualities of some kinds of the material used for earthenware, china, pottery, and porcelain, and their artistic qualities as apprehended by the trade. He had then to discuss the physical or mechanical structure of materials used by the potter in connexion with their chemical composition. These were inseparable the one from the other. In other words, the chemical composition and special physical structure went together, and they affected the form, surface, and, of course, the colour of the articles produced,—and by colour he meant not only the ordinary prismatic and tertiary colours, but something more, viz., the transparency or translucency of the material itself. Form was, of course, a matter of primary interest in all good wares. Having, by means of various specimens of Japanese and other ware exhibited, pointed out how the materials used by the potter could be made to lend themselves to diversities in surface, form, and colour, the lecturer proceeded to refer to an interesting point in connexion with hard-burnt terra cotta. He observed that Messrs. Doulton lately noticed that upon all prominent points on any portion of a piece of terra-cotta work that had received special treatment in the way of modelling, or that had been subjected to considerable pressure, there would be found a sort of fine white bloom, at first sight efflorescent, but really not so. Now he had found that by well washing the terra-cotta clay with distilled water, the bloom did not appear in the articles made of clay so prepared. On analysing the bloom he had found it to contain sulphate of lime, which was ultimately turned into a complex silicate of lime, and being in the liquid, as it were, of the clay, it came up to the surfaces most subjected to pressure or to the manipulation of the modelling tools, and, combining with other materials on the surface, formed when burnt a highly vitrified substance, very hard. In his opinion this bloom was very detrimental to the ware. He did not want to see a perfect uniformity of colour, but the bloom to which he was referring did not come in the right places, and was therefore, he considered, injurious to the ware, although he knew that some artists and modellers were rather partial to it. At any rate, it was a matter worth further attention. Having briefly referred to the manner in which the chemical nature of a clay affected not only the wearing powers, but the capacity to receive and retain colour, of such articles as bricks and tiles, the lecturer spoke, in conclusion, of the varied and beautiful effects to be obtained by carefully mixing small quantities of mica, tourmaline, hornblende, asbestos, and other minerals of a like character with the clay used for some kinds of ceramic productions.

The following are the heads of the succeeding lectures of the course, viz.:—II. (Nov. 29), Vitreous, Plumbiferous, Boracic, and Felspathic Glazes and Enamels. Iridescent and Metallic Lustres, and Colouring Substances. III. (Dec. 9). Stoneware and other Wares glazed with Salt. IV. (Dec. 13). Soft-paste Porcelains, European and Oriental. V. (Dec. 20). Hard-paste Porcelains, Chinese, Japanese, and European.

INFLUENCE OF JAMES BARRY UPON ENGLISH ART.

This was the subject of a very interesting paper read by Mr. J. Comyns Carr at the Society of Arts on Wednesday evening last, Sir Henry Cole in the chair. After treating of the life and character of Barry, Mr. Carr said,—I shall not attempt to-night with any fulness of detail either to expound the merits or to mark the defects of Barry's painting. His most important work hangs before your eyes, and I scarcely think it likely that there is in our time room for much dispute as to the intrinsic value of the result. Whatever praise may now be accorded to his talent would go but a little way towards satisfying the claims that were at one time put forward on his behalf. His indulgent biographer contrasts his genius with that of Raffaelle, not altogether to Raffaello's advantage, and Barry himself, I think, believed that he had established a style combining the noblest qualities of the antique with the chosen excellence of the greatest of the Italians. Looking back with that cruel clearness of vision which comes with lapse of time, we can perceive the absolute insecurity of these pretensions. We are able to recognise that such art as this could not, in its nature, be a full or satisfying expression of the mind of its epoch. The failure, as we have already observed, was, in this sense, not Barry's alone; as he was among the first, so also he was in the same respect the greatest of those who laboured in vain. But the classical sentiment which dominated his style, and which pervaded all the art of the eighteenth century, which strove for the embodiment of imaginative ideas, was in two ways absolutely fatal to the production of any work of real and full vitality. For in the first place, he it remembered, that the conception of the antique world which then governed men's minds was in its essence a dead and paralysing conception. The formula which pedantic criticism and the fashion of the time had combined to force upon the world was such as by no ingenuity could he made to express the movement, the passion, and the variety of human life. Men who swore obedience to such a straitened ideal were compelled, even against their will, to falter in their devotion to nature, and to rigidly exclude from their sympathies the feelings and sentiments of their age. Even a genius so true and so refined as Flaxman's could not wholly escape from the mark of this fashion. He was so far restrained by the prevailing spirit, that he could only reconstruct the classic ideal within the limits of a domestic existence. So often as he ventured into a wider realm, so often do his works bear the impress of reverent learning rather than of individual power. He could not express, through classic forms, the presence of the modern spirit; he had not the strength which could forge the link to bind the old with the new, and if we compare his transcript of Greek art with that which had been made by the masters of the Renaissance, we shall have to confess that, although it bears externally the marks of a greater fidelity to the past, it has not an equal sympathy to attach itself to the realities of a present world.

If we can recognise this limitation in the noblest sculpture of the time, how much more strongly must it impress itself upon the products of an art whose resources imperatively demand vividness of realisation, and whose effects are therefore forced into closer comparison with the facts of nature? Painting of all the many forms of artistic expressions can the least afford to accept a convention which seeks to exclude from its views the energy and passion of actual life; and, in yielding to such an influence, it must inevitably take refuge in the nerveless grandeur of Barry's colossal style, or sink into the pretty insipidities of a Cipriani or a Kauffman. But this devotion to a false and limited idea of antique grace was not merely a source of weakness in itself; it served no less to deprive the painters of the eighteenth century of the full benefit they might have derived from the teaching and example of the great masters of the past. Few artists of his age could boast of a wider and more generous appreciation of Italian art than was possessed by Barry. His letters from Rome, and his notes upon the paintings and sculpture in Venice and Florence, prove that he understood, with a justice and discrimination that were rare in his day, the several stages in the advancement of the art, from Giotto to Michelangelo. He never assuredly made a better use of his fiery and impetuous temper than when he boldly lectured the monks at Milan upon their folly in painting the "Last Supper" of Leonardo; and the energy of his discourse on that occasion would, I think, almost suffice to strike terror into the heart of a modern restorer. But, in spite of Barry's real enthusiasm for the painters of the Renaissance, it is easy to perceive that he was constantly testing their work by reference to the standard of the antique. He did not study or accept them in the sense in which they have since been studied and accepted, as the instruments of a great imaginative impulse, whose individuality was stamped not less upon the method than upon the essence of their art; he chose rather to measure his praise of their genius according as he found they approached in their work to the correctness and proportion of ancient sculpture. Such a process of investigation could not be expected to reach the real spirit of Italian art. It was conducted by men who were intellectually already pledged to an impoverished ideal, which a pedantic criticism had chosen to graft upon antiquity, and who, therefore, discovered that Raffaelle and Michelangelo had little to teach which could not be better acquired from the surviving records of the art of Greece and Rome. There was, indeed, one man in England who possessed a keener insight into the great imaginative design of Florence, and better understood the uses of its example. The genius of Blake shot a momentary radiance across the dull sky, which others could not penetrate at all, and then sank earthward with no sure footing to tread the earth. He had the vision which showed him how great a thing painting had been when it stood as the mirror of men's highest imaginings, and he was quick to perceive the extent of the change that was needed before English painting could hope to undertake this difficult duty. But he must be judged as a seer rather than as an artist, for he had no strength sufficient to effect the revolution he so ardently desired, and while he failed through lack of practical power, others who were, like Barry, more perfectly equipped, failed no less from the lack of that intensity of imagination which, in Blake, was developed to the point of disease.

The defects that might be anticipated from this superstitious devotion to Classic style, with its consequent misapprehension of the greatness of Italian design, are easily traceable in the works of Barry. We are struck at once in looking at his pictures with the want of individuality, not merely in the features, but in forms, with the lack of passion and character in the faces, with the absence of expressive energy in the movement of the limbs. The action is either tame or exaggerated; the figures, even where the scale is colossal, are wanting in grandeur and dignity, and, at first sight, these things are more surprising, seeing that there existed at this time another kind of art which would specially tend to the development of the very qualities we miss. It is a remarkable phenomenon that the efforts of men like Barry, and West, and Haydon were contemporary with a series of the most brilliant triumphs in the practice of portraiture, and nothing shows more conclusively the insecure basis of the so-called ideal art of the period than its rigid and determined exclusion of all those qualities which make portraiture interesting. The comparison of two men like Barry and Reynolds must now be fatal to the pretensions of the former. Nor is this dependent merely upon difference of individual genius. If Reynolds had undertaken the task that

Barry attempted, he, too, would have failed in a greater or less degree, and it remains for us to consider, as one of the most interesting problems connected with art-history, in what manner the gradual progress of painting in England and in Europe has led to the decay of imaginative design, and to the assured supremacy of the departments of portrait, landscape, and the realistic illustration of contemporary manners. Looking first to England, we may see that the force of the Reformation, whatever may have been the gains in a spiritual sense, had unquestionably the effect of suddenly snapping the artistic tradition. It is not to be said that, even under more fortunate conditions, our early English painters could ever, by their independent effort, have enlarged the capabilities of their art as to render it fit to compete with that of other nations, but it is nevertheless true that, up to the time of the Reformation, English painting had a real existence; and if we go back to a still earlier date, we shall discover a period when the illuminated works of English MSS. were the most perfect in Europe. If, then, the Reformation, with the Puritan movement by which it was followed, had not entirely depressed the artistic spirit, the successive revolutions of style, which were deferred till the next century, might have more rapidly completed themselves, and the English school, as we now know it, would have had an earlier birth. But, when the Reformation came, the imaginative impulse was turned into a different channel. The force of the Protestant feeling expended itself in denunciation of the ornate luxury by which the earlier ritual had been surrounded, and, in the condemnation of Romish doctrine and practice, it was inevitable that all the outward graces of life, and the arts by which they were sustained, should be temporarily discouraged. Imagination, escaping from the control of the Church, and seeking for itself a free realm, became, by a strange irony of fate, one of the strongest elements of opposition to the art which, of all others, most imperatively needs imagination; and the artist, thus deprived of the sympathies of those who led the new movement of ideas, made scarcely any effort to keep pace with the intellectual development of the time. All the strength of our Renaissance found expression in our literature, and we are left to guess who, among the earlier poets of our school, might, under different conditions of national life, have become great imaginative painters. I know not if it is only a fancy, but I have sometimes thought that, in the author of the "Fairy Queen," there dwelt the soul of a painter; and in the precise and ordered pattern of his verse, so richly and so lovingly adorned with the description of all that might give delight to the eye, we have enshrined a series of visions that might, under other conditions, have found their way on to fresco or canvas. But it is only in the earlier stages of our literature that we are permitted to indulge such fancies, for soon the poet became also the dramatist; and the drama, while it is the highest expression of the literary spirit, serves also most clearly to assert the distinctions between the modes of literature and art.

Seeing, then, how completely literature had absorbed the national energies, it is not surprising to find that the after-growth of art in England is due to a foreign source. In the minds and in the homes of the cultivated classes the taste for art survived, and we had great collectors and connoisseurs before we could boast of great artists. Even before the Reformation had left its mark upon the English spirit, Holbein had found a home at the English Court, and when the work of the Reformation was complete, or nearly complete, Rubens and his great pupil, Vandyck, were invited to our shores. At first sight, indeed, it may seem strange that the residence among us of these great masters of the craft did not avail at once to establish the tradition of imaginative design, but the solution of this riddle is to be sought as well in the nature of the art of which these men were the professors as in that determined impulse towards literature of which we have already taken account.

House Property.—The freehold house, No. 49, Long-lane, Smithfield, adjoining the Barley Mow Tavern, one of the oldest houses in the City of London, having a ground floor area of only 190 ft., was sold last week by Mr. Robins, of Waterloo-place, for the sum of 860*l.*

DUDLEY GALLERY.

The present Winter Exhibition of Cabinet Pictures in oil is the fourteenth held here (so flies time), and comprises 453 paintings, and a dozen little pieces of sculpture. Of these latter Mr. Mullins sends "A Little Maid," in terra-cotta, Mr. Lawson a "Jeannie Deans," in the same material; and clever Mrs. R. J. Fennessy "Donatello, a Sketch for Bronze," which would pair very well with her "Cimabue," already issued in that metal. The collection of pictures shows much sound, honest work, but very few productions to excite great admiration. Looking even to the best known names, it is regrettable to find Mr. G. D. Leslie, R.A., wasting his skill on "Apple Dumplings" (150), and Mr. Stacy Marks, R.A., sending such an utterly uninteresting affair as "Studying Impromptus" (111). Mr. McWhirter's "Thunder Storm on the Grand Prairie" (107) is too like some very special occurrence to be accepted as representing the general. Nevertheless, there are plenty of pleasant pictures to justify a visit, as for example the "Pannier de Fleurs" (53), by H. Fantin; the charming "Spanish Lady" (61), by J. B. Burgess, A.R.A.; "Luring a Conger" (75), H. Macallum; "Première Communion, Dieppe" (95), a sketch by P. R. Morris, A.R.A., "The King's Highway" (173), S. E. Waller; "Le Déjeûner" (200), by Leon Lhermitte; "Souvenir of Algiers" (273), by A. Armitage, R.A.; "Rondinella" (295), by Alfred Ward; No. 324, by C. J. Lewis, marked,—"Now came still evening on and twilight grey"; and many others.

A SEWAGE FARM AT DARLINGTON.

Situated near to the border of the great coal-field of the North, and served early by railways, the ancient town of Darlington has in the past few decades risen in importance, in extent, and in population greatly. And whilst its wealth and that of its merchant princes have been multiplied, there have been some of the difficulties attendant upon large populations. For long the sewage of the town was dealt with after the primitive fashion, the river Skerne running near; but latterly a system of sewerage was introduced, and the outfall placed some miles below the town, and close to the junction of the rivers Skerne and Tees. But ultimately this disposal of the sewage of so vast a population was greatly objected to, and an injunction was obtained, forcing the Town Council of the borough to cease polluting the river. They resolved ultimately to dispose of the sewage by the establishment of a farm, to which it is conveyed. Thence, pumped up by an engine, the sewage is disposed of by irrigation; and whatever may be said of the cost of the sewage farm,—and on this head something is often said by the Town Council and the ratepayers,—it must be acknowledged that the river is purer, and that the complaints of its pollution are never heard of below the town. It is to be regretted that river pollution is allowed above the town of Darlington, and this the more because below that pollution the water supply of the chief towns on Teesside is abstracted from the river. Though the water may be purified in its course, yet there is an old adage that "prevention is better than cure," and it is regrettable that this has not been applied to the towns and villages above the water intake, as it has been to the one below that intake.

The sewage-farm of the Darlington Corporation has been in operation a few years, and it has cost close upon 100,000*l.*; the exact cost up to the date last reported,—March last,—being 97,165*l.*, this being the cost of land, of drainage formation, main effluent sewer, pumping station, reservoir, &c. The land obtained was in 1876-7, about 225 acres, and there has been a further addition since. In the first of these years the work in connexion with the needful reservoir was commenced, the engine-house being completed in the following year. Cottages for engine-men and farm-labourers were built in that year, and to these there have been added buildings for about fifty head of cattle and ten horses. Of these works, the cost was:—Preliminary Act of Parliament, 898*l.*; land and expenses, 53,323*l.*; outfall drain, 1,139*l.*; formation of main carriers, receiving-chambers, under drainage, &c., 6,834*l.*; reservoir, 4,516*l.*; gravitation sewer, 585*l.*; pumping-station and main, 5,454*l.*; and cottages, 487*l.* Up to March, 1879, the total cost was 73,339*l.* Since then additional land to the value of 20,623*l.* has been bought, and other items of cost have brought the total up, as before stated, to nearly 100,000*l.*

For the most recent period for which the official facts have been issued, it may be said that there were 203 acres of the farm under crop. Of these, 85 acres were permanent grass, 22 acres rye grass, 8 acres potatoes, 13 acres turnips, and 23 acres barley. Including the stock on hand, the amount spent on the farm in the last financial year was 10,521*l.*; and the receipts, exclusive of the amount taken from the rates to balance, were slightly less than 6,700*l.* The loss, which fell on the rates, was in that year 3,838*l.*, the amount for the previous year being considerably more. As there are considerable receipts from and payments for live stock, it cannot be said what is the exact loss to the borough from the working of the farm; but it needs to be borne in mind that it is still young, and that it has been entered on in a period of depression for the agricultural interest, and one in which prices of many kinds of farm produce have been very low. As tending to show what the produce of the farm is, it may be added that last financial year there were received 186*l.* for barley, 25*l.* for beans, 69*l.* for hay, 1,109*l.* for milk and butter, 127*l.* for potatoes, 52*l.* for mangolds, 18*l.* for willows, 26*l.* for wool, and 8*l.* for straw. It is evident that though at first there must have been, and there has been, a heavy loss, yet that loss is being reduced, and there are yearly larger receipts from the produce. For some kinds of agricultural produce it is clear that the course of treatment is most fitting, and that from the sewage-farm large crops will be realised. It remains to be seen whether as a farm it will pay its way. It is clear that when farms at a rent comparatively low have barely made ends meet, and have sunk hundreds of pounds, land which has had to be purchased compulsorily at a high value can scarcely be expected to be a commercially good speculation; but it may be said that the farm not only relieves the borough of a difficulty, but in addition it converts what was a nuisance into a blessing. The supply of food is greatly increasing from the land, and is likely still further to increase. And if in the future, with better seasons and better crops, there should be a more remunerative working of sewage-farms, boroughs must expect to have to contribute to them, and that contribution must be taken to be that which represents the cost of the disposal of the sewage, and part of which might have been spent on the older plan.

THE HONESTY OF ENGLISH MANUFACTURERS.

In the opening address delivered at the Society of Arts on the 17th inst., by Mr. F. J. Bramwell, F.R.S., Chairman of the Council, the writer, speaking of the causes of the falling-off in the demand for the products of our industries, said:—

It may be there will be found, and I fear there will be found, but I do trust in only a few instances, that we have lost command of foreign markets, and even of our own markets, because in these instances the manufacturers have not been honest. There was a time when, travelling on the Continent, one was proud to see English manufactures put forward as those to be thoroughly trusted. A foreigner felt that if he bought an article of English make, though it might not be tasteful, at all events it would be what it purported to be,—sound, honest, and trustworthy. I am afraid we cannot now say so of all that is exported from our country, or that is offered for sale within it. I do hope we can say so of most of our manufactures, but we certainly cannot say it of all. But it should be remembered as against those who commit this grievous wrong of casting a slur on the character of any of our industries that they not only do harm to the particular manufacture with which they are connected, but they do harm to the character of the whole produce of the nation. A man who has been trapped into buying a bad English product of one kind is not at the pains to ascertain whether the badness is confined to this particular manufacture, and in all probability he has not the means of ascertaining, but he says, "I bought an article which came from America, and I found it good, sound, and trustworthy. I bought a similar article that came from England, and it broke in fair use, and when it broke its internal rottenness was discovered. In future, not only with regard

to this article, but with regard to others, I shall distrust the English make, and shall prefer the American."

In connexion with this most painful subject of unfair dealing, to my mind there is nothing more humiliating than the confession of widespread dishonesty which the nation had to make some few years since, when, for mere self-preservation, it became necessary to pass an Act of Parliament, directing the appointment of public analysts. The passing of this Act was a confession that, among those who supply food, which is to support life and to preserve the health of those who are in health,—and worse even than this, if possible, that among those who supply the very drugs which the physician prescribes to restore health to those who have lost it,—there were to be found numbers who made the food and the drugs alike the subjects of fraud,—fraud that did not stop short at the mixing with the food or with the drugs materials which were inert, and which did harm by diminishing the nourishing or the curative power of that which was purchased, but fraud which extended to the mingling, in some instances, of materials which were, in themselves, actively unwholesome,—materials which, being taken with the food, converted the food into a source of disease, and being taken as curative drugs, converted those drugs into positive poisons.

Is it not too much to be feared that, in some industries, at all events, that reprehensible conduct which has rendered necessary the appointment of public analysts to protect the population of this country, has been the guide of certain of the manufacturers, and has thereby caused us to export that which is a fraud upon the foreign buyer, and a discredit and an injury to the country that exports it?

I had intended to refrain from instances, but I will endeavour, in general terms, to state one which relates to a very large industry. It appears that in a certain manufacture the purchasers preferred to buy goods that were dyed in one stage of the process rather than in another, as the goods thus dyed were supposed to be better, and they naturally, therefore, commanded a higher price. The finished goods bore on themselves indications which enabled any purchaser at all acquainted with the manufacture to determine at a glance in which of the two ways the article offered to him had been dyed. Then came the deceit. Means were adopted by which the appearance that would have been presented, but for these means, upon the material dyed in the undesirable way, was concealed, so that the appearance really presented was that which would be shown by the manufacture when dyed in the desirable way. It is true that experts in the trade can, after the deceit has been employed, distinguish the one fabric from the other, but the ordinary buyer living abroad, and not suspecting the fraudulent ingenuity that had been exercised in England, and seeing, as he believes, the well-known appearance indicative of the superior mode of dyeing, is deceived, and pays a higher price than he would have paid had he known the truth. It cannot be urged in explanation that this contrivance was resorted to because the appearance presented by the one fabric when in use was superior to that presented by the other. This was not so, as the part of the fabric that was thus treated was the very edge, and was cut off before the fabric was used.

You must not imagine that this deception was practised by a few, or to a limited extent. So far from this being the case, it became worth while to invent machines to supersede the handicraft preparations by which the deception had been originally practised, and these machines were patented. I need not say that such patents are voidable, as being against public policy, their purpose being that of fraud. I am aware I shall be told these are hard remarks to make upon a practice which has now prevailed for years, and to such an extent as to entitle one to say,—"It is commonly done. Everybody does it. Why, therefore, reproach us with that which is a custom of the trade?" I answer, "Because it is a custom for the purpose of deceit."

With respect to commerce, I do not know much about the way in which it is carried on, but I cannot help seeing the statements which appear in the public press from time to time, and if these are well founded, and that they are cannot, I think, be doubted, looking at the fact that they are not contradicted, it would appear that commerce is pursued, in certain instances, under conditions which, equally with those of the manufactures I have been condemning, are a fraud and a disgrace.

BUILDERS' BENEVOLENT INSTITUTION.

An election of pensioners on the funds of this Institution took place at Willis's Rooms, St. James's, on Thursday last, Mr. Thomas F. Rider, president, in the chair. There were nine candidates (five men and four women), of whom four (two men and two women) were to be elected. The poll opened at noon and closed at three p.m., shortly after which hour the scrutineers, Messrs. Thomas Stirling and F. W. Keeble, announced the result of the voting. The following are the names of the candidates, together with the number of votes recorded for them, viz.,—Hugh Richard Bowley, of Clerkenwell, aged 56, 2,002 votes; John Humphries, of Barnes, aged 70, 1,938; James Pilgrim, of Haverstock-hill, aged 60, 310; Thomas Gregory Bartlett, of Battersea, aged 65, 654 (including 80 votes to which he was entitled by reason of having been a subscriber to the Institution); John Page, of Marylebone, aged 67, 1,206 (the whole of the foregoing candidates now for the first time applied to be elected); Mary Ann Garner, aged 64, widow of Mr. William Garner, builder, Harrow-road (third application), 3,483 (including 80 votes due to her owing to her husband having been a subscriber); Selina Thomas, aged 72, widow of Mr. Charles Thomas, builder, of Upper York-place, St. John's-wood (third application), 2,084; Anne Boulton, aged 60, widow of Mr. Webber Napoleon Boulton, builder, Upper Clapton (third application), 1,750; and Martha Mann (first application), aged 60, widow of Mr. Samuel Loveys Mann (of the late firm of Newman & Mann, builders, Upper Thames-street), 6,174, including 390 votes to which she was entitled by virtue of subscriptions to the Institution by her husband's firm.

The President, therefore, declared the successful candidates to be H. R. Bowley, J. Humphries, Mrs. Mann, and Mrs. Garner.

Votes of thanks to the scrutineers (moved by Mr. George Plucknett, seconded by Mr. Cruttenden, and acknowledged by Mr. Stirling), to the checkers of votes (moved by Mr. Dines, seconded by Mr. T. G. Smith, and acknowledged by Mr. Bussell), and to the Chairman (moved by Mr. Phillips and seconded by Mr. Head), were duly carried.

The President, in replying, referred to one or two matters of interest in connexion with the Institution. Firstly, the Institution had, by the will of the late Mr. Larner, become reversionary legatees of that gentleman's estate. After the death of Mr. Larner's widow and daughter, the Builders' Benevolent Institution, jointly with the National Lifeboat Institution, are to share the estate. It appears that Mr. Larner's mother was a pensioner on the funds of the Institution, but was taken off them when the family found themselves in better circumstances. Secondly, a foreman in the employ of a leading London building firm, having on the completion of a job received a gratuity of five guineas, had thought he could not do better (seeing that his father was elected a pensioner on the funds of the Institution some years ago) than hand the money to the Institution which had supported his father in his old age. These incidents were, Mr. Rider thought, of sufficient interest to be mentioned on that occasion.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

The opening meeting of the new session was held on Wednesday, the 17th inst., the Rev. S. M. Mayhew in the chair. The Rev. Preheudary Scarth described an early font, apparently Saxon, in Stanton Church, Gloucester. The Rev. J. A., Lloyd reported the discovery of Saxon carved work during the recent restoration of his church at Broad Hinton, Wilts, and exhibited a full-sized drawing. Mr. Loftus Brock, F.S.A., reported the discovery of a Roman pavement of beautiful design, in the Close, Winchester, of which the Rev. C. Collier sent a drawing. Mr. Lewis exhibited a rubbing of a Saxon coffin-lid found at Bexhill Church, where much Saxon walling has been found above the Norman arches during recent repairs. Amongst other exhibits, the Chairman produced several beautiful specimens of early pottery found in London, including a thirteenth-century green ware jug, of large size. Also an early Chinese carving in jasper, found in excavations at Bishopsgate. Mr. Thomas Morgan, F.S.A., read a paper on the results of the recent Congress at Devizes. The second paper was by Mr. C. H. Compton, on the Cradle Tower in the Tower of London, which has recently been opened out and freed from the modern buildings that surrounded it. The roof is beautifully groined, and, as the reader observed, the tower afforded access from the moat to the Queen's apartments. The whole has been thoroughly repaired under the direction of Mr. Taylor, of H.M. Office of Works.

FREEHOLD GROUND-RENT IN LEICESTER SQUARE.

THE ALHAMBRA THEATRE.

A large number of capitalists was attracted to the Auction Mart on Tuesday by the announcement that Messrs. Cbinnock, Galsworthy, & Chinnock would offer for sale a freehold ground-rent of 710*l.* per annum, secured by the greater portion of the Royal Alhambra Theatre, in Leicester-square, together with two attached residences, Nos. 24 and 27, Leicester-square, with reversion in thirty years to the rack rental, estimated at 5,000*l.* per annum. The particulars describe the theatre as occupying one of the most prominent positions in the West End, and comprising a noble and substantial structure, erected about the year 1850 by a public company under a charter of incorporation, at an enormous cost, and affording accommodation for about 4,000 persons. The whole area of the land, including the site of the two adjoining houses, was stated to be nearly 12,000 superficial feet.

The auctioneer, before asking for bids, enlarged at considerable length on the very great value of freehold land in the locality, as well as on the value of the building itself, observing that in the event of its possible conversion, it was well adapted for Government offices, co-operative, or any other public purpose, and that supposing any such change in the character of the building to be contemplated, the probability was that arrangements could be entered into with the present proprietors of the theatre.

The first bid made was 15,000*l.*, and 17,000*l.* having been offered, there was a pause in the biddings, on which the auctioneer observed that if they estimated it at twenty-five years' purchase on the ground-rent, which he considered it worth, it would amount to more than had been offered, and then they must add to that a considerable sum as the value of the reversion. By further advances the property was brought up to 21,000*l.*, when the biddings again stopped, on which the auctioneer remarked that it was about the only freehold land in the neighbourhood, the land generally in the locality being leasehold; and he reminded them that the selling price of freehold land in the vicinity of Leicester-square at present was 3*l.* per foot, which represented 36,000*l.* as the value of the site at the present day, which must yearly increase. There being no further advance, the property was withdrawn.

SALE OF BUILDING SITES AT SNARESBROOK.

An estate at Snaresbrook, which has just been laid out for building upon, was offered for sale at the Auction Mart, on Thursday, the 18th inst., by Mr. F. G. Hunt. The estate is situated near the Snaresbrook Railway Station, close to Wanstead, and was described as a portion of the comparatively small quantity of land that can now be sold near to Epping Forest. The sites offered were twenty-three in number, having frontages varying from 32 ft. to 60 ft. in length, and from 130 ft. to 200 ft. in depth, They are intended for the erection of a superior class of houses, one of the stipulations being that no house to be built on any of the sites facing the high road to Chigwell shall be of less value than 600*l.*, whilst the houses to be erected on other portions of the estate are not to be of less value than 400*l.* Another stipulation prohibits the carrying on of any trade or business whatever on any portion of the estate. Nine of the sites were sold, two of them having frontages of 64 ft. and 50 ft. each, realising 255*l.* and 250*l.* respectively; six others, with 32 ft. frontages, fetching prices varying from 165*l.* to 150*l.* each; and a site fronting Nightingale-lane, on another part of the estate, and angular in form, with a frontage of 44 ft., realising 100*l.*; the total proceeds of the sale amounting to 1,535*l.*

COMPETITIONS.

Exeter.—Ths compstition at Exetar between the architecte of that city for ths new church at New Town has (ae we announced a fortnight ago) resulted in the choice of the designs of Mr. R. Medley Fulford to be executed, and those of Mr. E. Webb to receive the second premium.

The dsign salectad for execution, with tho motto "Laus Deo," ie a eimple composition in the Geometrical style, having double transepts, not of great projection. The clearstory has two-light windows, with transoms. The walle are to bs of brick, relisved with freestone, and the brick will show in the interior. The piers of the arcade are to be of Devon reddish granite. There is a tower at the north-west angle, having a pack-eaddle roof, with a very ornate flèche rieing from its centre. A passage to each of the vastries north and south is entered under the east window. The nave roof is hoarded in polygonal form, and divided by the principal arched ribe.

"Cui Bono," the second premiated deeign, ie a composition of Byzantine or Lombard character, in brick, the nave having a spacious clearstory with coupled windows. A hold campanile rises at the north-west angle. There ie a narthex at ths west end opening into a baptistery semi-circular on plan. The roof ie of tie-beam construction, with five arches springing from enriched colnmns, with good effect. The author is Mr. E. Webb.

"Confidance" ie a bold and eimple Early English design, with towar and spire at the south-weet angle, transepts, wide chancel aisles, and an apsidal east end. Ite author is Mr. E. H. Harhottle.

"Omnia diligentia eubjiciuntnr" ie a Ceomstrical design. The north transept ie the base of a tower eurmounted with a wood spire covered with lead. Tho area seats 800 and more, as demanded, and a west gallery is shown. This design was submitted hy Mr. Ashworth.

"Si Foitnna juvat" is conspicnous from its lofty north-weet tower having a tall spirslet at one angle, and a pyramidal roof seen over the battlemente. The style is Early Decorated. The length of the nave clearstory is relisved by two gablets, each containing two windows of increased height and nicely managed on the inside. There is a ventilating spirelet in the centre of the nave roof. A narthex extende from the tower along the west end, giving accese to the western doors. The arcadee are intended to have pillars of Devon marble. This design is by Mr. Pearson Hayward.

Pontefract.—In answsr to advertisemente there have heen sent in no fewer than fifty-nine sets (average five to nine sheets in a sat) of drawings, under various mottoes, for a new addition to the very old town-hall of this borough, and dnring the last few days the rate-paysrs, &c., have had an opportunity of viewing these ideae of architecte from all parte of the kingdom. The first premium being only 50*l.*, and the second 25*l.*, the authorities are snrprised to find snch keen competition. The vote in Council restricts the eum to 7,000*l.* as the cost of the new buildings, but eome of the designs are eo elaborate in detail that the stone front of the hall will ewallow up that amount, and make a total of nearly 20,000*l.* Indeed, out of the whole lot it would he difficult to eelect half a dozan sete which any respectable builder would undertake to build for the amonnt specified. The corporation will do well to fairly weigh the various conditions eet forth; and before deciding we hope they will take into their confidenss eome professional architect.

REVOLVING DIVISIONS OR SHUTTERS.

Probably the lsrgest movable division ever fitted up hae heen snpplied to Scotland by Salmon, Barnee, & Co., for St. Bridget'e New Roman Catholic Schoole. It ie for the purpose of screening the altar from the schoolroom, and ie worked by the patent balance-weight motion belonging to the firm, and can, by mesne of the ordinary long arm, be raised and lowered instantly. The dimensione, according to the statements which reach ne, are eo much in excess of what has hitherto heen considered practicahle in the way of revolving divisions or shutters, that the makere may he fairly congratulated on having solved, with their patent balance motion, a difficnlty which hae hitherto heen a serione one in regard to divieions of large apartments.

COMPENSATION CASE.

Mr. Under-Sheriff Burchell, at the Middlesex Sheriffs' Court, last week presided over a special jury in the case of "The Metropolitan Board of Works *v.* Thurgood," which was an appeal from an award made by Mr. Rodwell, M.P., in respect of twelve small tenements in Commercial-place, Whitechapel, required under the Artisans' Dwellings Act. The houses were in a low neighbourhood, and had been condemned. The evidence, as usual, was very conflicting as to the value of the property. The surveyors for the Board estimated the value at 1,250*l.*, and the surveyors on the other side put the value at 2,450*l.*

The amount of the award by Mr. Rodwell, M.P., was not allowed to be mentioned to the jury, and the Under-Sheriff, in smmming up, said the case was of considerable importance, because if the verdict were less than the award Mr. Thurgood would have to bear the expenses, and he (Mr. Burchell) thought that, as a member of Parliament, the sooner Mr. Grantham got the law amended the better.

The jury retired, and on their return assessed the value at 1,900*l.* The award was 2,100*l.* Mr. Grantham, for defendant, said, as the verdict was less than the awasd, he had to ask, under the Act, for 20*l.* as costs. The Under-Sheriff said he should certsinly grant the application. A verdict for 1,900*l.* was accordingly entered.

"THE USEFUL AND THE BEAUTIFUL."

Sir,—Mr. W. Cave Thomae, in the *Builder* of the 20th inet., writing on thie eubject, says,—"Why should we not be content on occasion, as Nature is, *with a little robust and useful ugliness?*" Simply hecause there is no reason why anything should he made ugly. "The elephant is not beautiful"; no, but it ie better than that, it is a noble animal. The finest and grandest works we have are as a rule the most simple,—in painting, architecture, sculpture, and engineering. A work often becomes ugly becanee the foolish designer *tries* to make it beantiful *by adding work to it.* An ugly building could often be made passable by knocking down eome of ite featuree rather than by adding more. Ae a rnle, anything ugly could have been made to look well *at the same cost* if a little taste had heen added, and if its ornamental work had all been omitted. Why is it that the back of a building is often much finer than the front? Because it has been designed for utility and without straining after effect. The exterior of Nswgate is one of the best buildinge in London. Simple and grand; how very different to the style now so much in vogns in the City! The great thing is, not, as Mr. Cave Thomas eays, "to he content with a little nglinese," hut to be particular in avoiding any one ugly point in anything. *The absence of ugliness* is the great point; it doee not matter how simple a building is (the more so the better, I say), let it be useful and well planned, simple and of *good outline*, and ths beantiful will then, and not till then, come in as an accessory.

Mr. Cave Thomae says there is "uglinese in Nature." A very ugly remark which I certainly cannot agree with. G. T.

DISTRICT MARKETS.

Sir,—I am glad to see that thie subject finds place in your columns, and, as an inhabitant of Kensington, I venture to eay that no district stande more in need of such a market than ours. Kensington is a charming place to live in, and few people willingly leave it, but it is a most expensive place, on account of the extremely high price of provisions. These are, indeed, chargad at higher rates here than in the immediate neighbonrhood of Groevsnor-square and Mayfair. I fully agree with the opinions expressad in the first letter which appeared in the *Builder* in respect to Continental markete and their advantages, and the exceesive cost of fish here; and what ie true, donbtless, of other parts of London is in its fullest force in this locality. In respect to the second letter, which I see in your issne, it does not appear that the Company, to whom the writer is the architect, pnrposes to cover the whole subject; at least in aefar ae ie indicated by its title, "The Local Meat Market." I should have prsferred to see the designation a wider one, each as, "The District Markete Company," for instance; for my idea of what is wanted in Kensington, in Chelsea, and in Bayswater, ie a dietrict market in each parish, situated probahly near ite railwaye, where not only meat, but vegetables, fruit, and flowere, fish, fodder, and other suppliee of constant consumption and convenience to the pnblic, might be found and purchased for ready money, without the bnyer having to pay moet nnjnstly for the credit wbich ie given to othere or for those who do not pay at all. I am neither a epeculator, a builder, nor an architect, and I have not a railway share; and it ie merely as an inhabitant of Kensington that I add that there are two extensive plote of ground, at prssant chiefly nntilised, hstween the Gloucester-road Station and the High-street, Kensington Station, which might, it appears to ms, either of them accommodate convsniently to the neighbourhood each a district market ae would he a great public henefit. Thsse plote helong, I believe, to the railways that join and diverge here, and the proximity of a fins pnblic market to them might be enitsble and commodious in eeveral waye, and especially for their conveyance of eupplice to it; hut enoh questione as these I leave to othere more competent to deal with them than I am, and, moreover, I would not attempt to treepass unduly on your valuable epace. Sigma.

ARCHITECTS' SPECIFICATIONS IN RELATION TO WOOD.

Sir,—The writer of the article in the *Timber Trades' Journal* under the above heading is no donht a eufferer from the wording of the epecificatione, which do obtain what their authore rsquire, viz., that all woode shall be of the hest quality only; and with this very necessary provision, any one acquainted with the timber trade of former yeare and that now in existence knowe the great difficulty thare ie of getting really sound and good quality now as compared with the former period. Thie, no donht, is the reaeon of the complaint, and the only reason which hae any value, for that of selecting sizes which can only hs obtained by sawing ie abeord. There wae a time when only 3 in. by 9 in., 3 in. by 7 in., and 3 in. by 11 in., were obtainable, but now almoet every conceivable section can be obtained direct from the timher merchant. John Geo. Carey.

LAW OF EASEMENTS: CLAIM TO LATERAL SUPPORT.

Sir,—Nothing poseihly ie more crude or imperfect than the existing law, or, more properly, want of law or legal definition in thsse caees. In fact, we have to deal with the *lex non scripta*, or unwritten law.

One of the *dicta* ie that every building is, or ehould be, capable of eelf-support, and is not entitled to "extraneone support." Another saye, if you disturh any existing eaement or support you are liable in damagee.

With all these conflicting statements, let me euggest a *viâ media*, whereby the varione intereste may be coneidered. *A priori*, whoevar disturbs the *status quô* shonld do eo at his own risk and peril, and it should be provided that a three months' notice, ae in party walle, should be given, thie notice applying equally to any external wall abutting on vacant ground or land; and any and all costs and chargee in eecuring such premieee, and making good any damage, should be at the sole cost of the building owner.

It may happen that a building is endangered, or the reverse, eo that by being properly underpinned it has a much better foundation than existed previonsly. Many of the eo-called eaements have been simply trespassee that have passed unheeded, ae where a small window hae heen formed in an external wall overlooking the ground of an adjoining owner without conent. In snch matters, where no written consent can be ehown, the contrary might be asenmed.

Under the Building Act of 1844, any one eo forming an opening improperly could, on one month's notice, be required to hrick it up,—a mattor now only to he treated ae a trespass at common law, and thus made more difficult.

Robert Lacon Sibley.

N.B.—The dafect is a want of any mode of lsgal procedure to be followed in theee matters; it is, therefore, essential this should be supplied.

"Appleton's Patent Self-Centre Rule."—The patentee hae hit npon the notion of marking and figuring his rnle in half inchss both waye from the centre, eo that on applying the centre to any given point the operator can read off right and left any nnmhar of inchee or half inches on each eide. For hanging pictures, mounting drawings, and many other operatione, it will certainly be found more handy than an ordinary two-foot rule, and as there is no reaeon why the new marking shonld make the rule any dearer, it will doubtless be largely asked for in preference when it ie known.

THE MODERN BARRACK: ITS PLANS AND CONSTRUCTION.

SIR,—May I correct an omission that seems to have occurred in all the published reports of the paper upon this subject read by Mr. Ingress Bell at the Royal Institute of Architects?

Neither in the Transactions of that body, nor in the professional papers, is any allusion made as to the authorship of the numerous designs of modern barracks exhibited at the meeting. Mr. Bell must, therefore, have failed to make it clear that I was the designer of them all, with the exception of the elevations of the Knightsbridge Barracks.

In these several works I was ably assisted by Mr. J. M. Rogers, A.R.I.B.A., and the other architectural draughtsmen of the Designing Branch, which was under my immediate supervision. I regret that I was unable to be present at the reading of the paper; I should have been able to explain some points which, by the reports, appear not to have been clearly understood.

H. C. SEDDON, Major R.E.

COMPETITIONS.

LIVERPOOL INSTITUTE SCHOOL OF ART.

SIR,—I learn (from this week's *Builder*) that no less than seventy-five sets of designs (embracing 593 drawings) have been sent in for the above building, the contemplated outlay on which is only 10,000*l.*; yielding, therefore, if executed, a commission to the profession of about 500*l.*

In the interests of the profession may I venture to ask each competitor to assist the investigations of the Competitions Committee of the Royal Institute of British Architects, by kindly informing me by letter (under his motto if he please) the actual out-of-pocket expenses incurred in preparing his design, and also, as nearly as he can, the amount of time expended on it by himself or his assistants, and his own assessment of the value of such time.

THOMAS PORTER, Hon. Sec. to the Committee.
No. 2, Westminster Chambers.

BUILDERS' AGREEMENTS.

SIR,—Will you, or any of your corresponding architects' inform me if it is not the custom for architects to draw up agreements, and have them signed and witnessed in their own offices, when relating to buildings they have in hand?

I have recently had two disputes respecting the payment by builders for their agreements and stamps (though the specification stated distinctly they were to pay), and in one case the party employed a solicitor, who stated that I, as an architect, was liable (under some Act) to a penalty of 20*l.* for preparing the agreement and charging for it, as it was an infringement on the rights of the legal profession.

Now, if this is correct, it is a serious thing for architects in small provincial towns, as most of the works are let in separate trades, and I have had work, say for a small house costing under 400*l.*, let in five separate branches,—*i.e.*, the brick-work, wood-work, slating, plumbing, plastering, and painting,—all let separately, and separate agreements signed by each trade. If it is necessary to go to a solicitor with each contractor in a case like the above, I should like to know who will pay his charges, as a proper tion would certainly object.

INQUIRER.

PARLIAMENT-STREET PAVEMENT.

SIR,—In a paragraph headed "Wood Pavement," in your number of the 20th inst., you say,—"It is expected that the works, which are being executed by the Asphaltic Wood Pavement Company, will occupy about a fortnight or three weeks." As manager of the Asphaltic Wood Pavement Company (Limited), I beg to inform you that the work in question is not being done by my Company. The difference between which, and that now being laid in Parliament-street, may be seen by any one passing through Chandos-street, Strand, which is now being paved on the Company's system.

FRED. W. SMITH, Manager.

Books.

Songs and Poems from 1819 to 1879. By J. R. PLANCHÉ. London: Chatto & Windus, 1881.

MRS. HENRY MACKARNESS, the author, herself, of a host of popular books, has collected under this title a number of her admirable father's songs and poems, not merely for the poetic genius shown in them, but as illustrative of his gentle and genial nature, which enabled him to live to the age of eighty-four without making an enemy. It is a charming little book, fully justifying this view, and more. We should have been glad, however, if it had been made to include even more of Mr. Planché's songs than it does. For example, "The Bumper of Burgundy," a song immensely popular in his time, and which, in his absence abroad, was published by Braham, as we have often heard Planché say, without the name of the author of the words. Again, one song, a powerful denunciation of evil, written for the remarkable spectacle "Babil and Bijon," and which was not sung in the piece, is alone given, though many, we think, would be glad to have the whole of the songs that were written for it. So charming are they, that Mr. Boucicault, in his little "Book of the Play," sold in the house during its performance, speaks of his own work as being simply a basket to hold Mr. Planché's flowers. Reference is made in the preface to some of his separately-published poems, and to the list given might have been added a jocose version of "The Sleeping Beauty," which was illustrated by Mr. Richard Doyle. The complete neglect which befell this was a cause of annoyance and surprise to the author, who had a fondness for it, and could never understand why it had not become popular. It would have a better chance, probably, if it were produced now. What Planché wrote twenty years ago usually reads as well now as then. Take, for example, the following lines from "A Christmas Greeting," in the volume before us, which might have been written last week, so fully does it represent the cry of the moment:—

> "The days they grow shorter and shorter,
> The town's worse than ever for smoke,
> Invention, necessity's daughter!
> How long must we blacken and choke?
> Contract with some wholesale perfumer
> To wash off the soot as it falls,
> Or let a gigantic consumer
> Be placed on the top of St. Paul's.
>
> Oh! strive by some channel to turn it,
> Ere down our throttles it rolls;
> Why can't the Gas Company burn it?
> 'Twould save them a fortune in coals.
> Much longer we ne'er can endure it,
> The smother each resident damns,
> Unless something's done to cure it,
> 'Twill cure *us* like so many hams."

This quotation must be our justification, if any be needed, for going a little out of our way to recommend the "Songs and Poems" of a dear and much regretted friend.

VARIORUM.

THE *Magazine of Art*, as bound, makes a handsome, entertaining, and instructive volume. It is equally suited to the library shelves or the drawing-room table. A capital gift-book!——"The Metropolitan Masonic Calendar and Pocket-Book, 1881," and the "Illustrated Price List of Masonic Clothing," both come to us from the indefatigable Geo. Kenning. The fact that a second edition of the Pocket-book was last year called for and absorbed shows that it needs no further recommendation.——A new edition has been issued by Messrs. Longmans of "The Elements of Mechanism," by T. M. Goodeve, M.A. It is an excellent little book of its kind. ——A new edition, also, has been published of the "Moulder and Founder's Pocket Guide," by Fred. Overman (London: Sampson Low & Co.). It is an American book, and to the present issue has been added a useful supplement on Statuary and Ornamental Moulding. —— "Stationary Engine-driving: a Practical Manual for Engineers in Charge of Engines," has been written by its author, Michael Reynolds, with an earnest desire to raise the character of engine-men in this country, and it seems well calculated to effect its purpose.——The new serial story in the *Quiver*, entitled "In Vanity and Vexation," which is already exciting interest, is from the pen of the popular author of "Lost in the Winning," a story which achieved a success a few years ago in the same magazine.——The Christmas Number of the *Pictorial World*, produced under the superintendence of Dalziel Brothers, is likely to prove an attractive one. ——A pile of children's books, magazines, and Christmas "Parts" have reached us. The *Boy's Own Paper* and the *Girl's Own Paper* both come from the *Leisure Hour* Office,—a recommendation by itself. "The Glad Time," with very good illustrations, is the "Little Folks" Annual (Cassell); "*Judy's* Annual" has some amusing sketches. "Four Flirts: their Cards, and how they Played them," by Ernest Warren, is the *Round Table* Annual. It is illustrated by Hal Ludlow, and will have many readers. "Cassell's Almanac" has, as usual, a wood engraving on every other page.

Miscellanea.

Technical Education.—The Cutlers' Company, being desirous to render further assistance in the development of a knowledge of the principles of science as applied to the materials used in the cutlery trade, have arranged for a course of lectures being delivered in the Hall of the Company during the ensuing winter season. Sir Henry Bessemer has kindly promised to commence the course, and will, on the 1st of December, read a paper "On the Manufacture and Uses of Steel, with special reference to its employment for Edge Tools." The admission will be entirely free, but by ticket, which may be obtained on application to the Hon. Secretary, addressed to the Cutlers' Hall.

London Custom House.—Messrs. Robert Boyle & Son, Holborn Viaduct, are at present ventilating this building with their patent air-pump ventilator, under the direction of her Majesty's Office of Works.

Architects in Ireland.—The *Irish Builder* is complaining sadly of the want of *esprit de corps* amongst the architects of Ireland, and writes thus:—"Here in Dublin (and indeed throughout the provinces) we have a class of architects who, with a few, a very few, honourable exceptions, are utterly unworthy of their profession, their country, or of any journalistic representation. It is with a sense of almost humiliation we write these words, for the men we speak of have been tried in every way, and have been found wanting. In this city, we have for some years past the semblance or make-believe of an Irish Institute of Architects; but we would be false to our principles and teachings if we would longer pretend there was any real Institute of Irish Architects in existence. The Central, the London, Glasgow, Edinburgh, Newcastle, Manchester, Birmingham, and some other architectural societies live, and work, and thus afford evidence of their vitality and usefulness, but the so-called Irish Institute exists only by courtesy upon paper or upon a zinc plate. It has done nothing, or next to nothing, for some years past, and from present appearances it intends to do nothing. It has no sessions or meetings, no papers are read, and once or twice, perhaps, in the year a faint echo is heard, as if some voice was crying out from the grave. On these occasions there is a sort of resurrection, at which about half a dozen members assist. The appearance of a new Viceroy in Dublin, or some event which calls forth an address or deputation from some other professions, calls also forth an apparition on the part of the dead or dormant Irish Institute,—and then come night and sleep again."

Plumbers Again.—Last week the roof of the Shireball and Guildhall, Shrewsbury, was discovered to be burning. The fire is supposed to have been caused by plumbers who were working there on Thursday. By two o'clock the fire was got under by the local brigades, assisted by the Wem and Oswestry engines, and the railway engine. Fortunately the whole of the valuable paintings were saved, and as the strong rooms, both county and borough, are intact, the contents are supposed to be uninjured. The town clerk, Mr. E. C. Peele, and the clerk of the peace to the county, Mr. de Courcy Peele, will be great sufferers, as they carried on the business of solicitors, and the whole range of their offices, which were at the top of the building, are destroyed. The whole of the roof and floor under it are totally destroyed, with the exception of the strong rooms. The hall was commenced in the year 1834, and finished in 1837. The erection cost 12,000*l.* The building is insured heavily in the Salop Fire Office.

The Tay Bridge.—The *Scotsman* states that the plan adopted for the restoration of the Tay Bridge involves the complete abandonment and removal of the existing viaduct. The structure to be substituted for the abandoned bridge will be erected on a site in the immediate vicinity, but a little higher up the river, and will be of such breadth as to carry a double line of rails. It is not yet finally settled whether the piers of the bridge shall be of iron or brick; but if the former material be decided on, it will be in the form of malleable iron, security being further provided for by a largely-increased width of foundations. The cost of the works will be very considerably greater than was anticipated in the application to Parliament made last session.

Galvanised Corrugated Iron Roofing.—A correspondent asks us if roofing of this description is rendered more durable by painting. In a pure atmosphere galvanised corrugated iron will prove durable for a considerable time, but in London our belief is that it is necessary to paint such roofs. Messrs. Brahy & Co., who have had a long experience, agree in this. They add, "In the case of zinc, however, which is a little more costly, painting is altogether unnecessary, and a roof covered properly with this material will last as long as three or four iron roofs."

The Royal Historical Society.—In this Society's Rooms, 22, Albemarle-street, on the 18th inst., a considerable number of members assembled to do honour to Lord Aberdare, the president, by presenting to his lordship a terra-cotta bust of himself, from the studio of Mr. Henry Harvey, sculptor, a Fellow of the Society. Dr. Zerffi made the presentation. Lord Aberdare, in the course of his acknowledgment, spoke of the artist as a young man entirely devoted to his art, and with good ideas of what art should be.

Memorial Hall, Dover.—The Memorial Hall and Dover Tabernacle was opened on the 16th inst. The building has been erected for the requirements of a congregation gathered together by the labours of the Rev. J. F. Frewin, and consists of a hall capable of accommodating 500 persons (exclusive of galleries, for which provision has been made), school-rooms for 300 children, double vestries, and offices. The schools are placed in front on the first and second floors; the ground-floor being occupied by the entrance-corridor to the hall, staircase, and kitchen. The buildings are Early English in character. The front is built of red brick with Bath stone dressings, and the roofs are covered with Bangor slates. The heating of the hall has been accomplished by a Porritt's stove. The contract was undertaken for about 1,860*l.*, and carried out by Mr. Bromley, of Dover; Mr. Andrew T. Taylor, of London, being the architect.

Re-valuation of Fulham.—Mr. T. A. Marsh, clerk to the Assessment Committee, has favoured us (*Metropolitan*) with some particulars as to the recent revaluation of Fulham Union. We learn that an increase has taken place in the gross value of 118,328*l.* over the lists previously in force, and of 99,855*l.* in the rateable value. The total gross value was 665,521*l.*, and the rateable value 545,854*l.* Hammersmith parish has increased in gross value by 47,127*l.*, and in rateable value by 40,237*l.*, the total gross value for the parish being 231,597*l.*, and rateable value 190,136*l.* Fulham parish had increased in value by 71,200*l.* gross, and 59,608*l.* rateable, the totals for the parish being, gross, 433,923*l.*, and rateable, 355,718*l.*

TENDERS

For new offices, &c., for the Chorlton Board of Guardians, Manchester. Messrs. Mangnall & Littlewoods, architects:—

Brown, Stockport	£10,550	0	0
T. & W. Meadows	10,239	0	0
T. M'Farlane, Manchester	10,229	0	0
Ward	10,090	0	0
Brown	9,998	0	0
Davison	9,982	0	0
G. M'Farlane	9,900	0	0
Wilson, Tott, & Huntley	9,849	0	0
Davies & Maudsley	9,783	0	0
Neill & Sons	9,737	0	0
Southern & Sons	9,765	0	0
Webster	9,700	0	0
Elms & Evans	9,679	0	0
Napier	9,590	0	0
Herd	9,537	0	0

For residence at Sittingbourne, Kent. Mr. W. Leonard Grant, architect:—

Higgs & Hill, London	£1,994	0	0
Shrubsole, Faversham	1,848	0	0
Johnson, Faversham	1,748	0	0
Lawson, Whitstable	1,742	0	0
Toad, Whitstable	1,712	0	0
Pavey, Sittingbourne	1,698	0	0
F. Higgs, London	1,667	0	0
Seager, Borden	1,648	0	0
Vaughan, Maidstone	1,647	0	0
Cornelius, Whitstable	1,592	0	0

For warehouse, Mill-street, Lambeth, for Mr. Charles Keartland. Mr. Stanley M'Murdie, architect. Quantities by Messrs. Sandall & Corderoy:—

Ansell	£987	0	0
Canning & Mullins	953	0	0
Ford & Sons	946	0	0
Higgs	942	0	0
Rice	889	0	0

For new residence for Mr. S. Morgan, jun., Severn Valley Mills, Newtown, Montgomeryshire, exclusive of stabling, conservatory, and laying out grounds. Messrs. Jones & Parke, architects:—

Williams, Newtown (accepted)	£1,380	0	0

For rebuilding the Founders' Arms public-house, Holland-street, Blackfriars, for Messrs. Daun & Vallentin. Mr. Wm. C. Banks, architect:—

W. & F. Croaker	£2,340	0	0
Ansell	1,991	0	0
Beale	1,898	0	0
Sharpe & Everard	1,840	0	0
Downs & Co., Southwark	1,830	0	0

For new front, &c., to 119, St. James-street, Brighton. Mr. Arthur Loader, architect:—

Lockyer	£592	0	0
Newnham	563	0	0
Bruton	539	0	0
Hackman (accepted)	523	0	0

For carpenter and joiners' work in the erection of a new Baptist Chapel on Victoria Town Estate, Deal. Quantities supplied. Mr. J. Wills, architect:—

G. H. Deane	£1,027	0	0
T. & W. Denne	964	0	0
Gibbons	900	0	0
Wise	885	0	0
Hayward	714	10	0
Trollope	688	0	0

For the erection of homestead at the Hall Farm, Akenham, Suffolk. Mr. Alfred Conder, architect:—

Girling, Ipswich (accepted)	£3,795	0	0

For the erection of a pair of semi-detached villas, Sebert-road, Forest-gate, for Mr. J. R. Tozeland. Henry C. Smart, architect:—

Miller (accepted)	£636	0	0

For erection of new premises of the London and County Banking Company (Limited), Lewes. Mr. Edward Salter, architect:—

Pearless, Eastbourne	£2,815	0	0
Card, Lewes	2 731	0	0
Snewin, Littlehampton (accepted)	2,537	18	0

TO CORRESPONDENTS.

W. H.—J. S. W.—B. & Co.—W. W.—W. A. P.—F. W. H.—A. L.—A. H. W.—A. O.—A. O.—F.—V. S.—D. & Co.—J. E. H.—T. F. A.—H. C. S.—W. V.—Mr. R.—W. C. A.—G. R.—H. T. S.—W. W.—K. R.—C. & Son.—E. A.—J. A. S.—C. P. & Co.—C. E. D.—W. C. R.—G. & H.—H. H.—W. G.—F. H.—O. B.—J. & P.—R. J. C.—E. A.—M. G. & Co—A. T. T.—H. G.—F. H. & Co.—B. W.—O. G. Putney (the Dead-meat Market, Smithfield, is 631 *ft.* from east to west, and 246 *ft.* wide, presenting an area of 155,226 ft. It is illustrated in our volumes for 1855 and 1857).—Cause and Remedy (the dampness complained of would seem to be the result of condensation).—E. S. B. (thanks; not desired).—H. F (shall be looked to next week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

TERMS OF SUBSCRIPTION.

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The Builder.

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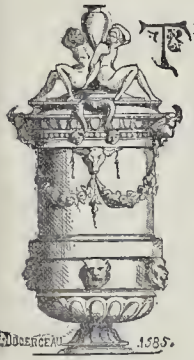
ILLUSTRATIONS.

CONTENTS.

*Dr. Schliemann's New Work.**



THIS book is unique. The expression is bold, but it is fully justified by the work. We live in an age of discovery. The very air is full of the awakened voices of the long silent past. A new literature has been recovered in the clay tablets of Assyria; and we speak of the libraries of Assyrian kings with almost as much certitude as of the contents of the British Museum. The products of long-forgotten art have been unearthed, at Mycenæ, in Cyprus, at Ephesus, in Magna Grecia, in Asia Minor, showing close resemblance to many of the objects with the representations of which the present volume is so rich. Again, we have had discussions on ancient history and poetry, and have been taught to live over again the life of the classic past, and to catch the echo of the music of Homeric times. Yet again, we have had autobiographic sketches, and stories of the triumphs of genius and perseverence,—tales of men who, from the humblest origin, have won their way to national or even to European power, and enriched future generations by the heritage of noble examples. Such names have occurred again and again in English history, from the familiar story of Sir Richard Whittington, to the later tales of George Stephenson and Sir Joseph Whitworth.

But in Dr. Schliemann's last work we have all these elements of interest combined. We have, in simple language not unworthy of the pen of Bunyan or of De Foe, the story of the son of the Protestant clergyman of the little town of Neu-Buckow, in Mecklenburg-Schwerin, who was born on the 6th of January, 1822, and whose natural disposition for the mysterious and the marvellous was stimulated to a passion by the wonders of the locality in which he lived. The garden of the parsonage was haunted by the ghost of Ernest Schliemann's predecessor. Behind the garden was a pond, out of which a maiden was believed to rise at midnight, holding a silver bowl. The air of the place was redolent of legend. A robber knight of old had buried his beloved child in the vicinity in a golden cradle; and buried treasures, fearful spectres, and underground passages, were the food of the imagination of the child.

The pastor himself, though neither a scholar nor an archæologist, had a passion for ancient history. He told his son, with warm enthusiasm, of the tragic fate of Herculaneum and of Pompeii, and of the wonders which were brought to light in those volcanic regions by the spade and the pick. He also repeated to the boy "the tale of Troy Divine"; the great deeds of the Homeric heroes; and of the ten years of struggle for one fair and faithless face. When nearly eight years old, Henry Schliemann received as a Christmas gift a volume of Jerrer's "Universal History," with an engraving representing the flight of Æneas from Troy. To the boy the picture was direct evidence. "Jerrer," he cried to his father, "must have seen Troy, or he could not thus have represented it." Not finding his father convinced by the argument, the lad came to the resolve that one day he would excavate Troy.

It may not unfrequently occur that high purposes are thus formed in youthful imaginations. But how often does it happen that they are carried out in after-life? Schliemann did, indeed, fulfil this resolve made when he was eight years old. But one feature of the romance was destroyed. The little maiden, Minnie, who was to be the helper and the reward of his toil, was married just one month before the lover of her childhood found himself far enough on in the battle of life to ask her hand in marriage. The blow was a severe one, but Schliemann found consolation. His companion in the Troad was his wife, an Athenian, who has borne him a son, Agamemnon, and a daughter, Andromache.

The death of Henry Schliemann's mother, when the boy was nine years old, was the beginning of misfortunes. It was followed by some change in worldly estate or position, of which we are only told the result. At the age of fourteen our author was bound apprentice in the little grocer's shop of Ernest Ludwig Holtz, in the small town of Furstenberg, in Mecklenburg-Strelitz. Here he came in contact only with the lowest classes of society. His occupation was the retailing of herrings, butter, potato-whiskey, milk, salt, coffee, oil, sugar, and candles; the grinding of potatoes for the still, the sweeping of the shop, and the like employments. He had been taught Latin, first by his father, and afterwards at the Gymnasium and the Realschule at Neu-Strelitz, but he had not begun Greek. A drunken miller who came into the shop recited about a hundred lines of Homer to the boy, and the melodious sound of the words, unknown as was their sense, made such an impression on him that he bitterly wept his unhappy fate. The three glasses of whiskey, bought with the few pence that made the whole fortune of Henry Schliemann at this time, by which he induced the miller three times to repeat the "divine verses," were bestowed with a result not often to be traced to the product of the still.

From this hard bondage, in consequence of an accident which must have seemed the culmination of his misfortunes, the boy escaped to sea. Always poor, he had never been so utterly destitute as at that moment. He had to sell his only coat to buy a blanket. Fate still frowned. On the night of the 11-12th of December, 1841, he was shipwrecked in a fearful storm off the island of Texel. "I felt," he says, "as if on that bank a voice whispered to me that the tide in my earthly affairs had come, and that I had to take it at the flood." On the following day his little box, containing a few shirts and stockings, and his pocket-book with letters of recommendation, was picked up, the only salvage from the wreck, by reason of which the boy earned from his companions the name of "Jonah." He reached Amsterdam without a coat, suffering bitterly from the cold, with the idea of enlisting for a soldier. His means being utterly exhausted, he feigned illness,—little room, we should fancy, for feigning,—and was taken into the hospital at Amsterdam. While there, the account of his misfortunes excited sympathy; a subscription was set on foot for him, which produced 20*l.*, and he obtained a situation in a merchant's office.

There his work consisted in carrying letters to and from the post-office, and in attending to the stamping and the cashing of bills of exchange. Thus, sure of food, he set himself to educate himself. First he took lessons from a famous caligraphist, and learned to write legibly. Then he began to study the English language. His salary amounted to 32*l.* per year, half of which he spent on his studies. His breakfast consisted of rye-meal porridge, and his dinner never cost more than twopence. His lodging, which cost eight francs a month, was a garret without a fire, where he shivered in winter, and was parched with heat in the summer. His method of education was original. His plan was to read aloud, without translating, and to write essays on subjects of interest, which he corrected under the supervision of a teacher, and then learned by heart. He went twice every Sunday to the English Church, and repeated to himself in a low voice every word of the clergyman's sermons. As he went on his errands he read and repeated to himself, and then committed to memory, the whole of the "Vicar of Wakefield," as well as of "Ivanhoe." By dint of labour like this he acquired in half a year what he calls a thorough knowledge of the English language. It may be added that Dr. Schliemann's pronunciation is still that of a foreigner and of a German; but that if the work before us proceeds, as we believe is the case, from his own unaided pen, he is justified in the previous remark.

The next six months were devoted in the same way to the acquisition of French. His choice of books was happy,—"Les Aventures de Télémaque" and "Paul et Virginie." "This unremitting study had in the course of a single year strengthened my memory to such a degree that the study of Dutch, Spanish, Italian, and Portu-

* Ilios: The City and Country of the Trojans. The results of researches and discoveries on the site of Troy and throughout the Troad in the years 1871, '72, '73, '78, '79; including an Autobiography of the Author. By Dr. Henry Schliemann, F.S.A., F.R.I.B.A. With maps, plans, and about 1,800 illustrations. London: Murray. 1880.

gnese sppeared very essy; and it did not take me more than six weeks to write and speak each of those languages fluently." Such is his own account.

In 1844 he obtained a situstion as correspondent snd bookkeeper in the office of Messrs. B. H. Schröder & Co., of Amsterdam, at a salary of 48l., which wss soon raised to 80l. Inspired partly hy the desire to make himself of more service to his employers, he now hegan the study of Russisn, and hired a poor Jew, at four francs a week, to come every evening for two hours to listen to Russian recitstions, of which he did not understand a syllshle. These nightly recitations, delivered in a loud voice, annoyed the neighbouring tenants; and while studying the Russian language Schliemsnn was twice obliged to find himself new lodgings.

In Jsnnsry, 1846, his principals sent him as their agent to St. Petersburg. There he soon rendered himself so indispensable to his employers as to find himself practically independent. Then he wrote to ask for the hand of Minnie; and the disappointment which he experienced rendered him for some time nnfit for any occnpation, and sick in hed. From his recovery he pressed forward with seven-lesgued strides to fortune. In 1847 he was inscribed in the guild as a wholesale merchant. It is characteristic of a man who could make new friends while remaining faithful to his old ones that for eleven yesrs he kept the agency of Messrs. Schröder & Co. Thoronghly understanding indigo, he confined his operations to that commodity. At the end of 1852 he estshlished a hranch house at Moscow for dealing in indigo; and, as he was always overwhelmed with work at St. Petersburg, it was not until 1854 that he found it possible to acqnire the Swedish and Polish languages.

For the remarkahle escape which he had in this yesr from the loss of his entire property hy fire, we must refer to his autohiography. In 1856 he found himself unable to restrain his desire to learn Greek, and at once set vigorously to work, for a couple of years, during which he read almost all the classical authors cursorily, and the "Iliad" and the "Odyssey" several times. In 1858 he renewed the study of Latin, and, further, arrived at the nnusual conclusion, "I thought I had money enough!" He then travelled in Sweden, Denmark, Germany, Italy, and Egypt; sailed np the Nile to the second cataract, learning Arabic hy the way; travelled across the desert from Cairo to Jerusalem; traversed Syria; visited Smyrna, the Cyclades, and Athens; and was on the point, in the summer of 1859, of visiting the Ithaca, when he was seized with fever. Business affairs then again claimed his attention, nntil, at the end of 1863, he found himself in possession of snch a fortune as his ambition had never ventured to aspire to. His old dream of Troy then recurred to his memory. But, hefore settling himself down to archæology, he thought hest to see a little more of the world. So he started in April, 1864, for Tunis, to visit the ruins of Carthage. He then went, *vid* Egypt, to India; traversed that country from the Himalayas to Ceylon; went to China, to Java, to Japan; and so to San Francisco. Thence, through Nicaragua, the eastern United States, Havannah, and Mexico, he made his way to Paris, where, in the spring of 1866, he settled down to study archæology henceforth with no other interruptions than short trips to America.

At last, in April, 1868, Henry Schliemann was able to realise the dream of his life, and to visit at leisure the scenes of those events which had always had such an intense interest for him, and the country of the heroes whose adventures had delighted and comforted his childhood. He started, hy way of Rome and Naples, for Corfu, Cephalonia, and Ithaca. This last-named island he csrefully examined, hut the only excavations he made there were in the so-called Castle of Ulysses, on the top of Mount Aetos. He afterwards visited the Peloponnesus, and examined the ruins of Mycenæ. Thence he went to Athens, and started from the Piræus for the Dardanelles, whence he proceeded to the village of Bonnarhashi, at the southern extremity of the plains of Troy. This spot had, in recent times, heen regarded as the Homeric Ilium, on the ground of the asserted existence of two springs at the foot of the village, which were taken to be the two, one of cold and one of warm water, mentioned by Homer. But it turned out that instead of two there are hetween thirty and forty springs, all of a nniform temperature of about 62° Fahrenheit. The Turks call the plsce Kirk-Gios; that is to ssy, forty eyes or springs. The spot, moreover, is eight miles as the crow flies from the Hellespont,—more than double the distance of Troy, as collected from the "Iliad." Bonnarhashi heing thus negatived, Schliemann examined successively all the heights to the right snd left of the Trojan plsin, and was at last strnck hy the imposing position snd natural fortifications of the hill called Hissarlik, which formed the northwestern corner of Novum Ilium, at an elevation of 162 ft. ahove the level of the sea. Here he decided to excavate; hut it was not till April, 1870, that he was able to return to the spot, and so commence a preliminary excavstion. Sinking through a mass of *débris*, he struck, at a depth of 16 ft. helow the surface, a wall of huge stones, 6 ft. 6 in. thick, which he wss subsequently enahled to identify as part of a tower of the Macedonisn period.

The requisite firman from the Porte was not ohtained until Septemher, 1871, and on the 11th of the following October the work was at length commenced. Eighty lahourers were employed, and the excavation was carried on till the 24th of Novemher, when it hecame necessary to snspend it for the winter. Returning to Hissarlik at the end of Msrch, 1872, Schliemann resnmed the work with 100 lahourers,—a number which he soon increased to 130, and then to 150. He was provided with the hest English wheelharrows, pickaxes, and spades, and paid his labourers each ahout 1s. 6d. per day. On the top of the hill he erected a wooden house with three rooms, a magazine, and a kitchen, and covered the huildings with waterproof felt to protect them from the rain.

For the details of the work of 1872, which was carried on till the 14th of August, we must refer to the volnme itself. On the 1st of February, 1873, the excavations were resnmed, in the teeth of an icy wind. It was in the course of this year that Dr. Schliemann discovered that the Hellenic Ilium, or *Novum Ilium*, of which he found such interesting memorials, extended over a much larger spsce than that which had been covered hy the preceding and more ancient cities. It wss in this year that the important discovery of the treasure was made. Many of the objects then found were exhihited at South Kensington, and commented on by us at the time. The largest silver vase alone contained nearly 9,000 objects of gold. The excavations were discontinned on the 17th of June, 1873.

In the heginning of 1874 an account, in German, was published at Leipsic, of the discoveries at Troy; and a French translation appeared at the same time. An English translation was pnblished hy Mr. Murray in Novemher, 1874, edited hy Mr. Philip Smith, under the title of "Troy and its Remains." In this work the hurnt city, which Dr. Schliemann regards as the Ilium of Homer, was reckoned as the second from the virgin soil. It now appears to be the third, ont of a series of seven successive periods of huilding.

In Fehrnary, 1874, Dr. Schliemann commenced the exploration of Mycenæ hy sinking thirty-four shafts in its Acropolis. The pnhlication of the work on Mycenæ in English, German, and French, occupied the whole of 1877, and the spring and summer of 1878; and an examination of Ithaca was then made. At the end of September, in this year, excavations were recommenced, on a large scale, at Troy, and csrried on until they were stopped hy the winter rains on the 26th of November. On the 1st of March, 1879, the work was resumed, and in company with Professor Virchow, of Berlin, and M. Emile Burnouf, of Paris, Dr. Schliemann made a careful exploration of the Troad. The pnblication of the large and heantiful volume hefore us, with its numerous illustrations (all referred to in the text), shows that no time for repose has been allowed hy the author from either his engineering or his literary work.

Thus far we have derived our information from the introduction to the hook. There is a preface, hy Professor Virchow, preceding the introduction. Then follows the main hody of the work, divided into twelve chapters. Of these, the first deals with the country of the Trojans. The second is on the ethnography of the Trojans; their several dominions in the Troas; and the topography of Troy. The third is on the history of Troy; the fourth on the true site of Homer's Ilium. Each of the five succeeding chapters is devoted to one of the pre-historic cities on the site investigated. Of these, the third, or hurnt city, is identified hy Dr. Schliemann with the Troy of the "Iliad." The sixth city, most prohsbly a Lydian settlement, and the seventh city, the Greek Ilium, or Novum Ilium, occupy a chapter apiece; and the twelfth chapter deals with the conical mounds in the Troad, called the Heroic Tumuli. This part of the work occupies 678 psges. It is followed hy an appendix, and a copious and well-arranged index, hringing the volume np to 800 pages. There are nine sepsrate papers in the appendix, hy Professor Virchow, Professor A. H. Sayce, Consul Calvert, and other writers familiar with the snhjects. One of these, a short article, hy Mr. A. J. Duffield, on the "Lost Art of Hardening Copper," is of interest, as giving reason for the opinion that it is to an admixture of rhodium or other metals of the platinum group that the hard quslity of ancient tools and weapons is to he attrihuted. A cstalogne of the plants hitherto known in the Troad adds to the information so copiously sfforded hy the volume.

We have passed over the details of each engineering campaign, on the ground that it would he more instructive to the reader to devote such space as we could command to a hird's-eye view of the results of this costly and adventurous work, arranged according to the chronological, or at least the successive, order of the seven cities, of which the remains have now heen exhumed.

The hill of Hissrlik, rising, as hefore mentioned, to a height of 162 ft. above the level of the Mediterranean, is situsted ahout three English miles to the south of a point on the cosst of the Hellespont, marked hy a tumulus, which hears the name of the tomh of Ajax. About the same distance to the west of Hissarlik is the shore of the Ægean Sea. The hill is the hesd of a low range of hilly country, trending to the south-west; at the foot of which lies the bed of the old Scamander, into which the Thymbrius falls, at ahout five miles to the south of Hissarlik. The Simois runs from east to west, nearly parallel with the shore of the Hellespont. It falls into a marsh to the north of Hissarlik, which drains into the Scsmander. The Plain of Troy stretches from the course of the old Scamander to that of the new river of the same name. Its width of nearly a mile expands into an area of a mile and a half wide at the foot of the hill of Hissarlik, sffording a sort of amphitheatre, well suited for a field of hattle. Besika Bay, of some repute of late, is on the coast of the Ægean Sea, ahout four miles to the south of the parallel of Ilium.

The hill of Hisarlik is covered with the *débris* of snccessive cities, to the depth of 52 ft. 6 in. The top of the native rock is now 59 ft. 6 in. above the plain at its hase, or 109 ft. 6 in. above the level of the sea. The stratum of made earth and rubbish forming the *débris* of the first city lies to a depth of 7 ft. 6 in. on the rock, or at a depth of from 45 ft. to 52 ft. 6 in. below the surface of the soil.

The remains of all the prehistoric cities, as has heen ascertained by twenty shafts sunk over the area of Novum Ilium, are limited to the precincts of the hill which formed the acropolis of this latest and largest city. The earliest city does not give any signs of having heen destroyed by fire. Nor have any external walls heen found which could he properly attrihuted to the earliest date. The pottery of this city is of a special type, principally, though not altogether, made without the nse of the potter's wheel. A lustrous hlack snrface has been given to many of the vessels, and linear patterns, incised in the clay and filled with white chalk, are used for decoration. Vessels with three feet are found, and a lustrous red cup, with one handle, is figured; it stands on a foot. But the great majority of the vases of this date are round at the bottom, so as to he unfit to stand on a hoard or level surface. They are also generally furnished with vertical tnbular holes, made in excrescences at the sides of the vessel. The application of the microscope to some vegetahle matter remaining in some of these holes shows that they served for the passage of linen cords, by means of which the vessel was snspended. This may often he the case with such vsses as are called by the name of *Aryballos*, used for drawing water from a well. But the general prevalence of the arrangement indicates that the vases must always have heen snspended when full, a fact which leads to the idea that such a method of disposing of them must have heen in use before the introduction of tables, or even of shelves. Querns, pestles, and grinding-implements of trachyte, hasalt, and

compact limestone; axes of jade and diorite; single and double edged saws of flint; arrow-heads of copper, and moulds of mica slate for casting them; pins, punches, and various ornaments of copper; knives of copper, one of which is gilt; pins, awls, and needles of bone and of ivory, and knuckle-bones, or *astragali*, used for a well-known game, show that a state of civilisation far from being despicable had been attained by the builders of the earliest town reared on the site of Troy.

The second city, of which the *débris* forms a stratum some 12 ft. thick, was inhabited, as is proved both by architectural remains and by pottery, by a very different race of people from the builders of the first. These second settlers built both their city walls and those of some of their houses of large stones, while their predecessors laid their foundations, composed of small uncut stones joined together with earth, on the top of about 8 in. of black earth that covered the surface of the rock. Cakes of clay were also used, in order to level the ground and serve as a sort of packing for the huge stone blocks. Some of the houses in this second city have evidently been destroyed by fire. A female skeleton, tolerably well preserved, was found in the ruins of one of these burnt houses; and ringe of gold wire and a pin of electrum were found near the remains. The skull is brachycephalic, and the jaw is decidedly prognathous. Vases with what Dr. Schleimann calls an owl's face and female attributes, but on which Professor Virchow, like ourselves, rather observes a rude indication of a human face, here occur. Handles are given to the vases; and tripod pots on round rests, such as are now in use, are found, instead of the vertical tubular holes of the earlier pottery. Wheel-made plates abound, and a curious form of drinking-horn, with two large handles, also makes its appearance.

In the third city, the remains of which form a stratum of 10 ft. thick, slightly baked bricks appear as building materials. A minute description is given of the structural remains of this third city. It is evident that it was destroyed by fire, and it was from its ruins that the great treasure of golden, silver, and electrum vases and other objects was recovered. From the bones found, it is evident that, with the exception of the household cat, all the domestic animals now known were kept by the inhabitants.

Curious figures of terra cotta, supposed to be idols or amulets, abound in these ruins. A very archaic figure of lead, with the legs joined like the pedestal of a Hermes, has also been figured. The vases are often of large bold form, furnished not only with handles, but also with a sort of horns, or ears, probably of a symbolical nature. The Svastica, or gammated cross, is found as a decoration, and the subject is treated at length. Crown-shaped covers to vases occur; and rude conventional imitations of animal forms are not unusual for the vessels. Stone axes and hammers, and flint saws, still were used, as well as copper shields, cauldrons, and vases. Battle-axes and lance-heads of bronze, and two-edged bronze daggers, are found; but it is an extraordinary fact, and one that proves the pre-Homeric date of this third city, that not a single sword has been discovered in its ruins. The splendid treasure here found is described at length. The skulls of two warriors are figured. They had helmets on their heads, but it is not said if they were similar. They were probably too much decayed to show. As to the skulls themselves, they are of two very different types, one of them being much flatter than the other, as well as much more prognathous, or prominent in jaw. A third skull, that of a girl, approaches a Greek type.

The inhabitants of the fourth city, of which the ruins occupy a depth of 10 ft., were of a lower order of civilisation than those of the third. The pottery is coarser and of a ruder fabric, although the same general forms were in use. "The masses of shells and cockles accumulated in the *débris* of the houses are so stupendous that they baffle all description. . . . . A people which left all their kitchen refuse on the floors of their rooms must have lived in a very low social condition."

Above the stratum of ruins of the fourth city is a layer of *débris* of about 6 ft. thick, evidently consisting of the remains of houses built of wood and clay. The rude stone hammers and axes, so common in the fourth city, are now no longer found. The patterns of pottery manifest a general decline. The mode of life was changed; for the kitchen remains were no longer suffered to accumulate in the houses. Knives and axes of bronze are like those found in the third city, except that the latter are shorter, rarely exceeding 6 in. in length. Needles of bone occur, but are not plentiful.

Above the stratum of ruins of the fifth prehistoric city, and just below the ruins of Novum Ilium, is found a vast quantity of very curious pottery, partly hand-made, partly wheel-made, so utterly different from the pottery of the preceding cities, as well as from that of Novum Ilium, that the explorer hesitates whether to refer it to historic or to prehistoric times. From the resemblance which it bears to the hand-made vases found in Italy, and called either Arobaic Etruscan or pre-Etruscan, Dr. Schliemann thinks that an indication of Lydian origin is afforded; and he calls this sixth settlement on the hill of Hissarlik the Lydian city.

With the last remains,—those of Novum Ilium,—we come into historic time. In B.C. 480, we are told by Herodotus, Xerxes, in his expedition to Greece, went to sacrifice in the temple of the Ilian Athene. For the account of this city, its noble relics, and its Greek inscriptions we must refer the reader to the book. It is one of those volumes of which it is impossible to give an abstract, within any reasonable length, because it is so full of new and highly suggestive matter. Our object has been rather to indicate the origin of the research, the method employed, and the general outcome of the whole, than to attempt a *précis* of a work so full of luminous and novel detail. We shall be content if we have awakened in our readers that curiosity which will allow them no rest until they have obtained the book. We can only now echo the closing words of Professor Virchow,—"Thrice happy the man to whose lot has fallen to realise in his maturity of manhood the dreams of childhood, and to unveil the Burnt City. Whatever may be the acknowledgment of contemporaries, no one will be able to rob him of the consciousness that he has solved the great problem of thousands of years. . . . May the work which he has terminated become to many thousands a source of enjoyment and instruction, as it will be to himself an everlasting glory."

We have only to add that publisher and printer are fully entitled to a share in the gratitude of the public for the production of this splendid and, in the best sense of the word, thorough work.

A FRENCH TREATISE ON WARMING AND VENTILATION.

THIS is a very formidable volume.* It is a treatise aiming at a thoroughly scientific treatment of the subject of warming and ventilating inhabited buildings; not dealing only with the various methods which have been employed for warming and ventilation, but starting from first principles,—from the consideration of the movement of air, and the method of formation and communication of heat,—and reducing the facts connected with these subjects to formulæ and diagrams. According to the taste for regularity of literary arrangement by which the French are so much influenced, we have under almost each heading the formal division of the subject under the several classifications of "Formules théoriques," "Conséquences pratiques," and "Tableaux graphiques," in which latter the "Conséquences pratiques" are reduced to diagrams, the results of which are supposed to be appreciable at a glance. In some cases the intermediate steps are omitted and we go at once from "Formules théoriques" to "Applications"; but the same rigidly logical method is adhered to throughout; and we are not allowed a section of a grate or a ventilating apparatus until we are supposed to have swallowed a sufficient number of formulæ to be able instinctively, almost, to estimate the capacities and incapacities of each form of mechanism in each material.

In this country we are apt to make too light of mere theory in dealing with practical matters of this kind; in French treatises such as this we find a tendency to overload the consideration of the subject with theory. No one in search of a practical solution of the problems of efficient warming and ventilation would be very likely to spend his time in going through the pages on pages of figures and formulæ here contained; nor do we feel by any means sure that he would be much nearer certainty in attaining his ultimate object by so doing. It is no more than mere common-sense to bestow adequate consideration upon the methods of radiation of heat, the conductivity of various substances, or the phenomena of the movement of air under various circumstances, before attempting to gain a satisfactory method of heating or of ventilation. But we question very much whether the attempt to reduce these phenomena to the strict minuteness of mathematical formulæ and of graphic representation in diagrams is not a delusion, calculated rather to waste time than to insure satisfaction. Supposing, for the sake of argument, that all the formulæ and conclusions are correct deductions from experimental investigation, the very experiments from which they are deduced are liable to so much unaccountable and unestimated variation of conditions that, unless they are the average of an immense number of experiments, we should in any case be sceptical as to their absolute accuracy. Granting this, however, it is literally impossible to insure precisely the same conditions for the practical application of the formula. Heat and the movement of air are phenomena so little amenable to management and discipline beyond a certain point, that there must always be a large margin allowed for any calculations as to the conditions for producing a certain definite distribution of heat or a certain movement and replacement of air; and even to have all mathematical expressions of the flow and movement of air at one's fingers' ends would not preserve us from the complications arising from quite unforeseen and uncontrollable fluctuations in the conditions under which we had to realise one result. The general knowledge, for example, that the flow of air in a tubular inlet must be retarded by the existence of a right-angle or any other decided angle in the conveying tube, is sufficient in general terms for all practical purposes; nothing is really gained by reducing it to a precise mathematical statement according to accepted data; we can never be sure that the statement will be absolutely correct for any length of time. To calculate precisely the movements of so variable a body as air in this way is something like calculating the exact form and velocity which a breaking wave must take from data of the density of water, depth near the breaking-line, nature of the beach, and strength of the wind; we might do this theoretically, but practically we know that the wind force is continually varying, and that the movement of the wave is liable to be influenced in a hundred different ways by the operation of other disturbances of the water in its vicinity. Most of what is given by these "Formules théoriques" can be deduced, as far as it is really practically applicable, by observation, without halting halfway to fix the observation in figures and diagrams. These latter form, no doubt, a language in which to state a theory if accuracy of expression is specially desired, and they form, when founded on a great number of experiments, a convenient expression of the total results, and as such we leave them to the study of the reader in this case; but we much doubt whether any one will ever either warm or ventilate a house by mathematical formulæ and with mathematical certainty of result, unless we were to have separate formulæ and separate appliances for every change of heat and barometrical pressure, not to mention the thousand and one variations in regard to material, aspect, length of conducting passage, and size of apartments, &c. &c., in which each habitation has its own idiosyncrasies.

It would in any case carry us quite beyond our limits to go into the theories and formulæ stated in these pages. It will be more to the purpose here to notice some of the points in the practical part of the treatise, where they seem to suggest improvements on our usual practice in this country. One of the very first things we come to in the chapter on construction of fireplaces is in regard to the section of flue to be adopted. We are reminded here of the curiously unreasonable form of rectangular oblong which we habitually adopt, and of which the only possible recommendation is that it is more convenient to the bricklayers than others, except the 9-in. square, which is supposed to be too small, and the 14-in. square, which is for most cases too large. As a matter of fact, we believe the area of the 9-in. square flue would be sufficient for most house-fires, and that the 14-in. by 9 in. is often indirectly the cause of smoking, from its being larger than necessary, and larger than can be easily warmed and supplied with up-

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* "Chauffage et Ventilation des Lieux habités." Par P. Planat, Rédacteur en chef de la Semaine des Constructeurs. Paris: Ducher et Cie. 1880.

current by the fire. But our French authority never thinks of a flue with square angles. A square flue with the angles rounded he will accept, or a circular flue, or an oval flue; but the flue with angles to catch and collect the soot is not in his books at all. There can be no doubt that for keeping a flue clean, and promoting a regular current or draught in it, there can be no plan so good as the circular one, which, however, is only now and then applied in England, in special cases. Circular it should be, with smooth sides of tile, so as to give as little hold as possible to the soot on its surface, and, at the same time, present a surface which the cleaning brush will easily operate upon with a complete sweep, instead of leaving angles where the soot lodges, and half escapes the brush. The "tallboys" with which it is proposed to crown the chimneys for better draught, do not present, in the illustrations given, any improvement on the usual hideousness of this type of article in England. Two or three of the more practical English contrivances against down-draught in windy weather are figured for the benefit of French readers.

In the following chapter on the principal systems of French constructors, it is noticeable that one of the marked specialties of the Galton stove in England, the upcast flue for warm air carried up the middle of the smoke-flue and receiving heat from the smoke, seems to have been adopted in more than one form in France. It occurs in Peclet's fireplace in very nearly the same form, and in the "Cheminée Cordier" the idea is carried further, a number of small tubes in the flue being substituted for the one large one. This is, of course, better in the way of drawing heat from the smoke-flue; at the same time it is more complicated and expensive, with perhaps not a compensating degree of advantage. The Cordier fireplace is unlike anything in use in this country, as far as we have observed; its special feature, besides the tubes in the flue above mentioned, consists in a kind of grating of hollow tubes leaning slightly forward over the fire; between these tubes the smoke escapes into the flue, while the greater part of the heat which in the ordinary fireplace escapes up the chimney is utilised in communicating heat to these hollow tubes or bars, and consequently to the air in them, which then passes up into a larger main tube running across the top of the apparatus and thence through openings into the room, at what point the diagram does not clearly show: indeed, we may say that many of the diagrams are very poor in regard both to style and minuteness of illustration, and in this respect quite out of keeping with the size and intended importance of the book. The framework of tubes, it may be observed, is hinged at the foot so as to be thrown back against the back of the fireplace-opening for better convenience in cleaning it and the grate. As a contrivance for catching surplus heat on its way into the chimney, provided, of course, the tubes are never allowed to become so heated as to burn the air, this seems a very ingenious and apparently efficient device, and is worth attention in this country. The "Cheminée Laury" is another modification of the same idea as the "Cordier"; instead of the hollow bars there is, arising from the back of the fire and partly overhanging it, a series of console-shaped pieces of metal with their edges towards the room. These both radiate heat into the room and also communicate warmth to the air in a tube, which, as in the Cordier, passes across the top of the fireplace and discharges warmed air into the room on either side of the fireplace and about the height of the mantelpiece. The "Cheminée Joly" has an iron shell, forming the apparent back and side of the fireplace, with an undulating face towards the fire and projecting laminæ in the rear; behind it is an air space, into which these laminæ project, and where the air is warmed and subsequently admitted into the room. This is, of course, the same principle as the Galton stove, only without the fireclay and with some difference in detail. At the close of this chapter, attention is drawn to a matter often, we might say generally, overlooked, viz.:—the difference between the requirements of a fireplace in cold and comparatively warm weather. If the chimney orifice is suitable for a good draught in cold weather and with large fires, then to keep up the same draught in warm weather we must keep up a larger fire than we require. To avoid this, means of altering the size of the opening from the fire should always be provided, and, moreover (a point often overlooked), should be contrived so as to be easily manageable from the front of the fireplace.

A chapter follows on foreign fireplaces, in which England occupies decidedly the largest place. The Lloyd, Sylvester, and Boyd grates are described and illustrated: the latter seems to be approved of as simple and effective; but while commended for the avoidance of burning the air by too hot surfaces, it is added that the fire-brick surfaces transmit much less heat than iron ones, and that the surface in contact with the air to be warmed must be considerably augmented in order to get the same amount of heat as in the metal-lined fireplace. This is true, but M. Planat seems to forget the compensating advantage of fire-brick in retaining the heat so much longer and giving it out so much more equably than iron, so that the fire requires less attention and to a great extent retains the same heating power for a long time after the fire itself has run low. It is more slow to heat, but more slow to cool, and therefore not subject to the continual variations in heating power to which a metal fireplace is subject. The Galton fireplace is fully figured and described, and much praised, its only fault being to occupy too much room, which has, in fact, prevented its frequent use in small dwelling-houses, although its admirable qualities as a fireplace for large barrack-rooms and other such establishments is universally admitted. Almost the only Continental grate out of France which is illustrated is the Badmar,—much used in Russia and Germany,—a very complicated affair, the plans and sections of which are too small and inadequate to render its action very intelligible. It is observable that here again the plan of carrying air up the flue in a separate conduit, to be heated by the smoke, is carried out, but with this difference: that in this case the smoke is carried up the centre metal flue (to discharge into a built flue in due time), and the air is carried up round it; thus reversing Captain Galton's arrangement in this part of his stove. It is added that the Badmar fireplace has the advantage that in summer, when not in use for burning fuel, it serves as well for ventilation as for warmth in winter; but we are not told how the circulation of the air through it is to be maintained in this case. A short chapter on the causes of smoky chimneys professes to take each of these causes separately and suggests the remedy; the author enumerates among these causes the want of a sufficient supply of air to replace what the fire should exhaust, a matter which is generally regarded in relation to combustion only.

The chapter on warming by hot air gives sections of several very elaborate systems for making the most of the heat in comparison with the amount of fuel used to generate it, some of which are worth the attention of those who are practically interested in the question. In the summary at the close of the chapter M. Planat expresses the opinion that the balance of advantages is in favour of brick or terra-cotta surfaces for communicating heat to the air, rather than of the iron ones which are so much more commonly used. He admits the comparative difficulty of arranging the surfaces of this slower conducting material so as to collect and communicate the greatest proportion of heat; but he states that from experiments made in 1869 by M. Tresca, sub-director of the "Conservatoire des Arts et Métiers," on heating apparatus of this material, it was found that they could be so constructed as to utilise 80 per cent. of the heat proceeding from the fire, which certainly seems a very satisfactory proportion. The advantage, in a sanitary point of view, of air heated by contact with brick and fire-clay surfaces over that which has been scorched, as one may say, by the quicker conduction of iron, is known to all, we imagine, who have any practical experience in the matter. M. Planat also gives a table showing that in experiments with various forms of heating apparatus, both of brick and iron, made under his superintendence, the brick shows a decided average advantage in point of economy of construction considered in relation to results; the term "brick" (*la brique*) standing, we presume, for what we generally call fire-clay, and which the French term "terre réfractaire," though the same reasoning may probably be applied to built brick heating apparatus on a larger scale. M. Planat adds a caution that the draught through brick flues is not so good as through iron, and that therefore especial care must be taken to ensure a complete and efficient draught.

In the matter of stoves, to which a separate section is devoted, it may be noticed that ideas which are comparatively new here, are already old elsewhere. We have only just seen tile-faced stoves made a specialty by one firm in England, but they are here in several varieties; in which we observe that the utilisation and collection of heat is effected by a number of surfaces in the interior of the stove, in every case figured here, instead of by mere thickness and mass of the material. Possibly the ultimate result is nearly the same; the thick-walled stove as made at Lambeth collects the heat more slowly, and takes longer, consequently, to come into effective operation; but, on the other hand, it maintains a very uniform temperature when it is once got up, and preserves it for a long time, even with a fire which has been allowed to get low. The "Poêle Phénix," employed in France, is an ingenious and very simple arrangement for a self-feeding metal stove burning coal; the coal is all deposited in a central chamber or coal-shoot running the whole height of the stove, and something like an inverted hopper, rather broader at the bottom than the top. The bottom of this receptacle hangs a few inches clear of the fire-bars below, and the lowest stratum of coal burns on the bars, the flame and heat escaping round the sides into the space between the coal-shoot and outer side of the stove; as the coal on the bars is consumed, the mass of unburned coal in the coal-shoot gradually descends by its own weight on the fire-bars, and thus the volume of coal is continually being burned away at its lower end, and proportionately dropping on to the fire, till it is all consumed. That is to say, it does all this in theory, and it no doubt will do so in practice, if one can ensure that the flame shall not, when the coal is loose and presents more interstices than ordinary, take a lead up the centre coal-shoot also, and waste a quantity of fuel by consuming it surreptitiously before its time However, as the coal-shoot is closed at the top and has no draught, and if there is a good draught provided out of the side portion of the stove, the probability is no doubt in favour of its action; and, granted that it will practically act as intended, it is no doubt a remarkably simple and compact arrangement for a self-feeding stove. Something of the same kind has been seen in England, but did not come into use. The Gurney and Musgrave stoves are figured, or described, with no expression of opinion. An Austrian stove, the "Geburth," has a curious arrangement whereby the metal stove-flue is returned upon itself with a variety of elbows and junctions, apparently with the view of gaining a sufficiently long flue for draught without making it a conspicuous object traversing the room. This might be commended to the attention of the clergyman who wrote to a certain society concerned with the protection of old buildings to ask what he should do with a long stove-pipe which had been carried the whole length of his Mediæval church, and out through the west wall, and how he should get rid of this disfigurement, and received a reply cautioning him against rashly meddling with an interesting relic of the habits of a previous generation.

A great number of different stoves are illustrated in the succeeding pages, to which it is worth while to refer, but which we have not space to particularise here, except to remark that there is one stove specially designed for burning coke, contrived by the Parisian Gas Company, which may be worth the attention of those who are now trying to promote smokeless fires in London. The conclusion of M. Planat is that all these forms of stove have their advantages, and that it would be difficult to name one as specially or entirely superior to the rest. The subjects of warming by hot water and steam, and that of ventilation, are separately treated, and we may say something in regard to M. Planat's views and suggestions thereupon in another number.

Art of Old Japan.—At the *soirée* of the National Indian Association, on Thursday evening last week, there was on view a portion of Mr. Pfoundes's Japanese collection of photographs, native illustrations, albums of sketches, &c. A series which attracted much attention consisted of interesting illustrations of the "System of Art" and "Progressive Lessons of the Japanese." It does not appear to be sufficiently widely known even amongst collectors, that there has long existed a perfect "system" as well as invariably "a motive," allegorical, poetical, or otherwise, in the "Art of Old Japan."

ON ARCHITECTS, PAST AND PRESENT.

THAT we should be every now and then reminded of the transitory nature of things mundane is only to be expected in a world wherein all things are ever on the change, and wherein one of the great laws of its constitution evidently is that nought in it is intended to remain always as it is, but must needs be perpetually, though it may be silently, passing away,—to be again, perhaps, renewed under other and still ever-changing forms. We are surrounded on all sides by evidences of this fact,—not only as respects individuals and single and isolated things, but in far more general and much wider and more universal ways. Nought is free from this law of nature,—nothing can escape it. The very earth itself on which we live is as much subject to it as are the animated forms and living things in it. This change may be slow, but it is not the less certain. If this be so,—and who shall doubt it?—the principle involved is not the less true and sure if applied to matters artistic and architectural; for where can there be found in the whole circle of things greater evidences of change and "progress,"—if that be the more significant word,—than in the successive changes as told in their histories of the *styles* of architecture, and in the lives and life's workings of those who bring them and their changeful phases into actual existence, and who fit them in each age to ever new purposes?

There are, at the present moment, not a few thoughts on this law of change which press on us; and we would call attention, if only for a passing moment, to the very singular, though perhaps not enough thought-of, changes which from the first beginnings of it have taken place in the course of the progress and development of Gothic or Pointed architecture, both during its natural development in the centuries wherein it was consecutively practised in its various phases, and in its later revival in these our own days, and as brought again into active and useful service by the men of the present day, and by those whose loss we are now deploring. It must be a subject worth some thought, and must needs be full of instruction in many ways. Take but any one style or "system" of architecture, no matter where practised or of what date in the world's history, and the more deeply and closely it is studied, the more changeable in its history it will be found as the years of its but perhaps too brief existence rolled by. There was no permanence of form in the older architectures; all was a growth or progress from first beginnings to, at times, all but perfect work, to decline and finally complete extinction and passing away into other forms. The Gothic is a sufficiently notable instance of this, from its "Early" beginnings to its "Late" decline and final extinction.

We cannot pause here, or venture to comment on the singular origin, and really wonderful course, of what is termed the Norman or Romanesque architecture which preceded the Gothic,—a phase of art, as we are inclined to think, hardly done full justice to, growing, as it did, out of a previous and more advanced art and architectural style. It spread, as we know, all over Europe, and assumed a variety of characteristic expressions. Springing out of the antique Roman art, it did its own work not a little effectively and well, till finally lost in that Early Gothic which succeeded it and which itself grew out of it. It forms in itself quite a complete art and architectural history, and in it may be found well illustrated that great law of change of which we speak as dominating art and architecture. It varied in its expression, not only in each country in which it was practised, in a most wonderful manner, but it changed from year to year in each of those countries, individualised as each one of them then was. We can hardly over-estimate its importance and value as a mode of art expression. It forms a complete history in itself. We refer to its past history. It has, too, as all know, its "present"; for it has with the Gothic been called again into useful and serviceable existence, and by none more effectively than by the late lamented Honorary Secretary of the Institute, with whom, as we know, it was always a favourite.

Thus it is that a glance back into and at the origin of the perfected forms of the old architectures, and at those who are no longer present to work at them, may and must possess a special interest. In these our own modern days, the different phases of Norman and Gothic, from Early to Late, have been applied to all but every purpose,—to cathedrals, churches, houses, and to buildings of all and every class, and certainly no small skill and ingenuity has been expended in so applying them, and considering the vast differences between the requirements of the past, when these styles of art and architecture originated, and our own wants of the present day, very much is to be said for the skill of those who have so applied them, and fitted them to altogether new and untried purposes. Nothing, it is curious to note in Gothic days, or during the centuries wherein it so happily flourished,—nothing occurred to mar or interrupt the complete domination of the Gothic idea of art. Its ascendancy was complete, and it reigned supreme until its final decline and extinction as a living style of art, and but for its "revival" in this our own day, by modern men, and by those and such as those who have but now passed away, it would have been as dead, for all active and useful and present purposes, as that of Egypt itself. If, therefore, the present of such original art ideas do not equal or even surpass the past of them,—why is it?

And there is yet another reason why at the moment this subject of the older architectures and arts, and of the artists who designed and worked at them, as contrasted with our present mode of doing the like work, and in the providing for special modern and of to-day wants, should be of more than usual interest; and it is that, while the lives and life's-work of the modern men of to-day are open to observation and inquiry, the lives and mode of work of those who designed and worked out the old architectures, from which we get so much, are all but lost. We know but little indeed of the methods of work and daily practice of the old architects and builders and workmen. In these days all is plain, but as to the old time, wherever the work might be, we are all but in total darkness. We can see very little of the *modus operandi*,—but little as to how far drawings helped. Many old structures we have seen, if very carefully and closely looked at, would seem to have been built up all but by accident or guess-work; nothing answers to the foot-rule, no line of the building is quite straight, nor parallel to the one opposite, yet is there in it a certain evidence of the presence of him who thought it out, just, indeed, as there is in a painting, of the ever-present thought and hand of the painter of it. It may be, and without doubt is, very difficult to define this in words, but it is sufficiently plain when pointed out, and, once seen, cannot afterwards be missed.

If, therefore, the history of the old and past styles of architecture, and the *modus operandi* of their production, when at their best, and of the lives and professional procedure and artaction of those who designed them, and their details, would be, if well told, of surpassing interest, then would be the history of modern art and architectural practice,—the same in intent and use, though in many ways so different and unlike. If in older and past days it must be a matter to wonder at the isolation of each particular and individual style, and the consequent limited range of view of those who worked it out, so must it be in these our days, and equally wonderful to ponder on the vast extent of our modern art and architectural outlook, and the many styles looked at and studied, and at times,—and every here and there,—"practised." Indeed, might we not here almost ask what style of architecture has there been anywhere that has not had its modern votaries, and that has not been, as far as that was indeed possible, more or less imitated and brought into active service, if not literally, and with closely-copied details, at least as far as was possible in idea? It forms quite a new chapter in art-history,—succeeding the past,—and a very curious one, though it may seem familiar. *In memoriam*, therefore, of those who have but now passed away, it may be well to ponder awhile on these common difficulties.

A Man suffocated in a Sewer at Birkenhead.—An inquest has been held on the body of a man named Michael Devaney, a labourer, who met his death in a sewer in Cleveland-street, Birkenhead, by inhaling foul gas. The jury returned a verdict of "Accidental death," adding the following presentment:—"The jury consider the Corporation have been guilty of great neglect in permitting such an accumulation of sludge in the sewer as had been elicited in the evidence, and such an amount of deposit ought not at any time to be allowed to exist."

THE SOCIETY OF BRITISH ARTISTS.

WHERE do all the pictures go that are painted? Not only do the smaller water-colour societies all exhibit twice a year now, but the large rooms of the Society of British Artists, whose exhibitions generally number from 900 to 1,000 works, are now also filled twice in the year. It is wonderful how so many people can afford to devote so much time to pictures, only a small proportion of which are sold. And perhaps, considering all that is required to make a picture, it is wonderful that, on the whole, there should be so good an average of paintings as there is. But one becomes, of course, increasingly fastidious under the influence of these profuse displays of paintings. There is no doubt that in every exhibition in London, even in those which no one professes to regard as first-class exhibitions, there are a large number of paintings which, if one considers them on their own merits alone, represent each a very considerable amount of training and ability, the surmounting of a great many difficulties in perspective and in the use of colours to produce the effects intended, the possession of a degree of talent more than is required, in many other walks of life, to ensure a respectable success; and in the best class of exhibitions there is generally not a picture hung of which this may not be said. And if we had just invented painting, all these respectable efforts would have due value; any man who could paint a picture would be a marked man, and would receive the respectful admiration of his friends and neighbours. But now it is with pictures as it is with books, or almost so. It is understood now that any one who chooses to write a book may do so, and so many people do choose that it is rather difficult to find any man of fair general education or with any special knowledge who has not written a book of some kind. The writing of books and the painting of pictures, it has been discovered, are, up to a certain point, within the power of a large number of people, if they choose to try hard enough. It is an understood thing that a certain standard of excellence in the imitation of nature may and will be reached by every one who sends a picture to an exhibition,—a higher standard often in mere execution than was reached by some of the greatest painters of antiquity. We have come to accept this fact, and accordingly we no longer attach much value to pictures which are merely correct in colour and perspective, and tolerably like what they are meant to represent. It may require a good deal of pains to execute even these, but then we have had the feat performed *ad infinitum*, so that it has no longer any value. The artist whose work is passed over by the critic with indifference or dislike may, no doubt, tell the critic that he could not paint even as well as that. The critic will reply, "No, and I have no wish to." The feat is not worth doing. That natural objects can be approximately imitated with paint and a brush we now all know, and have seen it done many hundreds or thousands of times; we want something more than that from a picture now. We want either a special idea illustrated, or, if the picture is only an imitative one, we want some special excellence and completeness of imitation, beyond what every man who has learned the commonplaces of manipulation with a brush and a palette can do.

Exhibitions are becoming, in short, too numerous and too mediocre. Referring to the one now under consideration, one may reasonably ask what is the use of filling all the walls of these large rooms in Saffolk-street twice a year with paintings, a majority of which are mere common-places that no one cares for? We do not ask the question by any means in the way of a special "set" at the present exhibition, which is rather better than ordinary, and contains some good things. And all exhibitions cannot be kept up to the highest standard, of course. But if the promoters of the Society of British Artists' exhibitions would be content with giving a smaller exhibition, and would be more particular and restrictive in their selections, there would be a better reason for the existence of the exhibition. A fair collection might be picked out of those that are there this year; and there are a few very good ones. But what is the use of hanging the mass of them we fail to see; unless it be to gratify an innocent pleasure which the authors of them feel in being hung at all in a public room.

It is just because there are some better works than usual in the exhibition that one regrets

having to pick them out of such a medley. Among them Mr. Gadshy's "Roses" (13) is a pleasantly-painted pictnre of two girls, the face of one of whom has much feeling and expression. At the opposite end of the room is a capital work by Mr. Reid, one of whose paintings was pnrchased a year or two ago with the Academy's Chantrey Fnnd. This one is "Lost and Fonnd": the story of a little girl who strayed in the fields and fell asleep there. An old rnstic approaches from the right,—a study very similar to one in the painter's Cbantrey-fnnd picture. The treatment of the landscape displays that spotty manner which spoiled a good pictnre of Mr. Reid's in the last Academy; bnt it is a good work. Mr. A. Hill's "The Fihula" is a realistic study of a model, with a classic pose and background; good as a study. Mr. Cattermole's "The Law of Venice" is a small oil-painting, the title being again a name for a pictnre of some half-length figures in Venetian robes; a good little work, as might be expected, bnt rather deficient in "motive." "Thistledown" is the title of a fine landscape by Mr. Grace, one of the best members of the Society. A pleasant study of children, and carefully finished in detail, is that by Mr. J. C. Waite, "I Can't See It,"—the sentence uttered by a little girl who is looking through a telescope, while her brother, in sailor-dress, sits before her. Mr. Garland's "A Contented Mind" is another pretty child-picture, in which the interest is partly also in the furnitnre and other accessories. Better than either of these is "My Last Bonnet," by Miss Cornelissen,—better in character, though not so carefully finished: it is the face of a small chnbby child with a large bonnet on. Mr. Stuart Lloyd's "Dunnose Head" is a good landscape; so is "A Summer Afternoon in Surrey," by Mr. Aubrey Hnnt. The "Haunt of the Wild Fowl," by E. Ellis, is better than either. Mr. Ellis is a fine landscape-painter, who shows in most of his works qualities above the average. Mr. Henley's "The Bee and the Drone" is a pleasant study of a monastic interior with two monks, in whose figures and expressions there is much quiet character. Mr. Girardot's "Faces in the Fire," and Miss Florence Martin's "A Duet," are both well-imagined pictures,—interiors with figures,—not quite fulfilling their authors' intentions; the last-named shows two figures of girls, seen in profile, against an open window, one playing an organ; there is very nice feeling in it. The exhibition includes some good flower and bric-à-brac pieces; Mr. Muckley's "Lilies and Roses" is a very fine work of its kind, and Miss Miller's "May" is good. "A Wintry Gleam: North Wales" is another specimen of Mr. Ellis's powers in landscape; and in the same room Mr. Gadshy's "Forty Winks," a study of a sleepy little child in mob-cap and mittens, should be looked at. A sleepy dog, by another artist, Mr. Trood, under the title "Drowsy," is an admirable bit of animal character and drawing. Mr. Walter Stacey has a small work called "A Threshing Floor," very good in composition and character. Several of Mr. Wyke Bayliss's finely-finished and very accurate architectural interiors are scattered about the rooms, and are all worth looking at, though we think Mr. Bayliss has, in some of them, been trying a little too much for effects of light which appear rather too palpably contrived; bnt his treatment of architectural detail is excellent, both from the architect's and artist's point of view. Among some small sculptural sketches on the centre pedestal of the large room are two very good heads,—"Sappho" and "Pandora," by Mr. MacLean, and a capital little sketch of a sleeping boy, by Mr. Mullins; Mr. MacLean also sends a terra-cotta study of a portrait statue of a child reading, which is excellent in character, though not graceful. There are some good things among the water colours, which, on the whole, however, do not seem to be equal to the usual run of the exhibition (of which the water-colours show usually much the best standard), while the oil-paintings are above the usual standard. But we repeat the opinion that the exhibition would be likely to rank much better if the Society contented themselves with a smaller quantity, and demanded better quality in the mass of the works as a condition of acceptance.

A Marble Bust of Charles Summers, sculptor, who was born at Charlton, Somerset, 1827, and died in Paris in the year 1878, as the inscription on the pedestal states, has just been placed in the vestibule of the Shire-hall at Taunton.

SANITARY SCIENCE IN ITS RELATION TO CIVIL ARCHITECTURE.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A PAPER on this subject was read by Mr. E. C. Robins, F.S.A., Fellow, on Monday evening last, Mr. John Whichcord, President, in the chair.

Mr. Robins commenced by observing that no subject of study could be more honourable than that of the principles of sanitary science, and of the laws which governed the application of those principles in the development of our national architecture. Those architects who for the last thirty years had practically proved their interest in sanitary science in so far as it related to architecture could not be otherwise than pleased with the obvious improvement in recent public opinion and the quickening of the professional conscience thereon. The articles in the *Builder*, published in the year of the cholera, 1852, had first led him to take a personal interest in the subject, and he became a member of the Regent-square Local Board of Health, King's-cross, which had a district forming a nineteenth part of the large parish of St. Pancras. That Board published in 1854 a report of inquiries undertaken by it, showing the necessity for the employment of properly-qualified surveyors and sanitary inspectors. Mr. Chadwick was of opinion that the subject of house drainage should be cultivated as a specialty, and attributed to the neglect of that course many existing evils. Sanitary science was not, indeed, so old but that architects of the last century might have been found as ignorant of the principles of house sanitation as medical men themselves once were. The object of the present paper was to consider, (1.) What had been defects in sanitary construction; (2.) What were the remedies now generally available; (3.) What further improvements were required. In London a system prevailed which compelled the professional architect to provide against the insanitary condition of the main sewers: he had to fortify the modern dwelling-house against sewer gas, which contaminated not only the air breathed by the inmates, but also the water they drank. It was not necessary to enter into much detail respecting sanitary defects; a summary was provided in a pamphlet entitled "Dangers to Health," written in a grimly-humorous way by Mr. Teale, surgeon to the Leeds Infirmary, and dedicated to his medical brethren. Such defects consisted not only in those things for which an architect might be blamed, but also in the faulty workmanship of artisans: in the bad jointing of iron and stoneware piping, in false levels and bad laying of drains, in perverse connexions on the wrong side of traps, in ill-supported vertical soil-pipes, in the thousand evils emanating from the want of trained foremen and workmen. At the Conference on Public Health held in June last by the Society of Arts, Mr. Rawlinson had stated that house drainage was at the root of all sanitary reform, and that "he was pleased to inform them how the Earl Spencer had kindly permitted the inspection of the system of drainage adopted at his Lordship's house in St. James's-place"; and Mr. Rawlinson added that Lord Spencer's town house was the most perfectly-drained house in London or elsewhere. The evidence given by Messrs. Eassie, Rogers Field, and Griffith before the Society of Arts was referred to. The principles summarised by Mr. Griffith were quoted,—principles which were quite in harmony with many architects previous practice. They were (1.) Communication between main sewer in street and house-drain should be disconnected or severed by an open-air space being left between the house-drain and sewer; (2.) The house-drain, air and water tight, should be laid to such a fall as to be self-cleansing, free from deposit, and ventilated; (3.) The soil-pipe should be fixed inside the house and taken up full size above the roof; (4.) The waste-pipes should discharge into the open air instead of into soil-pipes or a D-trap; (5.) There should be no means of drawing water from a cistern supplying a water-closet, other than through the closet; (6.) The waste-pipes from sinks, baths, lavatories, &c., should be S-trapped underneath, and made to discharge immediately into the open air, over trapped gullies; (7.) There should be no connexion with the main house-drain, when laid underneath the house, except outside the main walls of the building; (8.) "Pan closets" with D-traps should never be used, nor should D-traps be fixed under sinks, &c. The evidence of Messrs. Eassie and Rogers Field coincided in all material points with that of Mr. Griffith. With reference to the second division of his paper, the author prefaced the subject of warming and ventilation by quoting a remark made to him by Professor Jenkin, to the effect that the study and control of the pressure of the atmosphere, and not the temperature, is as the key to all sound ventilation. As that pressure was increased or diminished in its utilisation, so ventilation was promoted or retarded. Following the suggestion of Dr. Parkes, it was desirable to restrict the thing known as ventilation "to the removal by a stream of pure air of the pulmonary and cutaneous exhalations of men, and of the products of the combustion of lights in ordinary dwellings, to which must be added in hospitals the additional effluvia which proceeds from the persons and discharges of the sick." It was not only important that the air should be changed, but also that it should be drawn from a pure source and carried through clean channels. By the term "ventilation" the author meant a passage for the wind, change of air, or atmospheric recuperation. A way in was wanted for the air, and a way out for it in every building or portion of a building. Natural ventilation was the simple process of allowing the external atmosphere to mingle with the internal atmosphere of a building; scientific ventilation was the same thing, but with this difference: in the former case the air was free to mingle or not as it pleased, and in doing so it created many inconveniences; in the latter, direction was given to currents of air produced by interchange, and a healthy commingling of the oxygen with the carbonic acid gases was secured without the dangerous and disagreeable accompaniment of draught. The business of ventilation was to direct the pressure of the currents of air admitted and required to overcome stagnation under conditions where no draught was admissible. The natural process by which the temperature of the air was raised was twofold,—by radiation and by conduction. Radiated heat had the peculiarity of passing directly through any intervening space, without parting sensibly with its heat, and warming the first obstacle to its passage, such as a wall or window, with which it came in contact; conducted heat was the warmth given off from any surface by direct contact with any substance, whether air or otherwise. The conducted heat of an open fire passed into the air, escaping by the chimney flue, and was lost for heating purposes; the radiated heat of the open fire was alone available for raising the temperature of a room. Draught, however, was almost inseparable from the use of open fires, especially when they were placed directly opposite doors, whereby large quantities of air were drawn across the floor and passed up the chimney. With reference to the size and position of "inlets" in rooms, it was desirable to make the area of each opening not larger than from 50 to 60 square inches, and they should be placed on the same side of the room as the fireplace. The introduction of air by vertical shafts, suggested by a Mr. Whitehurst years before Mr. Tobin was heard or even thought of,* was a sound principle, suited to the requirements of ordinary rooms which were heated by the open fireplace only. Mr. Robins then drew attention to several varieties of stove and grate, some invented by architects. He described the heating and ventilating processes adopted by the late Mr. Wyatt in the new Hospital for Consumption at Brompton. Dr. R. E. Thompson, who had greatly interested himself in these processes, had, in a letter to Mr. Robins, thus summarised his views:—"I think that air should be admitted at the level of the various floors, and not from an underground chamber; also that the air so admitted should come from the east and west sides if practicable, and in any case should be passed over tubes of hot water. Air of uniform temperature is disagreeable and oppressive; it is better that the upper air should be colder than that of the floor, and that the warm air as it rises from the floor-level should be cooled and agitated as it mixes with the upper air by the incoming cooler air. The foul air should be extracted by the open fire, and by the extracting-flues at the top of the room, which should be heated by gas-jets below,

* Mr. Robins quoted from a pamphlet by Mr. Whitehurst, bearing date 1794 (the author died in 1788), entitled "Observations on the Ventilation of Rooms, on the Construction of Chimneys," &c., the following passage:—"The air-ducts to be about 3 ft. or 4 ft. long, and 5 in. or 6 in. in diameter, and fixed in either corner of the room most remote from the fire and communicating with the external air. The air will ascend in a perpendicular direction to the ceiling, and being gradually dispersed, will soon acquire the temperature of the room."

or made to communicate with the hot-air chamber above and in connexion with turrets forming ventilating towers." With regard to water-closets, Dr. Thompson considered that the space they occupied should be heated to a higher temperature than the passages leading to them, and that a separate means of extraction should be adopted. With regard to systems of underground reservoirs or chambers for the accumulation of heated air to be transmitted through shafts to the different rooms of a building, everything depended on the cleanliness of those heated air-chambers; indeed, Mr. Robins had heard of one in which decayed organic and vegetable matter had been allowed to accumulate; another in which a defective soil-pipe had discharged into it part of its contents. Alluding to the various systems of heating, the author said that twice in his practice he had been obliged to substitute hot water for hot air, both instances being in churches. Two leading principles governed the supply of hot water for heating purposes, termed high pressure and low pressure. The latter provided for the supply of water at a low temperature, which cannot reach boiling-point, in more or less large pipes; the former, circulating water at a high temperature in strong wrought-iron pipes of very small bore, rarely exceeding 1 in. in diameter. After referring to various examples in his own practice, Mr. Robins concluded with the assurance that the practice of civil architecture could not be divorced from the experiences of sanitary science. There was plenty of room for specialists and *dilettante* expounents,—indeed, co-operation in overcoming the results of past carelessness was most needful; but the fact remained that dwelling-houses, to be made healthy in the future, were and would still be the special province of professional architects.

Professor Corfield, on the invitation of the Chairman, opened the discussion, and observed that he was glad to have the opportunity of saying in that place what a deep debt of gratitude he owed to many members of the architectural profession for the cordiality and courtesy with which they had met him on very many occasions with assistance in matters relating to the sanitary construction of buildings. A great deal had been said lately against architects, who had been told that they did not know their own business, that they knew nothing whatever about drainage arrangements, and, in short, that all the evils connected with bad drainage were to be laid to their blame. He could safely say, however, that he had never met an architect in consultation on such matters without finding him intelligently solicitous for the welfare of the people who employed him, and earnestly desirous to do all he could to make his buildings healthy for those who lived in and used them. Mr. Robins had said, in concluding his paper, that the practice of civil architecture could never be divorced from the experiences of sanitary science. He (the Professor) would go further, and say that if it were not for the experiments that had been made by scientific men with the view of discovering the true principles of sanitary science, no improvement would ever have been made in the healthiness of our houses. For a long time the received method of procedure in matters of house-drainage was practically to bottle up the foul air of the sewers rather than to prevent it accumulating at all. After a time it was found necessary to provide some means of escape for the foul air, or it would make its escape in directions which were sometimes not suspected. Having done this much, we should probably have gone on in the same course for another hundred years had it not been for an important series of experiments conducted by scientific men, who proved that typhoid or enteric fever,—a disease not known by that name forty years ago,—could be produced by germs contained in sewer air, as he preferred to term it, and not sewer "gas" (it being as incorrect to speak of the air of an hospital ward as hospital "gas" as to term the air of sewers sewer "gas"). Until that fact was definitely proved, little or no public attention was paid to it, nor, indeed, was public opinion aroused on the subject until one or two members of the royal family had suffered from disease brought on, as it was believed, by sewer air. The poison of typhoid was not a gas or vapour, but consisted of particles, and it was quite possible that those particles were living things, or germs having vitality in them. It had been proved that those particles existed in the air of sewers, and it should be the object of such practical sanitarians as architects should be, to exclude those particles from all chance of admission to the interior of a house. He had certainly been astonished to hear Mr. Robins say that many of the essential principles now insisted on by the so-called specialists, and demanded by the laws of sanitary science, had been carried out for several years past in the better class of houses in London. It was his (the Professor's) experience that thousands of houses erected during the last few years in London were quite unfit to live in, so far as the drainage arrangements were concerned. It was only as the result of very important series of experiments that the necessity of the complete disconnexion of house-drains with the common or main sewers was demonstrated. It had been clearly shown that water-traps alone were insufficient to exclude sewer air if in direct connexion with such air, for it was absorbed by the water on the under side of the trap, and, when the water was fully charged with it, it was given off from the top surface of the water in the trap. Dr. Frankland had shown that when water containing or impregnated with foul matter was mechanically disturbed or shaken, the particles of foul matter gave off particles of air which were dispersed into the atmosphere, which became contaminated with those particles. By due attention to the principles of sanitary construction, the architect could be absolutely certain of excluding the entrance of typhoid fever into a house by the medium of the drainage system; and, moreover, in a house scientifically, and therefore healthfully devised in its sanitary arrangements, should a case of typhoid induced outside the house occur amongst its inmates, the spread of the disease amongst the other inmates could be as absolutely prevented. A case of typhoid fever was lately introduced in a large school, and he was consulted as to whether it would be necessary to disperse the scholars. When he found that the sanitation of the school was thoroughly in accordance with the most advanced practice of sanitary engineering, he was able confidently to say that it was not necessary to send all the scholars home; and the result justified him in saying so, for not a single scholar besides the one who brought the disease in with him suffered from it. Such immunity from infection under similar circumstances could not have been counted upon ten years ago, if, indeed, it could have been expected five or six years back. There was great difficulty, however, in rendering healthy houses which had been originally constructed and drained on faulty or defective principles, and sometimes little short of pulling them down entirely and rebuilding them would cure them of their inherent defects. One danger to be guarded against was that of amateur meddling with the sanitation of a house. Many useful and popular books had been written on the subject, graphically pointing out the evils of bad air and bad drainage, but to place such a book in the hands of the average householder, and to tell him to put his house in order in accordance with its teachings, was as absurd as to bid him to read a manual on amputation and then to set him to cut off a patient's leg. The circumstances of each case varied so greatly that no one would be safe without taking proper professional advice. One important practical point generally overlooked was that of the necessity of providing a syphon trap to kitchen and scullery sinks, even though the sink-pipe were made to discharge over an open gully in accordance with the now recognised right practice, for at night it would be found that unless such a trap were provided, a large proportion of the air finding its way into the house would pass through the open sink-pipe, and as the interior of the pipe was naturally liable to get foul, the air entering the house through it would inevitably be contaminated to a degree in proportion to the foulness of the pipe. He had traced several cases of sore-throat and diarrhœa to the omission of such a trap. Obviously the waste-pipes of sinks, even when discharging into the open air, were not, under any circumstances, proper inlets for fresh air.

Mr. E. R. Robson (architect to the School Board for London) said that wide as was the scope of Mr. Robins's paper, he regretted that it had not entered upon the subject of site and of the necessity of keeping houses dry. With regard to the question of drainage, he was perfectly certain that Professor Corfield need not go back more than six or seven years to arrive at a period when soil-pipes and house-drains were universally without ventilation and disconnexion from the main sewers. One very important point to be borne in mind in connexion with the subject was that the cisterns which supplied the water-closets should never be allowed to supply the water used for drinking and culinary purposes. This was, however, generally forgotten or ignored, with serious results very frequently, for although typhoid fever might occasionally be engendered by sewer-air, everybody knew that the primary cause of typhoid fever was bad water. The point as to trapping open sink-pipes on the inside, to which Professor Corfield had referred, was quite new to him. As to the large question of warming and ventilating, he thought it meant sunshine and fresh air as near as they could be obtained artificially. It appeared to him that all they had to do was to follow natural laws in the main. Natural laws had not hitherto been generally followed in artificial warming and ventilation. The open fire was no doubt the most charming way of warming a room, so far as appearance went, but it had the demerit of warming the mantelpiece above it, which was already warm, but it did not warm the window where the cooling surface was. To counteract the cold caused by the window the fireplace should be put underneath it. Above all, he thought it was of the first importance that the corridors and staircase of a house should be thoroughly warmed and ventilated, so as to form in reality a reservoir of warm fresh air outside the rooms. For the London School Board he was now engaged in superintending the erection of two schools, one of them to be warmed by Mr. Boyd's "Hygiastic" grates, and the other by Leeds's American steam-heating system. When those schools were completed and in working order he would communicate to the Institute some particulars and results of each method. The use of steam for heating purposes was, as the members of the Institute would know, greatly restricted by the inconsistent and obsolete regulations of the Metropolitan Building Act. As to the so-called "Tobin's" ventilators, although it was perfectly true that they were long previously suggested by Mr. Whitehurst, yet the merit of urging their extensive systematic application was undoubtedly due to Mr. Tobin. He differed from Mr. Robins when that gentleman said that inlets and outlets for ventilating purposes should be equal, for unless the outlets had an absolute exhaust, the inlets must always be larger than the outlets. He deprecated the adoption of the dirty chambers (for they always got dirty very soon) sometimes used in the basements of buildings as reservoirs for the air to be warmed. He differed radically from Mr. Robins when he advocated the warming of fresh air by means of stoves placed in such chambers. In all schools heated in that way he always found the teachers complain of lassitude, fatigue, and weariness. Unless the air was heated in a direct manner, just as the atmosphere was warmed by the heat imparted to the earth by the sun, or as the air of a room was warmed by the heat given off to it from the objects warmed by the fire, the principle proceeded upon was wrong. It was necessary to keep to direct radiation; in other words, the radiating points must be in the room to be heated, and not in chambers or places remote from it. He noticed some allusion in the paper to American practice, but he wished that American practitioners would give us not merely the results they were said to have achieved, but their formulæ. One gentleman, for instance, talked of admitting fresh air over hot pipes, but on a frosty day the result of the entrance of the cold air would be to cause one side of the pipes to get cold while the other side remained hot, and under such conditions iron pipes were only too likely to go to pieces.

Captain Douglas Galton, C.B., said that there was one cause of disease in many houses which was, he thought, quite as serious as sewer air or gas,—he meant the ground air arising from the unhealthy "made" ground upon which so many of the dwellings of the people were erected. Where such an impure foundation existed, it would account to a very large extent for some of the evils alleged to arise from the use of an air chamber in the basement for ventilating and warming purposes. The paper which Mr. Robins had read was one covering such an enormous extent of ground that it was impossible to adequately discuss it in one evening, but the thanks of the meeting were due to Mr. Robins for having brought the matter forward in such a comprehensive manner. He (Captain Galton) had recently been over to America, where he took the oppor-

tanity of seeing what was being done in the way of sanitation and architecture. The American architects seemed to have greater scope afforded them for showing what they could do than was accorded to the architects of this country. In two buildings,—a church and a theatre,—which he visited in New York, the arrangements for ventilation certainly far surpassed anything which had been done, or, he thought, even suggested, in this country. He believed the apparent perfection of arrangements in question was due, not to greater genius on the part of the American architects, but to the full scope given them to do what was needful, without stint of money. The church to which he alluded was that of Dr. Hall, a Presbyterian place of worship containing sittings for 2,000 persons. The ventilation was effected partly by means of propulsion and partly by extraction. The same means were used in the theatre,—the one in Madison-square,—and both buildings were ventilated with far greater perfection than had been attained in any building in this country. He had also been very much struck with the perfection to which the Americans had brought their system of heating by means of steam. Steam for warming purposes possessed a great advantage in the high temperature attainable with it in a very cold climate like that of the winter of North America, but its use was attended with certain inconveniences. The advantage of the hot-water system over steam was that it was possible to regulate the temperature of the pipes to any desired extent. With steam the temperature was necessarily high, although there had been introduced a system of using steam for warming purposes at a low pressure, —a system rather the reverse of the Perkins system of heating by hot water, for the steam was worked under a method of exhaust, so as to get it at a low temperature; it did not appear, however, to have been very successful or widely adopted. In this country he thought that, all things considered, it was a better plan to adopt the hot-water system than to resort to the more economical method (on a large scale) of steam heating. No doubt it was possible to produce a greater result at a lower expenditure of fuel in the case of steam heating than by the use of hot-water heating, but to secure even the advantage of economy the heating arrangements would have to be on a large scale.

Mr. Ewan Christian said he, too, had lately been in America, and he could cordially endorse what Captain Galton had said as to the comfort of Dr. Hall's church. He attended service there in October, and was never in so pleasant a place of worship, for he was able to attend to the proceedings in a manner in which he had never been able to follow the service in any English church whatever. He was also struck by the manner in which steam heating was carried out in Detroit, where, during the winter, when the temperature was 20° below zero, all the buildings within a radius of a mile from the steam generators were maintained at a temperature of 65° by means of steam-pipes radiating from a centre, and what was more, the surplus steam was used to work the lifts and hoists of the stores. With regard to the question of water-closets and traps, he believed Mr. Norman Shaw had solved the problem by his system of open soil-pipes without traps. He had tried it, and found it to answer admirably. Professor Corfield's warning about untrapped sink-pipes discharging into the open air was new to him. On the question of warmth, one very important means of securing it consisted in hollow walls, which, by interposing a blanket of air between the inner and outer parts of the wall, kept a building cool in summer and warm in winter. There was no reason why hollow walls, if properly built, should not be as strong as solid ones. The same reason that made it desirable to have hollow walls where possible, made it undesirable to build church roofs with the slates laid direct on to the boarding which formed the inside covering: cavities or hollow spaces should be interposed between the inner and outer skins of the roof. Some time ago he was consulted by the Archbishop of Canterbury as to some mysterious smells which were experienced in his grace's house at Addington. He found that the smells existed a very long distance from any possible source of leakage from soil-pipes or sink-drains, and he found it difficult at first to account for their existence, particularly as he was told that there was no smell whatever in the basement, the servants being entirely free from the annoyance. However, he carefully examined the basement, and found that the drain ran right underneath the house, and that, there being a leakage at the junction of the soil-pipe with the drain, the foul air ascended along the ontside of the soil-pipe and passed behind the battening of the upper rooms all over the house, being drawn hither and thither by the fires which were lighted in the different apartments. Even when the source of the evil was stopped, the foul air which had accumulated behind the battening was found to hang there so persistently that nothing could dislodge it but the pulling-down of the plaster and battening, and the complete opening-out of the surfaces of the walls. Seeing the difficulty which there was in getting people to treat ventilating appliances properly, he thought it was advisable, wherever possible, to depend on nothing more elaborate than an open window and a roaring fire.

Captain Galton said if he might be permitted he should like to add to what he had already said by giving a striking instance in corroboration of what Professor Corfield had urged as to the necessity of trapping sink-pipes that discharged into the open air. It was easy to conceive that sink-pipes would get foul, for at University College Hospital a series of tanks in the roofs, supplied with water from the water company's main for use in case of fire, were provided with overflow waste-pipes discharging into the open air above the ground-level. These waste-pipes, although nothing worse passed through them than the water supplied by one of the London companies, in two or three years got to be so insufferably foul and offensive that the air passing up through them into the roofs became quite tainted, and the evil had to be remedied by the use of syphon traps.

Mr. G. J. Symons, F.M.S., said that the paper read by Mr. Robins was very suggestive of the vast ramifications and range of the work and study of the architect. With respect to the condemnation so often passed upon the sanitary condition of houses erected under the superintendence of architects up to within the last few years, it was not, he thought, to be inferred that the architects of past generations, or even those of the present generation, had been to blame, for they had doubtless acted up to their lights and up to the standard required by the knowledge of the period. Again, he believed it was an undoubted fact that for the erection of a very large proportion of London houses the architects were not in the least responsible, as they were erected by speculating builders without the intervention of architects, who were probably rather too expensive for the average builder to avail himself of their services. If that were so, perhaps he should be pardoned for suggesting for the consideration of the Institute whether it would not be possible to establish some sort of inferior order of architects, who would be content, for a reasonable remuneration, to devote particular attention to the sanitary requirements of the houses of the people? Only the other day he wanted to build an office at the bottom of his garden, but he was afraid to go to an architect, as he feared to incur too great an expense. He and a builder laid their heads together, and succeeded in sticking up something. No doubt an architect would have done it better, and possibly as cheaply, but there could be no doubt whatever that the architect was looked upon as a very lofty and exalted being, rather above the means of the ordinary builder. He thought that the miles and miles of things,—he could not call them houses,—which disfigured our suburbs, and were built apparently with the express intention of tumbling down at the expiration of the ninety-nine years' lease, afforded proof positive that for some reason or other the builders were afraid or unable to employ architects. With regard to the ventilation of large public buildings, there was a firm in Glasgow,—he thought the name was Penicuik,—one of whose members told him that he had been engaged in ventilating a large room in Edinburgh, intended to seat about 3,000 persons. The method adopted was simply that of having two large iron vessels, somewhat resembling a pair of gasometers, balanced by pulleys, and each alternately rising and falling, in the roof-space. By pneumatic action these vessels were so contrived as to be continually engaged in exhausting the foul air from the upper part of the hall through valves fitted in the ceiling. This contrivance, he had heard, proved to be very successful, and it had the merit of being always workable, independently of the pressure on temperature of the atmosphere.

Professor Ayrton said he had listened with very much interest to Mr. Robins's paper. It occurred to him that one reason why Science had not done more for the comparatively new subject, as he might call it, of house sanitation, was that people had rather regarded the diseases which were now proved to very largely result from bad sanitary conditions, as natural and inevitable. He did not think that too much reliance should be placed on people's sense of what was unpleasant or the reverse, for he thought there were often unhealthy conditions prevailing in London and elsewhere without their being noticed by the public, who had grown accustomed to them, just in the same way as, in some countries abroad, people were found to live apparently in perfect comfort in atmospheres that would kill an Englishman. The Japanese, for instance, warmed their rooms by charcoal stoves without chimneys. The result was that, although the rooms were comparatively open, their atmosphere was unbearable to an Englishman, and it was not surprising to learn that disease was very largely prevalent in Japan. He had found, while travelling in America, that the ordinary American stove, whether of cast or wrought iron, was excessively unpleasant, for not only was the air of rooms heated by it made very hot, but the heated wrought iron allowed carbonic acid gas to pass easily through it. Knowing that such stoves were largely used, it need not be wondered at that the Americans were not, as a rule, particularly healthy people. Was it not possible, then, that there might be several things existing in our own country which we should in the future regard as very unhealthy, but of which we had at present no sensation of unpleasantness because we were accustomed to them? With respect to warming, he thought that as we were now coming to the age of electric lights which imitated the sun, in like manner we were coming to see that radiated heat was the only proper and healthy mode of warming, the air being at the same time cold. At the suggestion of Mr. Robins he had been turning his attention to the subject of the passage of air through pipes, and he had come to one point as to which, probably, some members of the Institute could assist him. He wished to know whether it had been ascertained by experiment what was the least velocity of air round a warm human body which was tolerated without being called a draught? Of course, it depended on the temperature, but what was the velocity for a given temperature that people would tolerate?

Colonel Prendergast hoped that the discussion would be adjourned to a future evening. The paper had dealt with two distinct matters, drainage and ventilation, either of which was in itself quite sufficient to occupy an entire evening. Nearly everybody who touched the question of warming and ventilation was apt to forget the persons who were going to live in the buildings dealt with, and some of the inconveniences and discomforts which were found to arise resulted from the employment of two or three sets of persons. To take the case of the brand-new barracks at Knightsbridge. The men's rooms there were provided with the admirable grates devised by Captain Galton, but nevertheless the rooms were found to be so wretchedly cold at night that the men had to be allowed extra blankets. Why was this? Simply because the doctors on the one hand, and the ventilating engineers on the other, had done their best to render nugatory the warming power of the stoves,—the doctors by insisting on having windows on both sides of the room, and the engineers by putting the ventilating grates between, but on a level with, the beds. What did he find to be the result when he visited some of the rooms the other night? Simply that the men, unable to bear the cold currents of air induced by the too-complete system of ventilation, had stopped up every extraction shaft. Surely it was within the power of science to put forward some sort of formulæ by which these results could be avoided? One very important phase of the question was that concerning the houses in which the masses of the people lived, and he thought that the means by which the sanitary condition of existing houses could be improved were eminently worthy of the consideration of the Institute. In his own house he had made an experiment which had proved to be very successful. As his hearers would be aware, in the narrow frontages of London houses, particularly if they were ornamental and of stone, it was exceedingly difficult, and sometimes impossible, to make

openings for purposes of ventilation. In the case of his house, he had built a tunnel underneath it from back to front, into which the external air was admitted and filtered, but not warmed, and from which it passed up through what were called "sweeping flues" to the apartments where it was required, and after being warmed in terra-cotta chambers at the back of grates (made by Mr. Rosser), was allowed to pass into the rooms; which were also provided with separate shafts for the extraction of the vitiated air.

Professor Hayter Lewis moved the adjournment of the discussion, and

The Chairman, in putting the motion, said it might be desirable to state that, as regarded the metropolis, the evils to which Captain Galton had referred as arising from the erection of dwellings on unhealthy "made ground," would, it was hoped, be prevented in the future, as the Metropolitan Board of Works had, under a recent Act of Parliament, obtained power to frame and enforce by-laws prohibiting the practice. The thanks of the Institute were due to Mr. Robins for his paper.

The motion was carried, and it was announced that the discussion would probably be resumed on the 17th of January.

It may be added that there was a large attendance of members and visitors.

ROMAN REMAINS IN LEICESTER.

THE JEWRY WALL AND THE ROMAN PAVEMENT.*

THE ancient buildings in Leicester may be broadly divided into two classes, those which have their regularly appointed guardians and custodians, and those which have not; and in the latter class will be found two of the most interesting fragments in the kingdom, the Jewry wall and the Roman pavement. In a recent report of the Museum Committee to the Town Council, it was suggested that the Roman pavement should be removed from its site in Jewry-wall-street. The report states an opinion that the pavement would be seen to greater advantage if it were laid on the floor of the new annexe at the Museum, and that in its present position it is suffering from damp, and is seen by a small number of persons. The answer to these arguments is that they are not proved, and not fully true. The pavement does not and will not suffer from damp, if proper means are taken in its present locality. After lying for 1,700 years it would be strange indeed if it should now suffer from that cause, or if it were not more likely to suffer in a modern building, away from the foundation where the Roman designer and builder originally laid it. It suffers, indeed, but it suffers from neglect in common with every other work of its class in the town of Leicester. It is not well seen, but it would be easy to remove the floor which is now only a few feet above it, so that a visitor could stand upright, and survey it with light and advantage, instead of having to creep upon "all-fours" in a dark cellar.

So far the report. If any other reasons exist for removing the pavement, the onus of proof lies with the movers, and there ought to be no difficulty in stating them. If a pavement, for instance, is wanted to adorn the floor of the annexe, a copy might be placed there. On the other hand, the difficulty of proving a negative is proverbial, and yet there are several apparent reasons for not removing.

1. The impossibility of doing so without injuring the pavement; there is a bloom of age, as well as a bloom of youth; it is as impossible to restore one as the other, and as easy to destroy. The removal of such a work is necessarily a partial destruction even with the greatest care in the operation, and the best luck.

2. There is, as the pavement now lies, an absolute identity of interest between the work itself and the page of history which it illustrates; it is not a mere antique, it is full of interest and instruction for the student, the antiquary, or the historian. Possibly forming part of the atrium or vestibule of the most considerable villa of the Roman town of Ratæ, dating from near the beginning of the Christian era, it is even now fresh in colour and unsurpassed in design by the skill of artist or workman. Was it the house of the Proprætor Suetonius, in whose time the armed hosts of Britain flung themselves to destruction upon the serried phalanx of the 14th legion; or was it later, when the Emperor Hadrian visited his town of Ratæ, or when Severus halted on his way to die at Eboracum? Near it, where now the comparatively modern church of St. Nicholas is to be seen, stood the Forum, adorned with temple and basilica, whose fragments lie scattered about the Museum, and there surely stood the original of that massive fragment of antiquity, the Jewry-wall, which yet remains, fast crumbling away, indeed, under the influence of the elements, a problem still unsolved as to its origin and purpose.

At the commencement of this paper the Jewry-wall was placed first in the list of ancient buildings, and it is probably first in interest, if we may judge by the numerous theories which have been advanced respecting it.

According to Geoffrey of Monmouth, who is believed to have written his British history about A.D. 1140, the town of Leicester was founded by King Lear, who built a temple there 1,000 years before the Christian era, where he and his daughter Cordelia were buried, and the Jewry Wall is supposed by some subsequent writers to be a remnant of that temple.

Mr. Burton's account is as follows:—"That this was a city in the Britons' time, before the coming of the Romans, I should conjecture from the name thereof set down by Nennius in his Catalogue of Cities, viz., Caer Lerion, that is, City upon Leir. That this was a great Roman station the Roman antiquities frequently found here will give strength and confirmation. First, the ancient temple dedicated to Janus, which had a flamen or high-priest resident here, in which place a great store of bones of beasts, which have been sacrificed, have been dug up, and the place is still called the Holy Bones."

Mr. Hollings, in his very able lecture on Roman Leicester, states an opinion that it is a fragment of Roman basilica or of a bath.

Mr. Thompson, in a very ingenious pamphlet, endeavours to show that it was part of the exterior wall and western gateway of the Roman town, and this theory is also stated in Throsby's history of Leicester.

It is no easy problem, therefore, which has baffled the skill of these eminent writers, and given rise to so much difference of opinion. There are four distinct accounts. Can we decide which is the true one, or which approaches nearest the truth?

The first theory is treated by all subsequent writers as apocryphal, but they also agree that we are probably indebted to the story for the play of King Lear, and, therefore, apocryphal or not in its origin, it becomes of considerable interest in forming another link with Henry VIII. and Richard III., between our ancient borough and the works of our greatest writer.

The second theory is more than questionable. It was not a Roman temple; it is at once too large and too massive, and has besides no indication of the adytum, or portico, or other essential parts of a temple. A Roman temple was a comparatively small building on plan, and the Jewry wall is evidently the fragment of a very large one.

The Roman basilica was a regularly designed building, with two stories of columns, not unlike the plan of a mediæval church, omitting the chancel, but with no arched recesses such as we find in the Jewry Wall. It is less easy to show that it was not a bath, but it is unnecessarily massive for such a purpose, and there is no arrangement of plan with tiles, and flues, and earthen pillars, such as we should find, according to Vitruvius, in a Roman bath.

Mr. Thompson's theory does not commend itself any more than the others. He proceeds on the supposition that Ratæ was originally laid out as a regular military encampment, like Eboracum, for instance, whereas, in fact, Leicester (Caer Lerion) was a considerable place before the coming of the Romans, as stated by Mr. Burton already quoted in this paper; and the walls which the Romans erected on the south and east and north were apparently determined in shape and direction so as to include and enlarge the older town, and the builders appear to have relied upon the river on the west, in addition to some defensive works about the site of the Castle and mount, and again about the Jewry Wall, which will be found to occupy the highest ground between the Castle and the west end of the north wall along the river bank. Again, the wall has no indication of a main opening, or any flanking towers, and there are no similar remains about the well-known sites of the other three Roman gateways, and no continuous indications along the supposed site of the western wall.

Are we, then, to fall back for explanation upon the story of King Lear? Are we to see the Jewry Wall as Geoffrey of Monmouth saw it, and as Shakespeare saw it? In the absence of any reasonable account of its Roman origin, we may prefer the twilight of fable to the darkness of error, and assign it to early British times, admitting that it was, very probably, adopted and adapted to military uses by the Roman Conquerors.

And in any case, we may admit that the ancient monuments of Leicester are sufficiently interesting to justify our guarding them with every possible care; and we may conclude that we ought to find the properly qualified guardians in the ranks of this society. Possessing on the one hand an authoritative connection with the Town Council, and on the other claiming assistance from all the available literary, and artistic, and practical skill in the town, it would, indeed, be remarkable if we should, in the words of Mr. Hollings, "while enriched by objects of interest sufficient to distinguish us from most other towns in the Empire, acquire the not very enviable distinction of being the least able to appreciate their possession."

* From a paper by Mr. W. Jackson, architect, read in the Archæological Section of the Leicester Literary Society.

NATIONAL ART MUSEUMS FOR THE PROVINCES.

THE success that has attended the system by which the South Kensington Museum has for some years past been enabled to send to the provinces well-chosen "loan collections," has not unjustly been regarded in the Department of Science and Art as a satisfactory symptom of the interest, rudimentary as it may be, expressed throughout the country in the efforts that are being made to spread a more practical acquaintance with the meaning and object of art,—that term now so widely used, but still so ill understood. That the first phase of this interest should have shown itself in the encouragement of a *dilettante* taste is little calculated to surprise; it was, indeed, the natural consequence of a movement that more immediately appealed to the cultivated classes. It is now a necessity for those in authority to lead this widely-expressed interest into more practical channels; this need has been felt, and the means alone remain to be studied as to the best mode of proceeding.

When Mr. Mundella some months since, as will be remembered, was appealed to for aid in the extension of the loan system of the South Kensington Museum to the National Gallery collection, he expressed a belief that the undoubted impetus given by this means in the provinces would be even further increased by the union of the whole system under a responsible Minister, whose sole duty should consist in the supervision and fostering of the art interests of the community throughout the country. We have before now expressed the same opinion. The manifold interests of art, far more extended than is generally believed, would be peculiarly benefited by a wholesomely-exercised protection and nurture that it has long since been considered necessary to extend to the great commercial interests of the country through the Board of Trade. A conclusion so natural requires, indeed, merely time to work out.

Our present purpose is to speak of the art collections that are so necessary in the provinces, and which are so unhappily termed "provincial" art museums. Let us consider these museums, and let them consider themselves, as worthy to be national institutions, each a factor in the general sum of the nation's success and fame. The great collections on the Continent, in the provinces,—we have in mind particularly at this moment the museums throughout Germany,—are all mostly "National" collections; at Munich, the "National Bavarian Museum"; at Nuremberg, the famous collection not unfitly termed the "German Museum"; and many others that might be prominently adduced. Here is a first duty and a first pride to make our so-called "provincial museums" national institutions which shall show, each by its effect on the particular part of the country in which it is placed, the value of such institutions, not as mere exhibitions, but as effective means of educating the producing classes. These it is that must be reached and beneficially affected, and the means for most effectually attaining this end are those that must be studied.

In a recent issue of the *Examiner*, in the course of an article on the subject of provincial art museums, the writer remarks, "We have

been striving for twenty years, hy meane of State aid and costly machinery, to encourage art in England, and to arouse and intensify that natnral æsthetic feeling which undeniably ie in the people." Theee efforte have nndonhtedly met with enccess; hut may it not he asked, has thie enccese heen in any degree commenenrate with the really enormous outlay of thongbt and money that hae been expended on the enhject? We may reet assured, however, with the comfortable,—or rather, perhaps, nncomfortable,—certainty that England has not heen the eole gainer hy our labonre, and that other countries not difficult to point out have largely profited not only hy the intellectnal expenditnre that has heeu bestowed on, but hy the large outlay of capital that has heen exercised in, the pnrsuit of the develop. ment of practical art-cnlture. It has long heen a recognised opinion that in the liberal State aid that hae been afforded to our important educational establishment at South Kensington, other parte of England were not sufficiently gainers hy ite at one time exclusive management for the benefit of Londoners, and the recently-introduced system of lending objects to provincial mnseume at once met with nnivereal approhation; hut complainte have been made, and not without reason, and proper donhts have been expressed, as to the real practical advantages that local mnseums have thns gained. The temporary nature of these exhibitions has always heen a principal drawback to their utility, while the want of intelligent claesification hae reduced the instructive nature of the collection, already imperfect, to a minimnm; we may, in fact, rest assured that as long as museume remain what are nnderstood as "mnseums," very little more than idle curiosity and the suspiciously eterile tastes of a few *dilettanti* will be fostered. What bas heen undonhtedly, it is impossihle to deny, the endeavour of our Science and Art Department, ie to render the museme under ite charge eesentially inetrnctive: it remains to question whether the meane adopted are not eomewhat open to criticism.

We live in an age when the fierce light of criticism is thrown npon nearly every enhject. Here ie a qnestion of something more than ordinary importance, relating to what we are daily learning to discover forms one of the vital elemente of the conntry'e prosperity. A false pride, or a desire to conceal or a hesitation to admit imperfections, mnst not he enconraged. Our South Kensington Museum, the parent establishment, has not been itself exempt from criticism, and nngrateful indeed as it may appear to find fault with an institntion where, with each lahour, have been brought together such an accumulation of treasures, it is not difficult for those who have some little experience of collections abroad to point ont where the South Kensington Mnseum ie deficient as a eystematic teacher of the altogether uninformed,—of that nnmerone clase the artisans, the real hard-working prodncers, whose condition and whoee usefnlness, and whose share in the advance of the nation's prosperity, and hence whoso happiness, we are all sincerely desirone to promote.

Many years before any thonght wae given to the formation of what we have so long known as the South Kensington Mnseum, the anthorities of our long-revered British Museum in Great Russell-street fnlly recognised the importance of classification in the arrangement of their treasures, and the learned and hard-working directors of that great institntion have done much to aid those who are desirous to acquire a knowledge of the principal divisione or periode of antique art, eo that the Britisb Mnseum hae become a complete book of reference for the etudent of classic art and archæology.

Very early in the existence of the South Kensington Mneeum, it mnst have ocnrred to ite managers that their establishment wonld never he complete till a perfect classification of all their objects conld he secnred; and when, in 1867, the managers, who in that year were so conspicuous at Paris, traversed day hy day the *histoire de travail* at the Exhibition, they mnst have felt that until the South Kensington Museum could show a eystematic arrangement like that, they could not lay claim to feel anything like eatisfaction with their work; and donhtless they have alone heen prevented from carrying out snch an arrangement hy the embarraeement connected with the loan part of their ehow, and hy the difficulty of separating the varione propertiee and placing them in their reepective order. Until some system is in vigonr the Sonth Kensington Mnseum will continue to be, with all its wealth, but a very imperfect teacher.

It is hy a watchfal attention to thie feature of classification that the mnsenms in the provincee may become ae valuahle from an edncational, if not from an intrinsic point of view, ae the parent establishment in the metropolis, and the examplee afforded in many inetancee that snggest themeelvee strikingly prove the truth of thie statement. Commenced on a well-ordered system, which it ehonld he the duty of experienced anthoritiee to lay down, it wonld he difficult for any confusion to take place. In the commencement lies, indeed, the chief point, as the Sonth Kensington authoritiee know only too well; objects ponring in from every quarter, —twenty-three yeare have sufficed to gather together the wonderful collection,—order and classification have become to an extreme difficnlt, and the embarrassment felt hy the directors can be understood hy all who have endeavoured to arrange in any order an accumulation of objects or of facts.

The clasification chosen and laid down,—a chronological order carried out ae far ae poesible in each great hranch of indnstry,—the objects, on their arrival, arrange themselvee as do in a well-ordered library the nnmerons hooke that are daily received, and which, witbont system, would soon end by becoming hnt an inextricable mass of printed paper. A mnsenm ehonld, indeed, be a book of reference, ae easily nsed ae the enclyclopædia or the dictionary. Of what practical nse could we imagine those to be were they arranged as are at present the greater part of the mneeume we all have visited? The peonliar valne of each a clasification needs alone to he seen to be nnderstood and appreciated. When the objects are thne arranged, each telle ite history with a peculiar emphacie that ie eminently calculated to interact, and the gradual development, the advance or decline, of any branch of industry or art can he etndied with profit.

That such museume well classified could be arranged in the provinces is proved by the existence of more than one estahliehed on this principle abroad, and of which the technical museme of Limoges and Lyone,—the former with ite admirable collection of epecimene of the enameller'e art, the latter with its ehow of the active weaver'e industry of the pact,—form etriking and familiar examples. It should undoubtedly he the endeavour more particularly of each town to posesss a technical museum in which the chief local indnstry ehould be specially represented, a featnre wbich need in no way interfere with the completion in other points of the collection. Before long, with the admirable system of exchange of casts, and hy the aid of galvano-plastic copies and the photograph, we may look forward to the time when the smallest mnsenm will he ahle to own an excellent working collectiou of well-ohoeen objects illustrative of the great art industries of the past. By an enconragement of the system of presentation on the part of rich citizens, which, in the provincial museume of the Continent, forms so admirable a feature; by a wide extension of the excellent system of lectnree wbich now for so many years hae been practised at the Sonth Kensington Mneeum, and which, in the provincee, might and ehould he delivered by the curator; and with our art echools and our technical schools in full working order, the mnsenms ehonld play an important part in education, and he indispensable alike to profeesore and pupils.*

In the provincee, where in thie direction all remains yet to he arranged, a method could he laid down, and, once laid down, wonld he easy to follow; commenced faultlty, and the future difficultiee will only become daily more and more obstructive. The provinces build up a nation's taste, a nation's wealth; the capital is but a nation's pride, and, above all, it aspires to lead; we are, however, firmly convinced that here lies a matter in which the provincee might with proper oare read a not unprofitable lesson to the metropolie. Let them not split on the rock of mere imitation, or else, taking the subject more eepecially under conoideration, their mnseume may well feel insignificant beside the great parent estahlishment in the capital. A provincial town might possees, hy due attention to the necessities of the oase, dependent on local industries, a museum of infinitely more practical valne, which ehonld contain bnt one-thousandth part of the treasuree which any of the famed collectione of the world at preeent possese. Such museume exist, and nnlese they are more largely spread in England we ehall snffer in the race in which our competitore already have over us more than one unnsual advantage.

Our appeal is, then, for the estahlishment of national museume in the provinces,—musenms the contents of which ehall be intelligently classified in such a manner ae not to form what museums have always been till recently, and what they too often still remain,—mere collectione of objecte vaguely denominated by an indifferent public as "ancient" or "old,"—but collections which shall serve ae valuable means of instruction, and which will in thie manner in no way lose their interest as placee of amneement, or as jnst objecte of national pride. On the contrary, collectione eo arranged wonld afford in a far more satisfactory and complete manner than at present the means of comparison. Strangers and foreignere wonld be ahle rapidly to see in what featuree each collection excelled, in what objecte it was richest; intending donore wonld observe in what essential the local museum was wanting, and in time succesive curators might not nnfairly aspire to attaining the limit of perfection in the order and arrangement of the collection under their care. Museume thue arranged wonld form, indeed, part not alone of the local, bnt of the national wealth, and ae such would afford ample ground for national pride. But at preeent, ae our eo-called "provincial musenms" exiet, the best of them etand hut eorry comparison with the great collectione of the capital.

It is a long time before one learns to visit a museum; indeed, it is an art tbat many never acqnire. It ie alone when we have determined to stndy during a certain time one branch of art or indnstry that we can hope to really profit hy frequently passing any time in an nnclassified mnseum, and then what self-control does it not reqnire, in one'e eearch after that one etudy, to pass by marvele of patient heautiful work, and how often, indeed, is one tempted from one's path? That the mere examination of rare objects heaped together, regardleee of clacsification, age, country, or relative merit, ie a eomewhat idle pnrsuit, calculated with too many to merely pass away the time, and with too many others to gratify a mere *dilettante* taste, it ie impossible to deny; and though it may he nrged tbat there are many who are able to profit eveu hy the examination of objecte of art thus arranged, it is not for each alone that our great collections are open. Our museums must become more directly instrnctors of the productive classes,—schools where every possible facility ie afforded, where etudy may he encouraged with the merest tyro, where no one need he rebuffed or intimidated by the apparent difficulty of the task before him. That our echools ehould lead us up to a certain point in this education is a consummation most devontly to be wished, but that is a hope that must be left to the near futnre to put into execution.

When our mnseums are eo arranged that the architect, the sculptor, tbe painter, the modellor, the wood-carver, the iron-worker, the worker in metal generally, the goldemith, the jeweller, the leather-worker, and workers in all the branches of indnstry whoee existence ie so dependent on art inspiration, can with ease refer each to the separately and chronologically arranged epecimene of his own particular art,—when well-written handbooks or catalogues, which ehonld be the same (this ie a want that the British Museum and the South Kensington Mnseum have already well eupplied), are at the disposition of thoee desirous to enter more clearly into the development of the art in wbich they are interested,—then we may hope to obtain from them the real advantages they can he made to afford.

* The collections sent on loan have always given the South Kensington Museum authorities some trouble, owing to the unwillingness on the part of collectors generally to have their objects separated. Might not, as such is so often the case, all exhibits on loan be shown in a special room or court, where they would not interfere with the classification of the rest o' the collection?

Noxioua Vapours.—On the 25th ult., an influential deputation from the Lancashire and Cheshire Aeeociation for controlling the escape of noxious vapoure and fluids from manufactories had an interview with the Right Hon. J. G. Dodson and Mr. Hibbert, M.P., at the Office of the Local Government Board, Whitehall, to nrge npon Government the expediency of dealing with the subject of noxioue vapoure in the enenirg eeeeion of Parliament.

INJURIES BY GAS AND DEFECTIVE GAS FITTINGS.

SOMETIMES when persons are injured it is impossible to fail in stating on whom the liability rests, and the amount of loss which has been incurred. In those cases in which there is any doubt, a legal judgment which in any way goes to promote certainty is an event upon which we may congratulate ourselves. It is for this reason that the recent case of Parry *v.* Smith (4 Law Reports, Common Pleas Division, 235) deserves notice. And the proposition which this case seems to us to lay down is that any one who uses or deals with a dangerous thing is liable for injuries caused by it, even if there is no contract existing between the injurer and the injured. This, therefore, is at once different, and yet like those cases in which a public right exists, and in which it is the duty of persons to prevent that public right from being infringed; as, for instance, if a person hangs a lamp over his doorway, and it falls and injures a passer-by, when he must be prepared to indemnify the passenger for injuries that have been incurred by him. The facts in the case to which we have referred were proved without much doubt. The defendant had been employed to repair a gas-meter in a cellar on premises where the plaintiff was a servant. The meter was taken away for repairs, and replaced by a temporary connexion consisting of a flexible tube, which was pushed into the inlet pipe and the other end into the pipe which communicated with the house. During the time that this temporary connexion was in operation, the plaintiff in the course of his employment went into the cellar in question with a lighted candle. Directly he opened the door an explosion took place, by which he was seriously injured, and consequently the cause of an action at law was produced. It was decided by the jury that the gasfitter had been negligent, but it was contended on his behalf that no right of action existed because no privity of contract, as it is legally termed, existed between the injured and the injurer, because what had been done did not amount to a public nuisance, and because there had been no fraud, misrepresentation, or concealment on the part of the gasfitter. The question raised is one, therefore, of obvious importance, considering the extent to which gas is now used in all modern buildings. And we may say at once that Mr. Justice Lopes, before whom the case was tried, decided, after a careful argument, that the gasfitter was liable to indemnify the injured man, on the ground that a duty attaches in every case where a person is using or dealing with a dangerous thing, which, unless managed with the greatest care, is calculated to cause injury to by-standers. Therefore, as long as this decision remains unchallenged, it is clear that work which has been done to gas communications may bring liability with it, not only as between the house-owner and the gasfitter, but also as between the gasfitter and any one who may have occasion to be near the place where the gas is. We say "as long as this case remains unchallenged," because it is, as Mr. Justice Lopes pointed out, the only one which at present bears directly on this particular point, so that it is quite within the bounds of probability that hereafter a similar case may arise before another tribunal and may be decided differently. At the same time it is well here to mention another point which is not unlikely to arise in such cases as the one upon which we are now commenting, and that is that when a general contractor undertakes to do work, and he makes a sub-contract, as is so often done in practice, with a regular gasfitter, then the gasfitter and not the contractor will be the person by whom any liability for injuries caused by bad gas-fittings or similar negligence must be borne. This is, of course, what may be termed a side point, but it is one of the first importance when we come to consider upon whom rests the liability for such accidents as we have mentioned. In a case which occurred some forty years ago, in which gas exploded in a club and injured the butler, this very point was raised, and it was decided that Mr. Cubitt (the case was that of Rapson *v.* Cubitt, 9 Meeson & Welsby, p. 710) was not liable, but that the injury was caused by the sub-contractor, to whom the butler would have to look for redress.

Again, it is necessary to observe that the law at present must, when no contract and no public duty are violated, be considered as limited as regards this question of injuries to things which are dangerous in their nature. For in the case of Collis *v.* Selden (3 Law Reports, Common Pleas, p. 495), it was decided that a man who carelessly hung a chandelier in a public-house was not liable for injuries which it caused to a man by falling upon him. Here no public right was violated, and no contract or privity existed between the plaintiff and defendant, nor was the thing which did the injury one dangerous in its character. Of course, if the man had been injured whilst the workman was actually employed on the work, the case would have been different, because we need hardly say that negligence by a workman, which causes injury to a man, makes that workman or his employer liable to the person who has been injured. To pursue this subject of injuries into greater detail, it would be necessary to enter into a technical legal discussion, which, though of interest to lawyers and jurists, would hardly gratify the readers of the *Builder*. Our object in the foregoing remarks has been to point out the liability which attaches to those who may use or be employed upon dangerous materials, and especially, as the case of Parry *v.* Smith shows, to those who have to do with gas and gas-fittings in buildings.

OBITUARY.

Mr. Mark Firth, whose munificence has done so much for Sheffield, died on Sunday last. His first gift of any magnitude was 1,000*l.*, which he added to a legacy of 5,000*l.*, left by his brother Thomas for the erection of a college for the training of young men for the Methodist New Connexion ministry. In 1869 he erected Mark Firth's Almshouses at Ranmoor, near his own residence, at a cost of 30,000*l.* His next munificent act was the gift of Firth's Park to the town; he purchased the Page Hall estate for 29,000*l.*, and set apart thirty-six acres for the benefit of the people of Sheffield. The park was opened by the Prince of Wales. The foundation of Firth's College, in Sheffield, opened by Prince Leopold in October of last year, will be fresh in the recollection of our readers. The college, which forms a prominent part of a pile of imposing educational buildings in the centre of the town, was erected and fitted by Mr. Firth at a cost of 20,000*l.* The endowment fund now amounts to 20,000*l.*

FROM ABROAD.

A PUSCHKINE Exhibition has been opened in St. Petersburg in the rooms of the Society for the Encouragement of Artists. Upon entering are observed the portraits of the poet and his wife, as well as busts and autographs. After the portraits came a long series of landscapes, whose subjects were inspired by the works of Puschkine, engravings serving to illustrate his works, a drawing of the recently erected monument to the poet (illustrated in our issue of Oct. 2nd), drawings of the house he inhabited, and of the localities which were dear to him. Autographs occupy an important place in the exhibition. There are also shown historical notices written by Puschkine on the occasion of his stay at Kischinew in 1822, several sketches in crayon by him, complete editions of all his works, and translations of them into all the languages of Europe. There are besides, a considerable number of musical compositions. Amongst the objects having belonged to the poet are the rapier which he bore on the day of his duel, his cane, a lock of hair with an inscription of M. Tourgnéniew, stating that the hair was cut off in his presence after the death of the poet, and a ring which had been presented to him by Princess Yorontsow. The Imperial Lycée has enriched the exhibition with many *souvenirs* of the youth of its illustrious pupil.

The International Congress upon Industrial Copyright, which has been assembled in Paris for the last month, has recently held its last sitting. The proposal that international patents should be granted for industrial inventions, trade marks, &c., has been unanimously adopted. Twenty-three States were represented at the conference, Germany and Spain being the only European powers which did not send delegates. They have both, however, expressed their willingness and desire to be represented at the next congress upon this question.

The *London Gazette* contains an order in Council with regard to the new treaty between England and Spain upon the same subject. By this treaty the authors, inventors, designers, engravers, and makers of the following works,—that is to say, books, dramatic works, musical compositions, drawings, paintings, sculpture, engravings, lithographs, and any other works of literature and the fine arts in which the laws of Great Britain give to the British subject the privilege of copyright,—shall, as respects works first published within the kingdom of Spain, have the privilege of copyright therein for a period equal to the term of copyright which authors, &c., of works first published in the United Kingdom are by law entitled to, provided the works referred to have been registered, and copies thereof shall have been delivered according to the requirements of the Acts (passed in the 7th-8th, and the 15th-16th years of the present reign), within three months after the first publication in any part of the kingdom of Spain; or, if such works be published in parts, then within three months of the publication of the last part thereof.

ARCHITECTS AND BILLS OF QUANTITIES.

THE following minute has been issued by the Council of the Royal Institute of British Architects:—

"*Sharing Commissions with Quantity Surveyors.*—It having recently been stated to the Council of the Royal Institute of British Architects that the charges made by quantity surveyors are sometimes shared by the architect, and such a practice, if it really exist, being open to great and obvious objection, the Council hereby publicly declare that, for the future, such practice, if proved, will be deemed conduct which, in the opinion of the Council, is derogatory to the professional character of any Fellow or any Associate of the Institute."

ARCHITECTURAL UNION COMPANY (LIMITED).

THE report of the directors (Messrs. David Brandon, Arthur Cates, James Edmeston, Joseph Jennings, T. Hayter Lewis, and Sancton Wood) submitted at the twenty-third ordinary general meeting of shareholders, held at their premises, No. 9, Conduit-street, on Wednesday afternoon last, contained the following passages:—

"In the report of last year, the shareholders were informed that the lease of the ground-floor and basement would expire at Christmas last, the rent for the whole then occupied being 225*l.* per annum. The directors are now able to report that the shop, with the front part of the basement only, has been re-let from Christmas last, on lease for twenty-one years to Messrs. Hutchins & Romer, at a rental of 175*l.* per annum.

"The arbitration-room mentioned in the last report (with the two consultation-rooms), has been completed, but the directors regret that, at present, it has hardly been used at all for the purposes intended. It is to be hoped that there will be an improvement in this respect, as otherwise they will be obliged, in the interest of the shareholders, to let it for some business purpose, which they desired to avoid when the alterations were made.

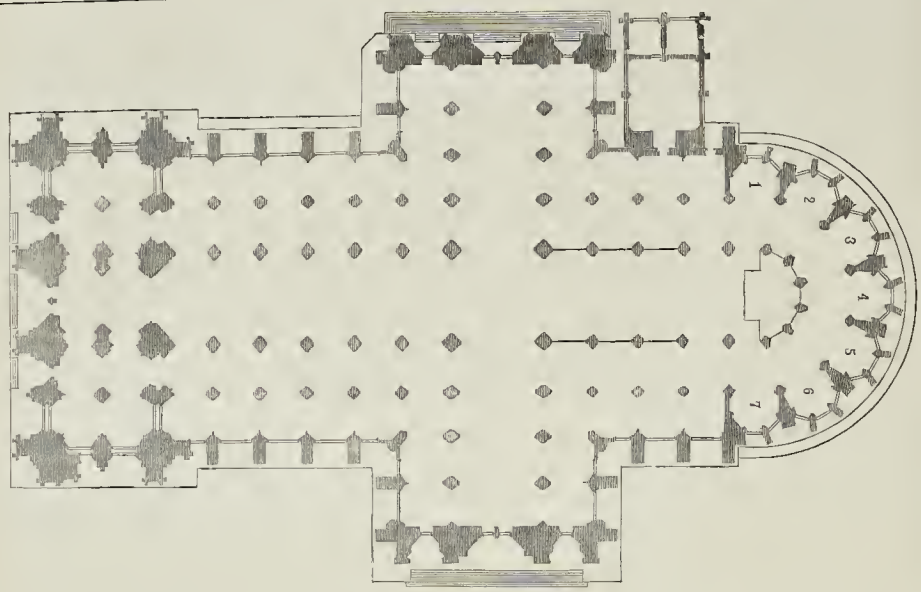
"The directors are glad to say that in the re-arrangement of the lettings which has taken place to meet the wishes of the leasehold tenants, no loss of rent has been incurred, but that the present rental is in excess of what has been hitherto obtained, without taking into account anything to be received for the arbitration-room, which will certainly yield a very handsome interest on what has been expended in the improvements.

"The renewal lease of the company's premises has been duly executed by the City of London."

The report was adopted. The following directors retired by rotation, viz.:—Messrs. James Edmeston and Sancton Wood, but they were re-elected; and Messrs. Geo. J. J. Mair and Wyatt Papworth were re-elected auditors.

On the recommendation of the directors, a dividend of 12*s.* per share, free of income-tax, was declared.

Mr. and Mrs. German Reed's Entertainment will close after Saturday, December 18th, and re-open on Boxing-day at three and eight. "The Turquoise Ring" will be temporarily withdrawn, and an entirely new holiday programme will be given on Boxing-day at three. Full particulars will be duly announced.



[*Scale about* 75 *ft. to* 1 *in.*

PLAN OF COLOGNE CATHEDRAL.

COLOGNE CATHEDRAL: THE INTERIOR AND ITS FURNITURE.

As a further instalment of the illustrations, which we promised our readers, of Cologne Cathedral, we publish this week a large interior view drawn by a German artist, which will convey the general impression of the interior of this vast and noble church. The great height and grand arrangement of the aisles of the nave are well shown from the point of view selected. The whole of the building is seen at a glance, except the two western bays, between the great towers. The variations in design between the earlier choir and the more florid nave are also distinguishable. These chiefly consist of the enrichments over the pier arches, composed of crockets and finials, and the foliated cornice below the triforium. The vaultings of the nave and its aisles differ also from those of the choir, as in the former the soffits between the vaulting-ribs are more convex, conveying rather the impression of a return to domical vaulting.

Although the nave of Cologne Cathedral possesses double aisles, yet there can be no doubt that the outer aisles were intended to be subdivided into chapels by light screens. This is obvious from the large aumbries (one of which occurs in each bay), intended to hold the vessels appertaining to the altars of the various chapels. Whether it is in contemplation to carry out the original design in this respect we are uninformed, and probably the matter is not yet settled; the nave seems to require furniture of some kind or other, as at present it looks rather bare.

It may not be out of place here to say a few words, from our own notes made on the spot, upon the furniture and fittings at present existing in the cathedral, which have not received so much notice as they really deserve, and are frequently overlooked by those who visit the church.

To commence with the high altar. This is partly ancient fourteenth-century work and partly Renaissance work of the seventeenth century. To the former period belongs the magnificent carved-marble frontal of the altar, adorned with thirteen foliated and canopied niches, twelve of which are occupied with statues of the Apostles, and the centre by a representation of the Coronation of the Virgin. It has been suggested that this was originally a "retable" or reredos, but we see no reason for supposing that it ever occupied any other position than that which it does at present, especially as altar-frontals adorned with niches and statuary are to be seen elsewhere in Germany and France; instances occur at Marburg, Erfurth, and at Folgoat. The Renaissance tabernacle and wings to the altar are fine in their way, but out of keeping, and the same may be said of the metal screens, two side-altars in the choir, and cantor's desks. However, these ought not to be removed, as they help to hand down the history of the building to our time, and have a certain amount of merit, and we cannot help saying that, although in a poor style of art, they are vastly superior to the modern "would-be Gothic" of the altar under the crossing, which is a positive disfigurement to the church, and it is a pity that, if an altar in this situation is required, it is not made movable.

The choir-stalls are remarkably fine, and look singularly early in character. They probably, however, do not date before the middle of the fourteenth century. They have no canopies, and the inner sides of the stone screens are concealed by tapestries designed by Dr. Bock, behind which are the remains of ancient frescoes. The outer sides of these screens are adorned with rich tracery patterns, bearing considerable remains of ancient coloured decoration.

The north outer choir aisle contains an altar of the Renaissance period, over which is a Byzantine crucifix, which probably belonged to the former cathedral, and a wall-painting of the Crucifixion (fourteenth century). Between the columns dividing this from the inner aisle is a very fine fourteenth-century monument, bearing the recumbent figure of a bishop. Above this is a beautifully-painted beam, bearing a series of sockets for votive candles, and some elegant iron scroll-work (fourteenth century).

The first apsidal chapel, marked No. 1 on our plan, contains a good double aumbry, a Late Renaissance font of marble, and a fine Early Renaissance monument to Prince-Archbishop Schwartzenberg, A.D. 1561. The altar of this chapel has a very pretty silk antependium.

The screen which separates this and all the other apsidal chapels from the aisle is fifteenth-century work. The lower portion is composed of pierced stone tracery, and the upper part of a very simple iron grille with a foliated brattishing; the grille is painted vermilion and the brattishing gilt.

The second chapel has an interesting fifteenth or sixteenth-century tryptych of wood, painted; over its altar, and in the centre of the chapel, is the very remarkable monument to Archbishop Philip von Heinsberg (d. 1191). The present monument, however, dates from the fourteenth century; it is surrounded with little embattled towers, emblematical of the fact that he erected the town walls. One of the old plans for the cathedral façade is to be seen in this chapel. The third chapel contains a magnificent triptych altar-piece of the fifteenth century, richly painted and gilt, and the ancient plan of the western towers found at Darmstadt. Also the fine altar-tomb of Bishop Conrad von Höchstetten, the founder of the present cathedral.

The fourth chapel (see plan) was formerly occupied by the shrine of the three kings.

The fifth chapel contains the magnificent "Dombild," a superb triptych picture, representing the patron saints of the chief churches in Cologne. The painter is unknown, but the picture bears the following letters upon its wings:—"M. N. O. X."* Whether this was the name of the painter, "M. Nox," or whether they were his initials, is uncertain. The date of this splendid work is supposed to be about 1426. There is a curious altar-tomb or shrine, with a wooden top or lid in the centre of the chapel.

The sixth chapel contains an ancient carved triptych altar-piece, with a representation of St. George and the Dragon, and a fine altar-tomb of white marble of the fifteenth century.

The seventh chapel contains a carved and painted altar-piece of the sixteenth century, a fine double piscina, and an altar-tomb with a slab inlaid with mosaic (fourteenth century). The south choir aisle contains two magnificent altar-tombs, one defended by a hearse or grille, and a modern Gothic altar with a fresco by Overbeck.

In the east aisle of the south transept is the very splendid altar of St. Agololphus, a richly-carved and panelled triptych, about 30 ft. high, adorned with pictures, statues, and very complicated canopy work.

The sacristy contains an ancient stone altar and a "Sacramentshaus," or tabernacle, of stone, adorned with rich canopy work.

* Whether a careful examination would result in the discovery of other letters, the whole forming an inscription, is a question. De Lassaulx thinks the letters form the name of the painter.

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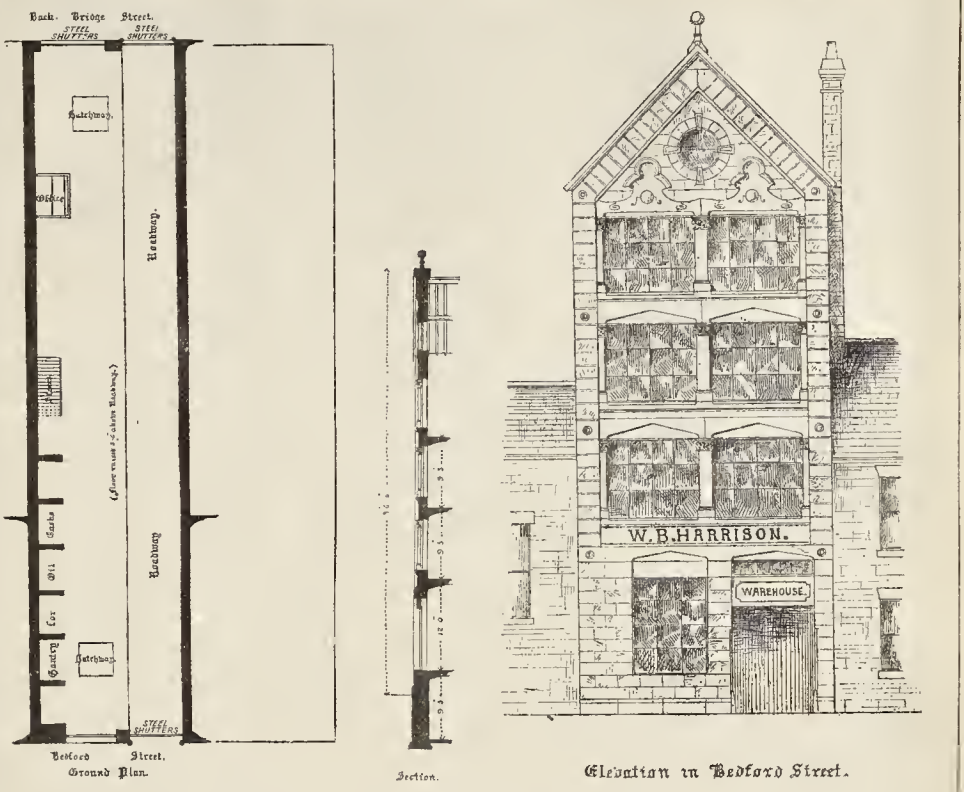
IOR OF COLOGNE CATHEDRAL: LOOKING EAST.



A WAREHOUSE IN SUNDERLAND.—MESSRS. TILLMANN, ARCHITECTS.

WAREHOUSE, SUNDERLAND.

THIS warehouse is situated in Bedford-street, is four stories in height, and extends from that street to Back Bridge-street; it measures about 21 ft. 6 in. in width and 93 ft. long. The arrangement has been carefully considered to meet the requirements of Mr. W. B. Harrison, the proprietor, an oil merchant. The front is of polished ashlar stonework. All the walls are built of brick. The floors are constructed of wrought-iron girders, between which are laid concrete arches. The basement floor is 6 ft. below the street-level, and forms very extensive cellarage. The lavatories for the men are on this floor. On the ground-floor is a roadway, running from street to street, paved with wooden blocks. A loading and discharging platform is fixed at the height of a rolley above the roadway. The space between the platform and roadway being left open provides the cellars with a very efficient means of ventilation. On the platform there is a row of large oil-tanks, 40 ft. long, with a heating apparatus (by Messrs. M'Kenzie & Moncur, of Edinburgh) fixed underneath, to prevent the oil freezing in winter. An office is fixed at one end of the building, where also are weigh-machines, &c. Above the roadway there is a gallery suspended from the first floor, thus saving the space used by the roadway. All the entrances are closed by patent self-coiling steel shutters. The windows are made of wrought-iron strongly put together, with the centre portion to open and shut for ventilation, and glazed with rough plate-glass. The top story, in addition to being lighted by the windows at back and front, has continuous skylights on both sides of the roof, running the full length of the building. At each end of the building there are hatchways for lifting goods from one floor to another. The lifting apparatus is worked by a silent "Otto" gas-engine, which is fixed on the top floor.

The contractor for the whole of the works was Mr. Mark Howarth, of Sunderland. The building was designed by, and carried out under the superintendence of, Messrs. J. & T. Tillman, architects, of Bridge-street, in that town.

BARRY'S PICTURES AT THE SOCIETY OF ARTS.

AFTER Mr. Comyns Carr's lecture, "On the Influence of Barry upon English Art," a quotation from which was given in our last number,

The Chairman (Sir Henry Cole), said he should be glad to say a word or two, to illustrate a few of the most important points which Mr. Carr had brought forward, before a vote of thanks to him was proposed. The comparative failure of Barry had been ascribed to the temper of the times in which he lived. Now, it had been his (the chairman's) lot to see most of the European galleries, and the impression made upon him by Barry's pictures was that they were, at any rate, as good as any class of pictures of the same time to be found in any of the great European galleries. He could not call to mind in the Louvre or the Luxembourg, where the French painters of the period were represented, any paintings which could be considered as good or better. He recollected some stiff-looking pictures by David; and, without saying that Barry's were perfect, he certainly thought they were equal to anything to be found in the French school. There were none in the German school of that time so good; the Italian school was as weak as water, and the Flemish was open to the same kind of criticism. It used to be very much the fashion to decry the English school, and within his own recollection the French doubted whether there was any English school at all until 1855, when we, for the first time, sent pictures to France; and then they awakened in a sort of wonder to the fact that we could show pictures like Landseer's, Mulready's, Leslie's, and others. They even went so far as to say that if Mulready's paintings were put up to auction in Paris, they would fetch as high a price as any by French artists. But looking at what the times were in which Barry lived, what could be expected? At that time we were plunging into the American War; how could painting be encouraged when the people were taken up with thoughts of how they could fight with their relatives across the Atlantic? A little later, and we had the French Revolution, and the political men of those days thought it wise to spend four or five millions in trying to put it down. How could you have paintings in such a time? Then came a series of Irish rebellions; and then Napoleon, with his perpetual wars, and our enormous expenditure to put him down. We had a clause in the treaty of Vienna that no Napoleon should ever sit on the throne of France, and yet he had seen the Queen of England and her Consort in Paris embracing one of the same family, as was the fashion amongst monarchs. He thought, therefore, the art of the times was very much influenced by other things besides art. In the first place, the artist must live; and if he believed in another world, he must paint according to his ideas of that world. At the present time domestic life in England was the dearest thing we had, and almost all our pictures were, more or less, illustrations of that domestic life. He maintained that our art was quite as good as French, German, or Belgian art, and a great deal better than the Italian. Mr. Carr had referred to the difficulties Barry met with in regard to painting St. Paul's; but that was not

an experience peculiar to him. After the Prince of Wales recovered from his illness, and went to St. Paul's to return thanks, the members of the Society subscribed 300*l.* or 400*l.* to put up a memorial window. They got permission of the Dean and Chapter, obtained a design, and thought the window was going to be put up. Then there came a curious set of arrangements for decorating the cathedral, and stopped its adoption. The design of their window represented a miracle above, as the principal subject, and portraits of the Prince and Queen below; but the artist who was entrusted with the grander scheme said that did not suit him at all; he wanted a bigger miracle than their artist had chosen, and from that day to this they had never been able to move a step. There was a force in the Church which could not be overcome, and Barry met with the same kind of difficulty. There was one feature in Barry's paintings which struck him as throwing light on painters' work in general, and particularly Mulready's, and that was the great, earnest sincerity with which he did his best. Almost the last words he heard Mulready utter were these, "If you want to be a painter, you must not spare elbow-grease; it is as hard work as anything people have to work for." Miss Amelia B. Edwards, in her admirable novel, "Lord Brackenbury," expressed the same idea in these words:—"Art tolerates no divided duty. A man must give his whole soul to it,—his whole time, his whole powers of observation, of memory, of comparison, of study. Even so the thing he does must always fall short of the thing he had hoped to do. The greatest painters who ever lived spent their lives, we may be certain, in the vain pursuit of an unattainable ideal. But, at all events, they did so spend their lives. They worked at least as hard as if they had been masons, plumbers, or joiners." He thought those were words which Mr. Carr himself might have used.

Mr. Hyde Clark said they must all desire to thank Mr. Carr for the eloquent address he had delivered, and not less to thank the chairman for his remarks. Perhaps, at one portion of the paper, they might have had the idea that Mr. Carr was underrating Barry in relation to his circumstances and his age, but in the end they must have arrived at the conclusion that he appreciated the artist and his efforts as much as any one. The question put was, Did Barry labour in vain; and did the Society labour in vain in associating itself with Barry in these efforts? It seemed to him that Mr. Carr had, to a great extent, answered that question, and that the chairman had fully justified the action taken by the Society 100 years ago. It was a long time to look back to, but Mr. Carr had found means to connect their interest even with that remote period. The interesting passage in which he gave the introduction of Martin Archer Shee to the author of the works around that room brought them into connexion with the men of the present day, and the reference to Sir Martin Shee seemed, to a certain extent, to answer the earlier question of the lecturer. He said there was a strange contrast between the two men, and, at that moment, he seemed to indicate a doubt whether Barry had succeeded or failed, and to suggest that he had failed, while Shee had succeeded. Those who had been in Shee's painting-room in the later years of his life, when he was painting portraits at the age of eighty, could scarcely consider his career a success. He (Mr. Clarke) remembered Shee saying to him once, "You are often now brought into contact with Mr. Haydon, and he, as a matter of course, abuses the Academy. I recollect when I myself was in difficulties with the Academy. I believe Mr. Haydon's grievance against the Academy is that, on one occasion, when he had sent two pictures to the exhibition, he happened to accompany them, and he heard an Academician call over the staircase to the porter, 'Whose paintings are these?' 'Mr. Haydon's, sir,' was the reply. 'Mr. Haydon's pictures to the coal-hole!'" Shee added that he had had a similar adventure. When he was a very young man, and painted some of those great works of genius which young men are most capable of producing, it so happened that two works he sent to the Academy were rejected, in a year when there were a great many rejected works. The idea occurred to some one of exhibiting all these rejected works, as a challenge to the judgment of the Academy. Those who got up the exhibition sent for his pictures, and they were to appear; but then it struck him that, after all, though he had been scandalously treated, it was, perhaps, not wise of him, as a young man, to put himself in competition with his seniors, and therefore he sent for his pictures, and got them back, not without difficulty, for they were in the catalogue. "Now," he said, "see where Mr. Haydon is and where I am. I have no doubt if Mr. Haydon had displayed a little more tolerance he would have been president of the Academy instead of myself." These words had a bearing on the earlier part of Mr. Carr's paper. Which was the man who succeeded, Barry or Shee? Shee enjoyed all the advantages of life. That charm of manner, which remained with him to the last, secured for him every social enjoyment and advancement in his art to the presidency of the Academy; but he (Mr. Clarke) believed, nevertheless, that the reputation of Barry would remain when the name of Shee would only be remembered by Byron's reference to it. The real test of Barry's position was that which the chairman had applied to it. He must be judged by the men of his day, and even by those before his day, and he would as willingly compare him with Sir James Thornhill as with any one. At any rate, with careful consideration, no one could fail to arrive at the same conclusion as the chairman, that in relation to his own day Barry occupied a truly great position. What did Barry realise? He succeeded no more than Haydon, and than many ambitious men, in accomplishing all the purposes of his ambition; but he did much. He prepared the way for a school of historical art in our own day. He was trammelled by the classical and academical ideas of the day, and those same notions pervaded the French school down to the last works of David. It was only broken by the force of events. Although Napoleon was represented as a Roman emperor, it was necessary to present him in his grey coat. It was in reality Napoleon and Wellington who, to a great degree, overcame the tradition of art, and rendered it more natural, and in the respective countries more national. If Barry was not able to do more, they knew by the records of the Society that he was desirous of securing the natural; for there were payments made for models, and every figure was, according to his ideas, presented according to nature. Even if he somewhat failed in his high aims, they must acknowledge his sincere desire to introduce a better element into art. One feature in Barry's work was particularly deserving of notice, that was, the introduction of portraits of illustrious men. If there was much absolutely classical, on the other hand how much was there national! He would conclude by moving a cordial vote of thanks to Mr. Carr for his valuable and interesting paper.

Mr. Laing was rejoiced to find that both the chairman and Mr. Hyde Clarke had spoken in praise of Barry. For the last fifty years he had been in the habit of coming to that room, and those pictures had been lessons to him throughout his life. He was glad also to think there was a movement in the right direction in the Society, and that the cause of art had been brought forward; for he feared that, for some considerable time, they had been paying very little attention to one of the principal objects with which the Society was founded,—the encouragement of fine art. He had much pleasure in seconding the vote of thanks, and bearing his humble testimony to the great painter whose works adorned the walls of the room.

The Secretary (Mr. H. T. Wood) said it might interest the members to see an old volume which the Society possessed, and which he had on the table, containing the MS. of a great deal of Barry's correspondence on the subject of these pictures. It began with the actual letter sent by Barry to the chairman of the committee, stating who the artist was who was willing to undertake the duty of decorating the room, when the ten artists who had been invited had declined. There were many other letters, but, perhaps, the most interesting paper in the volume was an account written by Barry himself of the circumstances which induced him to come forward, and of his object in painting these pictures. When the pictures were cleaned recently, he (Mr. Wood) had made it his business to look through all the old papers, and see if he could collect any facts not already recorded about the pictures. The minutes and other documents, however, had been so frequently gone over before with the same object, that he did not know that he was very successful in finding much that was new, but what little he did find, he put in the form of a pamphlet, which was given to all the members who cared to have it. His only object in alluding to it was to say that, coming with no previous knowledge to the study of Barry's history, he could not help arriving at the same conclusion to which Mr. Carr, with his ample knowledge, had been led, as to the extreme sadness of Barry's story. In that room, where they were surrounded by his great masterpieces, where he spent so many hours of hard work, the room to which men brought his dead body that they might pay it some of that tribute of respect which they almost grudged the artist while living, it seemed a pity that they could not awaken more enthusiasm for the artist who was full of such noble aspirations. One could only look back and regret that the fulfilment was not equal to those aspirations. Still, the Society of Arts might take some credit to itself for having faithfully discharged the trust left to it by Barry, and for having done what it could for his memory. Even if he had painted the pictures in St. Paul's, which he was so anxious to do, it was doubtful if his fame would have been higher than it was to-day. The Society had always cherished his pictures, and taken such care as it could of them, and now the present Council had undertaken the restoration, the result of which was before them. He would like to add that their chairman of the evening, Sir Henry Cole, had been a member of the committee appointed to superintend the cleaning, and it was in no small degree to his careful personal attention that so successful a result had been attained.

The Chairman, in putting the resolution, said he had no doubt that, owing to this lecture, Barry would be better known than he had ever been before, and that they should not again hear, for many years, the speech made, when some one said he was going to the Adelphi to see Barry,—"Barry built the Houses of Parliament, and not the Adelphi." That Society gave prizes and medals for the encouragement of art before the foundation of the Royal Academy, and he could not help thinking that even if the Royal Academy had a series of pictures as good of their kind, or if they could, within a reasonable time, produce a monument of the art of the present day to equal what Barry did in his day, they would have reason to be thankful.

The motion having been carried unanimously,

Mr. Comyns Carr, in response, said he would not detain the meeting, except to say that he did not wish it to be thought that he differed at all in his appreciation of Barry, or of the efforts he made, from the speakers who followed him. He cordially agreed with nearly everything that had been said by those who had, perhaps, spoken more effectively in praise of Barry than he had done. He cordially agreed with the Chairman that his achievements were very great in relation to the art of his time. He had no tendency to underrate the value of our English school; he had tried to point out that at the time when Barry was working there were magnificent achievements produced in that school, and if it was not Barry who produced them, it was because an indomitable current of ideas set in another direction, and because Barry, with heroic effort, was fighting against the stream.

LANDSCAPE ART IN THE FRENCH GALLERY.

Sir,—Although you have already noticed the present collection of pictures in Mr. Wallis's twenty-seventh annual Exhibition by British and Foreign Artists, I hope you will let me add a few words on a special point. The gallery contains 200 pictures, much the larger number being by foreign artists. The strength of English art is supposed to be in landscape, with Turner high up at the head of the list. A few, however, may be named worthy to take rank below, as Calcot, Constable, Copley Fielding, Creswick, De Wint, D. Cox, old Linnell, and Müller. These are a few of the select from a tolerably large school of landscape artists, but by no means all, especially if we ventured to include living artists from the Royal Academy and water-colour schools, but it is not my purpose to write a catalogue of landscape artists. The Dutch excelled in landscape before the English school had birth; and, for purity of tone and atmospheric effects, the best of the Dutch school have as yet no rivals. Painting can only be carried to a limited standard of perfection, however subtly treated, as there are effects in Nature which no art can reach. Turner learned this long before he died:

hence his wild, despairing attempts in colour, so bewildering and confounding to the uninitiated, and so beloved by a few select students and the best engravers. There are several landscapes in this winter's French Gallery worthy of careful study, quite as much for what they show as for what they promise; these are by a young German (or Bavarian) artist, K. Heffner. In the Gallery there are pictures by him, Nos. 9, 42, 59, and 75. The first, No. 9, is a bright daylight landscape, the middle-distance a glittering yellow and green; with water in the foreground and distance sparkling under the modified light of a bright but vapoury atmosphere. A coppice of pollards, bare of leaves, shows a late autumnal day. No. 42, "A Rift in the Clouds"; No. 59, "A Flitting Gloam before the Storm"; and No. 75, "In the Gloaming," may be grouped for study and comment. In No. 42, we have a night aspect, under the magic effects of a vapoury atmosphere and full moon. The general tone of clouds and landscape is dark grey; patches of nimbus clouds float along, through a rift in which the full moon shines out for a moment, silvering the margins of the drifting clouds. There are a boat and figures in the foreground, giving life to the scene, with groups of leafless trees in the middle distance. It is not a violent storm, but a weird wild night, alternately fair and showery, with most of the latter. On the right a house is seen amidst the shrubs, and water gleams both in the foreground and in the distance. Atmosphere and landscape throb under the sudden gleam through the "rift in the clouds." No. 59 is the most important work in dimensions and area of canvas, and is a charming broad daylight effect upon a wide stretch of flat watery shore. David Cox, in his "Over Sands" sketches, depicted such a landscape, and it would have gladdened the old man's heart to have seen these works of the young Bavarian artist. The coming storm is indicated by a dark bank of clouds on the distant horizon, which will soon ride hissing up with the wind, drenching the watery landscape. The whole atmosphere is full of lofty broken cumulus, through one small break of which the sun sends his rays, making the distance (water and grass) sparkle for the moment. Cattle cross the shoal water of the middle distance from the right to a lone moorland on the left, over which a few sea-gulls flit; an old flat-bottomed boat is stranded in the foreground. The whole picture is full of atmosphere. No. 75, "In the Gloaming," is a flat grey landscape, with a line of pollards on the left, shoal water in the middle, with cows crossing, and tops of windmills in the distance on the right. The sky is overcast with grey broken cumulus, whilst on the horizon the setting sun tinges clouds, land, and water, with thin streaks and flecks of gold, the rifts in the clouds showing tinges of sky orange and green. Here again, in this picture, the young artist has justified his title by the effects represented. Daylight is fast fading: it is "the gloaming,"—the prolonged twilight of a Northern day. As an Irish labourer once remarked, "Night is creeping about the ditches." In these charming pictures there is no mistaking the aim and purpose of the artist. The landscape aspects are wintery; the atmospheres are full of vapour; the clouds have parted with some of their stores of water, but have been by no means emptied; showery weather may be predicted; topcoats and umbrellas will be necessary. It has been said that a good picture is a "window in a wall." The possessors of these charming works will most certainly, in this sense, have an added window in their walls. Thanks are due to Mr. Wallis for affording us such a pleasant study and intellectual treat, and we shall look anxiously for further works by the young and gifted artist. R. R.

Fires.—The goods depôt recently erected by the North British Railway Company at Forfar was totally destroyed by fire on the 25th ult. The building was a wooden one with slated roof. The estimated damage is about 3,000*l*.——On the night of the 23rd ult. St. Mary's parish church, Hawick, was discovered to be on fire. The roof was completely destroyed, and the seats and walls were damaged. It is supposed that the fire originated by a joist projecting into the flue of the heating apparatus, which was used two days before.——A destructive fire has occurred at Mutley, Plymouth, the workshops and timber-yard of Mr. Philip Rundle, builder, being destroyed.

NEW BRIDGE AT HILGAY FEN, OVER THE OUSE.

A new bridge erected here for a company by Messrs. T. Shaw & Co., 141, Cannon-street, London, was opened a few days ago. The erection was commenced not three months since, and the contract expired on the 20th of November. The bridge will be the means of shortening the communication of Hilgay with the world outside by something like three miles. The bridge, which is of massive structure, is what is termed a lattice-girder bridge, of three spans, and is supported by cast-iron cylinders, 3 ft. in diameter, sunk below the bed of the river to the depth of 10 ft. 6 in. The foundation is of the hardest blue gault, better than which can nowhere be obtained. A lattice-girder of 90 ft. forms the centre span, and two girders, one 30 ft. and the other 40 ft., form the side spans. The 40 ft. span on one side is because of the peculiar bend of the river at this point, and it was also designed to give barges passing down the river the full benefit of the extra depth of channel on one side. The distance between the abutments, which are of white brick, is 160 ft. The cast-iron cylinders supporting the centre and side girders were filled with Portland cement concrete, and were secured to the bed of the river by means of a screw at the bottom, worked by a cast-iron capstan-head. In the capstan-head were inserted eight spars of tough elm. Two ropes were wound round the extremity of these spars, thus forming a wheel of eight spokes, and 20 ft. in diameter. When we take into consideration the pitch of the screw, which at the bottom of the cylinder was 9 in., and the large diameter of the capstan-head, which was hauled by 2 ft. 6 in. hawsers, attached to double-purchase crabs, we may imagine the amount of weight which was required to vertically depress these cylinders. It should be mentioned, in justice to that gentleman, that the works have been under the superintendence of Mr. J. Bloomfield, on behalf of Messrs. Shaw.

CITY AND GUILDS OF LONDON INSTITUTE.

A general report as to the affairs and position of this Institute has been issued by the Council. It appears that by the kindness of Gresham Committee, a room in Gresham College has been placed at the disposal of the Institute, together with the use of the library for meetings, and for the transaction of other business not interfering with the convenience of the Gresham professors. The Institute has been duly registered under the Companies Acts, 1862 to 1880. The Council are pleased to be able to report that the question which was so long left unsettled with regard to the future site of the central institution has been definitely decided by the grant to the Institute of a plot of land at South Kensington, about 300 ft. long by about 110 ft. deep, after allowing for a 40-ft. roadway in the rear, from her Majesty's Commissioners of 1851, for 999 years, at an annual ground-rent of 1*s*. The Council have entrusted the preparation of the plans and the construction of the building to Mr. A. Waterhouse, A.R.A. In accordance with suggestions thrown out in earlier reports, the Institute has voted a certain amount of its funds towards the support of existing institutions, which are affording technical instruction to those who are engaged, or are about to engage, in industrial pursuits. The institutions to which the Council have made grants are the following:—University College and King's College, London, the School of Art Wood Carving, the Mining Association of Devon and Cornwall, the Nottingham Trade and Science Schools, the Artisans' Institute, the Birkbeck Institute, the Union of Lancashire and Cheshire Institutes, and the Horological Institute. The Council have taken steps to render available for the purposes of the Institute the conditional grant of 10,000*l*. from the Drapers' Company, to be devoted to the erection of a Technical College in Tabernacle-row, which shall afford accommodation for the schools of technical chemistry, technical physics, and of applied mechanics. The Council propose that the Board of Governors shall set apart a sum of 5,000*l*. out of the funds at the command of the Institute for this purpose. They have agreed to rent for a term of 99 years from the Council of the Middle Class Schools Corporation a plot of ground of about 120 ft. in length by about 70 ft. in depth, at an annual rent of 200*l*.; the rooms at present occupied in the Cowper-street School being retained by the Institute for a period of at least five years at a further rental of 200*l*. a year. The building of this college, in accordance with plans which have been already approved by the executive committee, has been entrusted to Mr. Clifton, and it is expected that the necessary arrangements for the laying of the foundation-stone will be completed within the next few weeks. Since March last improved technical instruction has been given in the temporary class-rooms of the Institute in the Cowper-street Schools. During the present year instruction in certain branches of industrial art has been given in two houses in Kennington Park-road, which have been fitted up with the requisite appliances for teaching.

SALE OF FREEHOLD PROPERTY IN CATHERINE STREET.

Last week a freehold property in Catherine-street, Strand, nearly opposite to Drury-lane Theatre, was offered for sale at the Auction Mart by Messrs. Winstanley & Horwood. It consisted of the business premises and dwelling house formerly known as No. 9, Brydges-street, containing four floors and a basement, and at present let to weekly tenants at rents amounting to 81*l*. 18*s*. per annum, the landlord paying all rates, taxes, and insurance. The property was sold for 920*l*.

EXTENSIVE SALE OF WEST END PROPERTY.

One of the largest sales of property which has for some time past taken place at the Auction Mart, was held on Thursday, the 25th ult., when Messrs. Collier & Bowdich submitted to competition several valuable freehold investments in Manchester-square, comprising twenty-six houses, shops, and other premises, bounded on the east and west sides by the Portman and Portland estates. The property is situated in South-street, George-street, and Manchester-mews South respectively, and was offered in twenty-six separate lots. It was described as a freehold site, such as could rarely be obtained in the district, having an area of about 26,000 superficial feet. The present ground-rents and rentals were stated to amount to 266*l*. 4*s*. a year only, but that as the leases expire in 1886 the purchasers would, in five years and three-quarters, become entitled to possession, or to the rack rentals, estimated to amount, for the entirety of the property, to 3,000*l*. per annum. It was added that by reason of the costly houses recently erected, and the important improvements in progress in the immediate neighbourhood, there was every probability of the property greatly increasing in value. There was a very large attendance during the whole time of the sale, which lasted between two and three hours, with an eager and spirited competition for the several lots, all of which were readily sold for an aggregate sum amounting to upwards of 43,000*l*. Thirteen of the houses and shops are in South-street, and realised prices varying from 1,375*l*. to 1,990*l*. each, or an aggregate sum of 20,690*l*.; the twelve houses in George-street were sold at prices ranging from 1,240*l*. to 1,900*l*. each, with the exception of three of the lots, which realised still higher prices, Nos. 20 and 22, the estimated annual value of which was set down at 130*l*. and 180*l*., being sold for 2,020*l*. and 2,770*l*. respectively, whilst No. 14, which, in addition to a very large house, also contains extensive builders' premises in the rear, fetched 4,000*l*., the total sum realised for the George-street property being 21,495*l*. The remaining lot, comprising stabling and workshops in Manchester-mews South, was sold for 900*l*.

Subdivision of the Electric Light.—At Wednesday night's meeting of the Society of Telegraph Engineers, held at 25, Great George-street, Westminster, the President (Mr. W. H. Preece, Electrician-in-Chief to the Post-office) in the chair, a paper on "A System of Sub-dividing the Electric Light" was read by its inventor, Mr. J. W. Swan, M.S.T.E., of Newcastle-on-Tyne. The lecturer had previously dealt, before the Philosophical Society of his native town, with the subject of the production, and the best means of preserving this light, as mentioned by us at the time, and his later paper was a resumption and amplification of the former one.

TONBRIDGE, KENT.

Ferox Hall, an old mansion on the outskirts of Tonbridge, the residence of Mr. T. A. Beeching, the banker, has just been restored and considerably enlarged, Messrs. Wadmore & Baker being the architects. The works, which have just been brought to a conclusion, embrace the addition of a new garden-front and an extensive wing, stretching towards the stables and offices. The hall itself is one of those old red brick and tiled buildings of the latter part of the seventeenth century whose substantial pilasters and cut brick capitals give a quiet dignity to the surroundings which much more pretentious work often fails to secure. The new wing corresponds pleasantly with the ancient work. Its octagonal bay is surmounted by a lead bulb-roof. The chimneys are all carried well up. Over the entrance to this front is a carved sun-dial, bearing in suitable characters the legend, "You may waste, but cannot stop me." There are three sets of mullioned square bay windows to the garden-front. These, especially the principal one, are decorated with carving. The materials used in the new work are red bricks, similar to the old work, while the dressings are of local sandstone. The various quoins are rusticated, virgin cork bark being the *motif* for the rustication. Within, much care and no little expense have been bestowed upon the details. The principal rooms downstairs have their walls panelled with oak wainscoting, and so have the passages. The floors are of oak also. The various mantelpieces are of oak, Sequoia wood,—a Californian material something like cedar,—being also introduced into the fittings with good effect. There are some plaster ceilings modelled and panelled in the old style. Upstairs the wood fittings are of pitch pine. The kitchens are furnished with some capital ranges supplied by Messrs. Benham & Sons, of Wigmore-street, London. The exterior stone carving, and all the internal wood carving, has been executed by Mr. Harry Hems, of Exeter. The general contractors were Messrs. G. Punnett & Sons, builders, of Tonbridge.

ELECTRIC LIGHTING.

London.—On the evening of the 26th ult. a number of gentlemen interested in the progress of electric lighting visited the workshops of the Anglo-American Electric Light Company, in Vine-street, York-road, Lambeth, where the Brush system, in some of its later developments, is henceforth to be seen in actual operation. Besides the electric lights of the factory,—in themselves a sight of great practical interest,—there was shown a powerful new light, which is about to be sent to the Admiralty. This one light has an illuminative power equal to fifty thousand candles. This system of lighting is one of the three which are to be put on trial simultaneously in the City in the course of next year. It is at present to be seen at Liverpool-street Station, as well as in the company's works.

Woolwich.—The War Department officials at the Royal Arsenal, Woolwich, are at the same time extending their arrangements for the supply of gas to their works and buildings, and carrying out a series of experiments with the various systems of electric lighting which have been introduced to public notice, with a view of determining how far, and under what conditions, either mode is especially adapted to their requirements. Sixteen Brush lamps, all kept in action by one machine, are now in constant operation at the Royal Laboratory Department, some illuminating a large workshop for carpenters, while others are in adjacent rooms of smaller dimensions. This plan is stated to have proved at once the most satisfactory in its results, also the cheapest yet discovered, but the cost of producing the light is at present far too great to allow of its competing, on anything like equal terms, with gas. Consequently the authorities have just made extensive additions to their gas-works, from which not only the Arsenal itself is supplied, but the various barracks and dock-yards, the camp, and even the Herbert Hospital at Shooter's-hill, are lighted.

Hull.—A meeting of the Lighting Committee of the Hull Corporation was held on the 26th ult., "to approve and put into operation the Electric Lighting Bill obtained by the Corporation in the last Session of Parliament." The borough engineer submitted plans providing for six 6-000 candle-light power lights, one 2,000, five 400 for street lighting, and also one of 2,000-candle power, and two of 400 for the Town-hall. The proposed electric lights would supersede the lighting power of 105 gas-lamps of 16-candle power. Messrs. Siemens Bros. estimated the cost of the requisite plant for the extent of the electric lighting described, including steam engines and boilers, dynamo-machines, leading-wires, masts, brackets, lamps, lanterns, and insulators, at 3,700*l.*, in addition to which the engine-house and site would cost, say 1,300*l.*, making the total first cost 5,000*l.*, and they estimated the annual maintenance of the street lamps at 672*l.*, and the carbons for the Town-hall lights at 5½*d.* per hour for every hour the whole are lighted. With respect to the street lighting, therefore, the sum of 672*l.* per annum, plus the first cost of plant, would produce lights equal to 40,000-candle power as compared with 1,650 candle-power for the 105 gas-lamps to be displaced, and costing 420*l.* per annum, whilst the same apparatus would also provide lights for the entrance-hall, reception-room, and council chamber in the town-hall. It was resolved to take steps to make trial of the electric light for twelve months.

STATUES.

Earl Russell.—The subscription statue of the late Earl Russell has been placed in the Central Hall of the House of Lords. The statue is from the studio of Mr. J. E. Boehm, A.R.A., and stands on a marble pedestal.

Sir Francis Drake.—At a town's meeting held in Plymouth on the 26th ult., for ascertaining the views of the burgesses on the best method of celebrating the tercentenary of Sir Francis Drake, three resolutions were submitted: the first, that the contemplated memorial should take the form of a statue, or group of statues, within the borough; the second, that there should be a statue in connexion with a public museum and art-gallery, together with a science and art school; and the third, that a large and representative committee should be appointed to further consider the details of the proposed commemoration, and to report to a future meeting. The original motion for a group of statues, to take the form of a national memorial, was carried by an overwhelming majority, and a committee was appointed to carry the resolution into effect.

PARKS AND OPEN SPACES FOR THE PEOPLE.

Keswick.—A largely-attended meeting of the inhabitants of Keswick was held the other day in support of a movement for purchasing Fitz Park as a recreation-ground for the town. There appears to be a good prospect of the success of the project, a large proportion of the purchase-money (between 3,000*l.* and 4,000*l.*) having been already promised.

Kingsland.—A public meeting was held last week at Kingsland for the purpose of endeavouring to preserve Kingsland-green as an open space. Mr. John Kolday, who occupied the chair, said that every one knew that London was already very densely populated, and every scrap of ground in its immediate vicinity was bought up at a large value for building purposes. Therefore he thought they were perfectly justified in trying to prevent the only remaining piece of ground in the vicinity of their parish from being covered with buildings. Dr. Aveling then moved:—"That, in the opinion of this meeting, the retention or acquisition of open spaces in our metropolitan suburbs is most desirable on sanitary grounds." In his address he advised the parishioners to purchase the land out and out, and thus preserve it to their children as a recreation ground for ever. Mr. Runtz (of the Metropolitan Board of Works) supported the motion, and advised the parishioners to state their case to the Hackney District Board, who, if they approved of it, would borrow the money necessary from the Metropolitan Board on the usual terms. The resolution was adopted, and the meeting appointed a committee to carry out the business connected with the movement.

London.—The Metropolitan Board of Works give notice of their intention to make application to Parliament in the ensuing session for leave to bring in a Bill to effect the purchase and thus secure to the public the entire use of the Hackney Commons,—comprising London Fields, Hackney Downs, Wells-street-common (commonly called Hackney-common), North Mill-field, South Mill-field, Stoke Newington-common, Clapton-common, and parcels of waste land at or near Dalston-lane and Grove-street,—which form the subject of the scheme with respect to Hackney-commons confirmed by the Metropolitan Commons Supplemental Act, 1872.

HARBOURS.

Bristol Channel.—An influential committee has been formed with a view to urge upon Government the construction of a harbour of refuge for the Bristol Channel at Mumbles Head, near Abernethy. It is stated that over eight million tons of shipping pass up the channel annually, or one-sixth of the whole tonnage of the United Kingdom. The estimated cost of the work is 400,000*l.*, and it is calculated that a toll of ½*d.* per ton annually would provide the capital required.

Fraserburgh.—Preparations are now being made for the deepening of the north and south harbours of Fraserburgh, and the widening of the quays. Mr. Bostock, the resident engineer, left last week for London to confer with the consulting engineer, Mr. Abernethy, and submit a number of plans and proposals for his advice. It is expected that the work will be commenced early in December. The cost of the contemplated improvements will be about 30,000*l.*, which sum has been borrowed from the Public Works Loan Commissioners.

WATERWORKS.

Cromer.—We are glad to learn that the efforts to obtain a supply of good water for Cromer have at length, after many difficulties, been crowned with success. Continuous pumping has now been going on at the works for seven weeks, without being able to reduce the level of the spring; indeed, the difficulty has been to keep down the water in the well by means of the main pumps. So much for the supply. That the quality is equally satisfactory is seen by reference to the analysis which has been made. Many of the houses in the town are already supplied, and owners and occupiers are daily sending in orders for services to be laid on. There will be a meeting of the company soon, when it is hoped the public will cordially respond to the invitation to subscribe. Provision has been made in case of fire, there being more than forty hydrants about the town.

PARLIAMENT-STREET WOOD PAVEMENT.

Sir,—The new pavement in Parliament-street, just completed, cannot have a fair chance of showing the advantages of this form of pavement,—namely, freedom from mud in wet weather and from dust in dry weather,—as, in consequence of the macadam at the Bridge-street end and the Whitehall end, the surface of Parliament-street will be subjected to the mud and dust carried and blown in from these street surfaces. On this day (Nov. 27th) four powerful horses are dragging a huge roller over some tons of broken stone, crushing them into partial powder,—the more readily to become mud and dust. If it were possible, an Act of Parliament ought to forbid the use of broken stone in streets having a quick and heavy traffic, if only on the plea of economy.

Civil Engineer.

SCHOOLS AND INSTITUTES.

Sir,—I think you would do much good to builders and architects, and also to Sunday-schools, if you would point out from time to time the unsuitable buildings in which such schools are held, and suggest improved plans. Another direction in which there is scope for useful work is in Church Institutes. They exist in Leeds, Bradford, Hull, Wakefield, Bolton, and other towns, and we contemplate one in Liverpool.

A.

BAROMETERS.

Sir,—*Apropos* to the Glycerine Barometer of Mr. Jordan, it may interest you to learn that there is an automatic self-registering mercurial barometer at the Birmingham and Midland Institute, in which the ordinary inch of rise and fall is enlarged to 5⅝ in. so that the very slightest movement is accurately recorded on paper.

E. G.

THE USEFUL AND THE BEAUTIFUL.

SIR,—It is very important for the sake of art-progress that the following important position, viz., that the beautiful is not the sole purpose either of nature or of art, should be widely accepted. I have somewhere in my correspondence quoted, from a letter of Sir John Herschel to me, the astronomer's testimony to the same effect, and "G. T." seems, as well as one can gather from his entanglement of notions, to hold the same opinion; for he admits that the elephant is certainly not beautiful, only, he unfortunately adds, "it is better than that, it is noble." Now, the word *noble* can only in the very loosest way be applied to an animal which is apt to treasure and revenge even a slight injury, as one of the species is recorded to have done when it soused the poor Asiatic tailor with muddy water, and precisely as some ignoble humanities resent the prick of a pen. At all events, "G. T." admits that nature has other objects in view than the production of the beautiful. Would he also transfer the epithet "noble" to the rhinoceros, the hippopotamus, and the gorilla? Because if he would, it would show that he will not call a spade a spade, and it is useless to argue with him. The rhinoceros and the hippopotamus, moreover, fulfil "G. T.'s" one simple condition for producing the beautiful,—they have a "good outline," without convincing the man of taste or the general public that they are beautiful. It is because ugliness is possible in nature that art discussions arise, and that æsthetic principles are required for the artist's guidance. There would be no occasion for any further art "gabble," or even for art production, if ugliness were impossible.

"G. T." says "a work often becomes ugly because the foolish designer tries to make it beautiful by adding work to it": he ought to have said "uglier," for his words would then have represented my contention with regard to those bridges of Telford and Stephenson, which were the origin of this discussion; there was no question as to their fitness for their several purposes,—the wail was that they were ugly, that those engineers had increased the number of uglinesses in nature, and that this need not have been so had the designs for the bridges been nursed by some motherly architect, who would have brought them up as good and tasteful bridges ought to have been brought up. The exhortation in my previous letter was, Be content, on occasion, with a little robust ugliness,—a naughty, ugly, engineering work or two,—where perfect fitness has been achieved; for I have already shown in the pages of the *Builder*, in opposition to the modern morbid æstheticism, that the rigorous conformation of the manufacturers to utility is a wiser national aim than the attempt to overlay and sophisticate everything indiscriminately with fine art. It was the former motive which made our wares so celebrated in the marts of the world. The pursuit of fitness is the most solid manufacturing virtue,—a virtue which the greater portion of mankind can appreciate. A production rigorously adapted to its purpose will exhibit either no beauty at all, or as much as properly belongs to it. Whatever else is superadded is *appliqué*,—stuck on,—in deference to the tastes of the morbidly æsthetic few.

In conclusion, Mr. Editor, allow me to say that, had "G. T." turned to his Shakspeare, he would have found his theory,—that there is no ugliness in nature,—refuted by the great master; for does not the philosopher apply the epithets "ugly" and "venomous" to the toad, and make that "ugly remark" with which "G. T.," as yet, is unable to agree?

W. C. T.

"NOISES."

SIR,—In your article in last week's issue on the above subject, you say, "Light falling on selenium leads to a commotion among the particles of the metal, which is alleged to be audible. There is no reason to suppose that other solid substances are proof against similar disturbances." It is, therefore, interesting to ask,—Would ice, being an electric or non-conductor at a temperature of 0°, like sulphur, produce such a result? If so, the discoveries of the learned Professor Bell account for the sound produced by the Aurora upon the "ice packs," described by Arctic explorers as resembling the rustling of silk.

In a work by G. Murray Smith, F.R.G.S., on "Arctic Expeditions," p. 370, he mentions the above as a fact, testified by numerous reliable witnesses, amongst whom are Messrs. Ritch and Dease, formerly of the Hudson's Bay Company, and Admiral Pullen. In the particular instance mentioned, the temperature of the atmosphere was found to be 44°. I might further ask some of your scientific readers, that, admitting the above, would the lowness of the temperature be likely to increase the power of the phenomenon?

C. G. B.

CEMENT *v.* LIME.

SIR,—In Mr. G. R. Redgrave's interesting and enthusiastic paper "On the Use of Cements," printed in your number of the 27th ult., he gives a "statement of approximate cost of mortars" by Mr. Colson, showing results greatly in favour of cement mortars. The price of grey lime is there put at 14s. 6d. per cubic yard Now, our price for the best old Dorking greystone lime is 8s. per cubic yard, and the carriage to London is 1s. 3d., making 9s. 3d., to which about 56 per cent. must be added to bring it up to the approximation. It is true Mr. Colson points out such estimates must be received with caution, because of difference of locality; but surely no better place could be chosen than the great brick city chiefly affected by Mr. Redgrave's argument. In like manner the sand appears to be estimated at too low a figure, 2s. 9d.; that is to say, if a sharp, large-grained sand is meant, such as that found in the well-known pit on this estate, which would cost nearly double the money.

As Mr. Redgrave is firmly convinced that lime as now employed will shortly become obsolete, allow me to add that, without employing agents or travellers, and with simply an advertisement in the *Builder* to remind folks of our existence, the output from these works for 1880 will exceed that of any preceding year.

The season for transformation-scenes is at hand; but the idea of our dear old London exchanging her dingy bricks for monolithic concrete, with the beautiful appearance of stucco, even coloured stucco, does not present itself to my mind as "a joy for ever."

ALFRED BISHOP, Sec.,
Brockham Brick Company.

WHY WORK IS INFERIOR.

SIR,—The admirable article on the plumb-rule and spirit-level, in your issue for Nov. 20 (p. 606), merits the attention of masons, bricklayers, and carpenters. These instruments are the most important used in building construction, and there are many workmen, as you state, in each of the trades named, that do not understand the application of the plumb-rule and spirit-level in the most efficient manner to building-construction. Many, however, who do understand the necessity for their careful application in the construction of buildings, are not allowed by their employers sufficient time to use them so as to obtain accuracy.

In the present state of the building trade, the workman knows that his employer often considers levelling and plumbing mere waste of time, and the man who is most careful in these matters is frequently discharged in preference to an inferior and careless workman who knows neither how to use efficiently either plumb-rule or spirit-level, nor the necessity of their application in keeping his work plumb and level. Many builders' foremen are selected more for their abilities in urging on the workmen than for the purpose of directing them how to do their work in a careful and proper manner; and the workmen under such foremen are well aware that the time they take to do their work is noted in preference to any scamping they may do, or even mistakes they may make, as mistakes are frequently allowed to remain unaltered even in exposed parts, and treated as of little consequence. It would be difficult at present to find many buildings with the brickwork in level courses, the perpends carefully kept, much less true bond, masonry fixed in level courses and evenly bedded, and joinery carefully fixed level and plumb. I may note in addition to this, perhaps, the economy in mortar,—or, rather, what is in many cases called mortar,—and the care taken by the carpenter in the use of nails and screws; but there are other causes that affect this in addition to those already named. The present system of apprenticeship, or what is still worse, no apprenticeship in many cases, especially with bricklayers (who may, by the way, have served some time with the hod), is one. The apprentice is now instructed more with a view to piecework and quantity, than to be a careful and efficient workman,—as were those good and clever workmen in past ages, when men were respected for their skill by the employers whom they served, their abilities generally insuring them constant employment; whereas, at the present time, the workman who can do the most work, in what may be termed a reasonably scamping manner, is the most successful with many of the builders of the present time.

But probably the greatest evil of all is that of the owners of property and others who greatly encourage the entire system of constructing buildings in an inferior manner by their preference for the lowest tender, instead of giving a reasonable price to an honest and established builder or building firm that would employ efficient workmen of all trades under skilled foremen, and use sound materials throughout the structure that would be a credit to all concerned, and a gratification to the architect in seeing his plans carried out in a proper and efficient manner, and with the certainty that his client or clients would not, from the commencement of the occupation of the premises, be put to endless cost for repairs, or more serious consequences, as illness from defective drains, &c. The reader may picture the architect and his clerk of works in their efforts to maintain their credit in the construction of an important building with all this arrayed against them, and often in a most determined manner.

A CLERK OF WORKS.

HOW WE MAKE CONCRETE IN WESTMINSTER.

SIR,—Parliament-street is to have its wood pavement. The Institution of Civil Engineers is round the corner. The Whitehall Club is in the centre of it. Engineers abound in the neighbourhood, and look out of the club windows, presumably to see that the work in progress is being carried out satisfactorily, and in due accord with the most approved practice and theory. At the end of the last session we had at the Institution of Civil Engineers papers read to us and discussed before us relating to the most advanced means of using Portland cement, and in making concrete. Oh! architects, surveyors, contractors, everybody but engineers, come to Parliament-street, and see how we, the engineers, carry out in practice what we teach in our Institution.

Some short time back Parliament-street was "up" for repairs to gas or water mains. The trench was duly filled up, and the traffic again for a short time went along Parliament-street. Then in comes the contractor to lay the "improved" wood paving; and his mode of proceeding, so far as can be ascertained by a casual observer, is as follows:—the trench over the gas or water main is again opened, and the macadam of the whole street picked up to a depth of about 18 in. The trench is then filled up with a remarkably well-made concrete, composed of Thames ballast and Portland cement, in the proportions of about five or six to one. Let us hope that, in justice, the contractor, who may have, at some future day, to get at these pipes, will be informed of the material which covers them. Dynamite at least will be required to get through that 3 ft. of concrete.

The trench having been filled up, the ground is levelled and prepared to receive the concrete foundations for the wood paving. The concrete is composed of the old macadam mixed with a small quantity of Portland cement. So far as could be seen, it seemed about a yard of macadam to about a bushel of cement. The two were mixed together on a wooden platform, and several canfuls of generally extremely dirty water poured over it; it was then stirred up again, put into barrows and wheeled into position, and knocked down with the back of a spade to about 1½ in. thick, and as near level as the rough nature of the compound would allow.

It may fairly be expected that in the course of time this mass of dirt and granite will be about as hard, or somewhat less so, than the macadam that previously formed the roadway.

The surface of this concrete not being, presumably, sufficiently level to lay the wood upon, about half an inch of cement and sand is, after a few days, gauged up and laid over the whole surface; this is carefully cambered off to the desired curve, and the wooden blocks are laid thereon.

It may fairly be expected that, in the course (say) of a few months, this veneer of sand and cement will have returned to the granular condition in which it was only a few days back. Whether or no in that condition it will support the roadway level I am unable to say, not being a road contractor; but I sincerely trust, for the sake of the ratepayers, that there is a maintenance clause in the contract.

WESTMINSTER.

BARRACKS.

SIR,—Kindly allow me space to say, with reference to Major Seddon's letter in your impression of Saturday last,—

1st. That I was most careful to disclaim, explicitly, any personal connexion with the subject of my paper.

2nd. That I was equally careful to give the whole credit of the designs, &c., to Major Seddon and his assistants.

The "Transactions," when published, will give the paper in full, and show how clearly the above points were brought out. Meanwhile, I am not responsible for the incomplete newspaper reports of which Major Seddon, not unreasonably complains.

E. INGRESS BELL.

*** Why should Major Seddon, or any one else, complain? The reports were simply abstracts of the paper, referring to the more useful points of the discourse.

FRENCH BARRACKS.

Sir,—In reference to the subject of the improved construction of barracks, recommended by Mr. Bell at the meeting of the Royal Institute of British Architects, I should suggest that a visit might be paid next to the model barracks lately erected by the French Government for their forces. They are well worthy of an inspection by the sanitarian, architect, and military officer, as they are intended to embody in their plan and construction all necessities required by modern science. After seeing some of them, particularly at Tours, I described their character to a meeting of the Medico-Chirurgical Society of Edinburgh in the winter of last year. Some of the salient aspects of their design seem to point to economy of construction as to material and expense; the avoidance of complicated machinery in ventilation, drainage, warming, and sewerage, is also very apparent to the visitor. The canteens, kitchens, latrines and urinals, stabling, storerooms, and artificers' and artisans' shops, are all placed round the outside walls. The blocks for men's barracks are placed in the middle of the square enclosed by them, and are of four stories in height, comprising the regimental offices in the lower one, the effective men's rooms in the two middle ones, and the casualties in the topmost story. There are complete guard-rooms, cells, and prison, only a casualty hospital; but the real novelty of the whole plan is that of the transport regimental department, comprising stabling, forage, and harness rooms, and wagon-sheds.

W. V. Black.

LONDON FOR AMERICANS.

At the inaugural meeting of the Topographical Society of London, already mentioned by us, Mr. Henry Stevens (of Vermont), F.S.A., in proposing a vote of thanks to the chairman, said,—As an American, and he feared he was the only one there, he wanted to pat this young Society on the shoulder, and say in American language, "Go ahead." Americans were anxiously looking to Londoners to turn up the early history of America; for their ancestors all migrated from England, and a great many from London. There were movements now going on for the purpose of discovering American memorials in London. For instance, they are erecting a monument to Sir Walter Raleigh, the founder of Virginia. They also wished to restore a monument in a neighbouring church to Captain John Smith, the author of the "History of Virginia." But, perhaps, one of the most interesting monuments in London for an American was the Bank of England; for in a little garden in the centre was buried Thomas Hariot, the tutor and friend of Sir Walter Raleigh,—a man appointed by Raleigh and also by Queen Elizabeth to go out to Virginia in the first expedition under Sir Richard Grenville, his report being made in 1588. He was one of the most celebrated of England's mathematicians of any period. He was consulted by all scholars; he was a frequent correspondent of Kepler; and was, perhaps, the inventor of the telescope,—at any rate, he brought out a telescope in London in the same month that Galileo did in Italy, and it was now a disputed point whether he was not the real inventor. He was buried in 1621, in a church close by, and a monument to his memory was placed there by his great friend and patron, the Duke of Northumberland. In 1832 that church was wanted for the Bank of England. The little churchyard, however, was not destroyed, but built round, and now that little garden was the only memorial they had of this great man. Here it was proposed to re-erect the original monument, or something of the kind. There were hundreds of other spots in London which were interesting to Americans far more than they could be to Londoners, and he had no doubt that this Society would receive much encouragement from America.

A Hardening Liquid.—Correspondents say that Dr. Gehring, at Landshut, in Bavaria, by means of an enamelling liquid, renders any species of stone or cement harder than granite, and gives it the absolute appearance of any other mineral that may be desired. The process, the writer goes on to say, admits of being applied to metal, which is completely protected from rust.

THE MAYOR OF LOUTH, LINCOLNSHIRE.

We might well have added to the notice on p. 651 of our last number that the architect of St. Swithin's Church, Lincoln, of which we then gave an illustration, — Mr. James Fowler, F.R.I.B.A.,—is now, for the third time within seven years, mayor of his town. All our readers know that the talents and tact of the student whose name was appended to many good drawings in Bowman & Crowther's "Churches of the Middle Ages" years ago, have won for him a general recognition; and will not regret to know also that he is evidently not without honour in his own country.

SEWERAGE AND DRAINAGE WORKS.

Newbury.—A ratepayer of Newbury having made complaint to the Local Government Board that the Urban Sanitary Authority here had made default in providing the borough with sufficient sewers, Mr. J. T. Harrison, one of the inspectors of the Board, held an inquiry into the subject on the 16th ult. On behalf of the complainant, it was stated that there had been a great deal of sickness, including malarious fever, in the town, which contains some 12,000 inhabitants; that the drains empty themselves into the Kennet and Avon Canal,—which is half canal, half river, and a very sluggish stream; and that some of the sewers (particularly one in Gas House-lane) were on a dead level, and were consequently nothing but elongated cesspools. It appears that three years ago the subject engaged the attention of the local authority, and at that time plans for the proper drainage of the borough were prepared by Mr. James Lemon, C.E., but nothing has yet been done towards carrying them into effect. The evidence given by Mr. Benjamin Sargent, borough surveyor, was to a great extent corroborative of the statements made on behalf of the complainant, while Dr. Woodforde, the medical officer of health, gave evidence not only as to the defective condition of the drainage of the borough, but as to the bad quality of the water. Alderman Adey deposed to the steps which the Council had recently taken in reference to the drainage question. The committee, who had visited various towns, had recommended the sodium process as adopted at Taunton. The system was one of filtration in tanks. The committee were in favour of a modification of the system in force at Aylesbury and Taunton. The process was to filter the sewage, which ultimately went into the river. The Inspector said that was a system which the Local Government Board would not sanction. The Board would be very much to blame if they allowed the sewage water to flow into the river, unless thoroughly purified, as it would become the drinking-water for other places, including Reading. Ultimately the local authority undertook to submit to the Local Government Board, by Lady Day next, a modified scheme for the treatment and disposal of the sewage, and the inquiry terminated.——At a meeting of the Urban Sanitary Authority on the 25th ult. it was resolved to offer a premium of 100*l.* for the best plan for the drainage of the borough, and 50*l.* to the engineer sending in the second best plan.

Lichfield.—Mr. Taylor, an inspector of the Local Government Board, has held an inquiry at Lichfield with regard to an application by the Town Council for sanction to borrow an additional 8,000*l.* for the carrying out of the sewerage works. The city treasurer submitted a financial statement, which showed that the total amount already borrowed for sewerage purposes amounted to 21,125*l.* 13s. 10d., out of which 18,999*l.* 1s. 5d. had been expended, leaving a balance of 2,126*l.* 12s. 5d. The surveyor gave an estimate showing the items embraced in the additional 8,000*l.*, among them being 3,200*l.* for the purchase of the reversion of the sewage farm from the Ecclesiastical Commissioners; balance due to contractors, 2,000*l.*; extra work and sewage-pipes, 2,750*l.*; surveyor and clerk of the works, 800*l.*; probabilities, 1,376*l.* The estimated total cost of the sewerage works was 29,000*l.*

Lincoln.—Public attention in Lincoln has on several occasions been called to a nuisance existing on what was at one time a favourite suburban walk—the Monks'-road. This nuisance has resulted from the drainage of the County Hospital being allowed to run down Clay-lane and so into the dyke on the north side of the road in question. The effluvia from this dyke has been so noxious, especially in dull and rainy weather, as to virtually close the road to all but those whose business compelled them to use it. Complaints thereof having reached the Hon. W. F. B. Massey-Mainwaring, owner of the land in the immediate neighbourhood, that gentleman requested the engineer (Mr. S. K. Page) of the Native Guano Company, who deal with the Aylesbury sewage by what is known as the "A B C" process, to visit Lincoln for the purpose of demonstrating by a series of actual experiments how easy it would be to successfully deal with the nuisance. Temporary tanks were erected in a field on the east side of Clay-lane, and here for some days the experiments have been carried out, with (according to the *Lincolnshire Chronicle*) perfect success.

PROPOSED SANITARY WORKS.

Workington.—The Workington Local Board has applied to the Local Government Board for permission to spend 3,000*l.* for works of water supply; 300*l.* for sewerage works, and 3,000*l.* for works of water supply outside the Board's district.

Cockermouth.—Captain R. C. T. Hildyard, late of the Royal Engineers, and an inspector of the Local Government Board, has held an inquiry here as to the application of the Cockermouth Local Board for permission to borrow 1,500*l.* for works of sewerage, water supply, &c. The area of the Local Board's district is 2,424 acres, and the population in 1871 was 5,115. The works are to be carried out from plans by Mr. Pickering, the engineer to the Board; 800*l.* of the proposed expenditure is to be spent in flagging the footpaths of some of the streets with white Lazonby stone.

CHURCH-BUILDING NEWS.

Broad Hinton.—The parish church of St. Peter, Broad Hinton, has just been reopened, after restoration, which has consisted principally in rebuilding the chancel and east walls of the nave, with the addition of an organ-chamber, the erection of a new chancel arch, and removal of the old one to the organ-chamber, and the repair and strengthening of the tower. In connexion with this latter work, it may be mentioned that the pier of the tall and handsome tower arch was found to be bulging inwards to the extent of 9 in. from the perpendicular, about 10 ft. from the floor, and rapidly giving way. The tower was shored up with timber under the direction of the architect, Mr. Ponting, the base removed, concrete laid on the solid rock, and new foundations built 4 ft. 9 in. below the surface. Scaffolding still remains on the exterior of the tower, the casing being now under repair, and new pinnacles are being provided. The reredos is of Beer stone, with a cross of alabaster, filled in with tiling of a mosaic character. The re-table is of red Mansfield stone. The chancel steps and pavement are newly laid with Minton's tiles. The east window, by Clayton & Bell, has been enlarged by the addition of a copy of Leonardo da Vinci's "Last Supper." Two north windows in the chancel, and the east window of the organ-chamber, are by Mr. Alexander Gibbs, two of these,—that of St. John the Baptist and St. Cecilia,—having been erected to the memory of the present clerk's father (a former parish clerk) at the expense of Mr. Wm. Eatwell, of London. The dole window is filled with stained glass by Hardman & Co., Birmingham, the subject being St. Nicholas, from a picture by Botticelli. The cost of the works is estimated at about 2,000*l.* The builder is Mr. Barrett, of Swindon.

Tedworth.—The new church at Tedworth, near Marlborough, Wilts, erected at the sole cost of Sir John Kelk, to take the place of the old parish church at South Tedworth, was consecrated on the 9th ult. The plans were prepared by the late Mr. J. Johnson, architect, of London, who died before the work was commenced; but Mr. Gordon, son of the Hon. and Rev. Canon Gordon, of Salisbury, has taken up the work, and carried it to completion. The exterior walls of the church are built of Bargate rag, with Bath stone dressings. The high-pitched roof is covered with bands of plain and ornamental tiles. This is surmounted by a spire, 120 ft. in height, built entirely of Bath stone on the pier of the west end, between the two west windows, gabled out by means of arches into a circular turret. The old burial-ground is retained around the old parish church, which

will henceforth he nsed as a mortuary-chapel, and consequently there was no consecration or provision made for funernls in the churchyard. The spire hears within it,—ia an open turret rendering them visible from helow,—six hemispherical hells. The east window (a three-light one) is filled with stained glass, hy Messrs. Heaton, Butler, & Bayne. The centre light depicts the Crncifixion, the figures heing nearly life-size. The reredos has heen sculptured hy Messrs. Farmer & Brindley, and represents the Road to Calvary. The sacrnrium is paved with marble mosaic, hy Messrs. Burke. The chancel is similarly paved. The oak stalls and reading-desk are of varnished oak, ornamented hy carved poppy-heads. The chancel ceiling is moulded, panelled, nnd decorated hy Messrs. Heaton & Butler. On the north side of the chancel is the organ-chamher; on the south side is Sir John Kelk's chapel. Both of these are divided from the aisles hy carved oak trncery screens, and separated from the chancel hy carved tracery screens of stone, with Devonshire marhle columns with carved capitals. The whole of the interior is huilt with Caen stone ashlar. The cost has heen 12,000*l*. Messrs. Dove, Bros., were the hnilders, and Mr. Hamlin acted as clerk of the works.

Wingfield.—The parish church of Wingfield, nesr Harleston, Suffolk, was re-opened on the 16th nlt., after restoration. The church contains three fine altar-tombs, one of them heing that of Michael de la Pole, second Earl of Suffolk. Another is that of John de la Pole, second Dnke of Suffolk. The third tomb, hitherto believed in the locality to he that of William de la Pole, fourth Earl and first Duke of Suffolk, is believed hy Mr. Phipson and other nrchæologists to be that of Sir John Wingfield. Some twelve or fourteen years since the chancel was restored hy the Ecclesiastical Commissioners, and at that time the roofs of the nnve nnd of the north aisle were also restored hy suhscription, hut when the present vicar, the Rev. W. Salter Price, hecame incumhent in 1877, he found much which needed to he done to put the church in good order. The south aisle roof was rotten and nnsafe, and the hrick floors were green from damp and age. With the generous help of Lord Waveney, who is now the owner of Wingfield Castle, nnd other liheral contributors, a fnnd was raised to defray the cost of restoration, and the roof of the south aisle was completely renewed and re-leaded, and this part of the church heing first done, it was boarded off, and service has heen held in the south aisle and chancel for some time past. The whole of the walls throughout the church have been re-plastered, and the stonework in the piers and arches of the nave has heen repaired and renewed where necessary. The unsightly old pews were removed, and the floor having heen raised 3 in., the nave and aisles have heen fitted with oak henches, the heads of the henches in the nave heing elegantly carved. The old pulpit, which had heen made up of part of the woodwork of the old rood-screen, though the carving has heen hidden hehind a profuse coat of paint, has heen remodelled. The old carved tracery of the panels has heen retained, and other panels in corresponding style supplied. The removal of the west gallery hns opened np the tower arch. The total cost of the work was 1,078*l*. The work has heen undertaken, nnder the direction of Mr. R. M. Phipson aa architect, solely hy Mr. G. Grimwood, of Weyhread, and the carving and other such work has heen entirely done hy Suffolk craftsmen.

Stow-cum-Quy.—On Sunday, the 22nd ult., the old parish church of Stow-cum-Quy, near Cambridge, waa re-opened, after complete restoration, under the direction of Mr. William White, F.S.A. The following legend, inscribed on a hand of stone in the north aisle, tells its own story as to the work, which has been carried out in a simple hnt thoroughly substantial manner:—

"This stone was placed as a record of the restoration of the parish church in the month of November in the year of our Lord God, 1880, and in memory of Clement Francis, of the town of Cambridge and of Quy Hall, in this county, by whom the good work was originated, and, with the willing help of others, was carried on. It had been in his heart to rebuild this House of God as a thank-offering for many blessings received during the course of a prosperous life. He died March 7th, 1880, aged 64, not having been permitted to see the full accomplishment of his desire, which was happily completed by Sarah Francis who for thirty and two years had been his loving and devoted wife."

The roof was found to he in an almost dangerous state; the ends of all the main timhers heing completely rotten. These have been pieced without removal. If once removed their replacement would have heen impossihle. The whole of the fittings are of oak. A few repairs were done many years ago by the now aged rector, who has held the living fifty-five years, non-resident, there heing no parsonage-house. The chancel has been thoroughly restored, with a grant in aid from the Ecclesiastical Commissioners. Some interesting arches carried on angels have heen opened out in the two side walls, — one containing a window, another forming n recess in which are remains of decorative colouring. A few remains of decorative colour nave been discovered also on the walls of the nave. These have been preserved, though not sufficiently clear to he deciphered. The upper stage of the tower also has been rehuilt in stone and flint. This had been removed some eighty years ago and replaced with timher framing, filled in with brick and a sham parapet. Some rather interesting parapets of brick, often found in the eastern counties, were necessarily removed from the clearstory, and could not he replaced.

STAINED GLASS.

Hurstmonceaux, Sussex. — The old parish church here has just had placed in it a three-light stained-glass window, the gift of Mrs. Hooper Greenaway, the subject running through the three openings heing "Christ the Comforter." A brass plate nnderneath the window records the gift, which is a memorial to the widowed lady's children. The artists are Messrs. Gihhs & Howard, of London; who have also in hand n memorial window to the late Lieut. Hamilton, who fell at Cahul last year, in defence of the Residency, under Major Cavagnari.

East Garston.—The east window here has been filled with stained glass. The church heing dedicated to All Saints, the most suitable suhject was thought to he, "Our Lord in Glory welcoming the Saints into Heaven." After much thought it was decided to place the chosen subject in the hands of Messrs. Lavers, Barraud, & Westlake, who hnve carried it ont in a very satisfactory mnnner. It includes a large numher of figures. Along the hase of the window is the inscription, "To the honour of God and in memory of All the Saints this window is dedicated by Martha Gray (horn Palmer), aged 91."

PROVINCIAL NEWS.

Huddersfield.—On the 17th nlt., Mr. Joseph Orossland, J.P., the president of the Hudders-field Banking Company, laid the foundation-stone of some new hank premises at the corner of Cloth Hall-street and New-street, Hudders-field. The intended building will he about 85 ft. long hy 47 ft. wide, covering a superficial area of about 440 square yards; it will have three fronts,—to New-street, Cloth Hall-street, and Chancery-lane. The first and second floors of the huilding will he arranged for suites of offices, with strong-rooms, &c., and will hnve access from a wide stone staircase opening into Cloth Hall-street. The contracts entered into up to the present time amount to ahout 17,000*l*. Messrs. Ratcliffe & Sons are the masons employed; Mr. James Christie, the carpenter; Messrs. Goodwin & Sons, slaters; Mr. Geo. Garton, plumher; Messrs. G. & F. Scholfield, smiths; Mr. W. E. Jowett, plasterer; Mr. S. Kendal, painter; and Messrs. Thornton, hot-water engineers, all of Huddersfield. The fire-proofing will be done hy Messrs. Dennett & Co., of Nottingham and London; the strong-room hy Messrs. Taylor & Sons, of Marsden; and the carving hy Mr. Harry Hems, of Exeter. The huilding is heing erected from the designs and under the superintendence of Mr. Edward Hughes, of Huddersfield.

Warrington.—On the 13th nlt. Lord Winmarleigh opened the extensive new offices and works which have just heen erected for the *Warrington Guardian*. The new huildinga are in the most central part of Warrington, adjoining the Post Office, and in front of the Town Hall. They measure externally close upon 200 ft. in length, and 100 ft. in width, are divided into three hays, and are lighted hy windows in the sides, gables, lantern windows, and skylights. A feature in the huilding is the nse of glazed white bricks in the inside, interspersed with diapers of hlue, and cornices of red, which give the whole huilding a hright character. The vitrified surfaces of the walls will render cleanliness permanent, and make whitewashing unnecessary. Sixteen iron columns support the roof, and divide what may he called the nave from the side aisles. Along the timbers supporting the roof of the nave, which is considerahly higher than the roofs of the aisles, the history of the *Guardian* from its commencement is given in gold old English letters, forming a striking ornamental frieze, divided into sections hy the county and city shields of the places or persons named. The huildings have heen erected for Messrs. Mackie, Brewtnall & Co. (limited), hy Messrs. John Collin & Son, huilders, from plans hy Mr. Thomas Beesley, architect, Warrington, nnd form what is no doubt one of the most complete provincial newspaper offices in existence.

Salford.—The Salford District Town-hall and Markets Committee, in a report just made to the Corporation, state that the contemplated extension of the Town-hall on the west side, for the purpose of affording more cell and other accommodation for the police department, is to he commenced forthwith, a contract having heen entered into for the work. This extension, when completed, will exhanst the whole of the available space afforded hy the present Town-hall site.

Teignmouth.—The Teignmouth Local Board having proposed to expend 6,000*l*. in erecting a market and Board offices, on the 26th nlt. Mr. Smith, inspector of the Local Government Board, held an inquiry, when it was stated that the unsuitahility of the present market had caused a decline of husiness, hut the tolls would pay the cost of a new market. Opposition was made to the scheme on the ground that the town was already 27,000*l*. in debt, and that the rates amounted to 5*s*. in the pound, hesides which there were water and sewage schemes on foot, which would cost ahout 12,000*l*. In reply it was stated that the Board rates were only half the sum mentioned, and in proof of the necessity for new offices it was pointed out that the snrveyor's office wns in a hay-loft, hut as this was over a placeloccnpied hy mnnnre-wagons, the chairman of the Board had declined to meet the snrveyor there, and as a compromise they met to discharge the Board's husiness in a disused mortnary (!)

Dorchester.—It is intended to proceed at once with the erection of a museum and library, also a school of art and accessory huildings, for Dorsetshire. About 3,000*l*. have heen suhscribed. Mr. G. R. Crickmay, of Weymouth, is the architect, and the tenders for the work are to he sent in hy the 20th of this month!

Kidderminster.—The Government have decided to erect a new General Post-office here, hnt local opinion is not unanimous as to the hest site. One party is in favour of retaining the present site in Church-street, while another seeks to remove it to Exchange-street. Deputations representing hoth sets of people have waited on Mr. Fawcett, the Postmaster-General, who has deferred his decision.

SCHOOL-BOARD SCHOOLS.

London.—On the 3rd of March last, the London Board accepted the tender of Messrs. Sheffield & Prehble, amounting to 9,873*l*., with the addition of 500*l*. for provisions, for the erection of a school for 1,200 children on the site in Farrance-street, Limehouse (Tower Hamlets). The contractors have since become hankrupt, and the Board accordingly invited fresh tenders for the completion of the school, and have accepted the lowest tender, that of Messrs. Hook & Oldrey, of Cowley Whnrf, Kensal-road, W., amounting to 8,534*l*., with the nddition of 500*l*. for provisions. As a snm of 1,600*l*. has heen paid to the original contractors for work already done, the total cost of the school will thns amount to 10,634*l*. The accommodation as recognised hy the Department is for 1,188 children. Cost of site (area 16,100 square feet), 6,602*l*. 19*s*. 2*d*. Total cost per head (inclusive of 1,600*l*. already paid), 8*l*. 19*s*. On the 12th of May last the Board instructed the Works Committee to hring np a scheme for the provision of a swimming-hath for the use of the hoya on hoard the training ship *Shaftesbury*, and to propose a tender for acceptance. The committee accordingly ohtained tenders for a hath 125 ft. long hy 45 ft. wide; hut as the lowest tender amounted to 1,047*l*., various alterations were made in the plans with a view to reduce the cost, and fresh tenders were then ohtained. As these tenders were still somewhat higher than had heen anticipated, the committee ohtained estimates of the saving which would he effected hy reducing

For the erection of Board schools, in three departments, for 1,000 children, situate in Cannon-street, Hanley, for the Hanley School Board. Mr. W. A. Keates, architect. Quantities supplied:—

Bennett, Rugby	£8,500	0	0
Gibson, Burslem	7,575	0	0
Tracey, Stafford	6,936	0	0
Inskip, Longton	6,793	0	0
Bentley	6,580	0	0
Cook, Burslem	6,330	0	0
Grosvenor, Tunstall	6,095	0	0
Gallimore, Newcastle	5,995	0	0
Barlow, Stoke	5,990	0	0
Ellis,* Hanley	5,799	0	0

* Accepted subject to certain reductions.

For alterations and bar fittings at the Blue Anchor, 67, Whitechapel-road, for Messrs. A. & J. Billinghurst. Mr. C. A. Legg, architect. Quantities by Mr. W. Hawker:—

Gill	£584	0	0
F. & F. J. Wood	553	0	0
Whyard	507	0	0
Aney	495	0	0
Walker	489	10	0
Parrish (accepted)	459	0	0

For additions to Ashton Gate Board Schools, Bristol, for the Bristol School Board. Mr. Stuart Colman, architect:—

Bennett	£632	14	0
Hodges	598	7	0
Pugsley	596	0	0
Hayes	590	5	0
Wilkins & Sons	590	0	0
Bastow	589	0	0
Searle & Son	589	0	0
Humphreys	559	0	0
Cowlin & Son	547	0	0
Veals	543	0	0
Crocker	541	10	0
Veals	529	0	0
Church	529	0	0
Crick	525	0	0
Banner	520	0	0
Lewis & Edbrook	514	0	0
Beaven	508	0	0
Coslea	498	0	0
Hatherley (accepted)	497	0	0

For farm-house to be built at Oghourne, Wilts, for Mr J. A. Buckeridge:—

Wiltshire, Swindon	£337	0	0
Hoskings, Hungerford	330	0	0
Elliott, Newbury	330	0	0
Gale, Ogbourne	325	12	0
Benner, Highworth (accepted)	238	10	0

For a Congregational church, Turnham Green. Mr. T. L. Banks, architect. Quantities by Mr. J. Sargeant:—

	Church.		Removal of Old Building.
Patman & Fotheringham	£3,963	.....	£120
Nye	3,790	.....	94
Sharpe & Mills	3,635	.....	100
Morter	3,585	.....	125
Colls & Son	3,549	.....	140
Adamson	3,436	.....	127
Toms	3,435	.....	75
Bransden	3,081	.....	72

For a residence at Streatham Hill, for Mr. T. L. Corbett. Mr. T. Lewis Banks, architect. Quantities by Mr. J. Sargeant:—

	House.		Fernery.
Morter	£4,136	.....	£99
Sharpe & Mills	4,115	.....	114
Toms	3,970	.....	105
McLachlan & Sons	3,784	.....	100
Patman & Fotheringham	3,783	.....	98
Downs	3,679	.....	78

For alterations at the Clarence, West Kensington, for Mr. Manley. Mr. H. J. Newton, architect:—

Minchin	£307	0	0
Taylor	227	0	0
Lanhle	220	0	0
Godden	210	0	0
Wagner	195	0	0
For New Counter.			
Warne	167	0	0
Skinner (too late)	166	10	0
Heath	163	0	0

For the erection of back addition to Leyden House, Christchurch-road, Streatham, for Mr. Edward Homersham. Mr. A. Johnson, architect:—

Knight & Richardson*, Sydenham	£130	0	0

*Accepted.

For erecting two new class-rooms at St. Gabriel's Schools, Easton, Bristol. Messrs. J. W. Trew & Sons, architects. Quantities by Mr. W. Munro, Bristol:—

Stock	£425	8	8
Dubin	402	10	0
Pugsley	398	0	0
Pitt	390	0	0
Forse & Ashley	384	16	0
Kidner	384	10	0
James	383	0	0
Summerville	380	0	0
Crick	376	0	0
Banner	360	0	0
Veals	349	0	0
Cowlin	348	10	0
Hill	345	0	0
Humphries	345	0	0
Davis	343	0	0
Hatherley	343	0	0
Saise & Son	342	10	0
Church	339	0	0
Williams	337	0	0
Williams & Prosser (too late)	329	0	0
Hodges (accepted)	324	18	0

For alterations and additions to Cox & Semadeni's Patisserie Suisse, High-street, Southampton. Mr. A. Martin, architect:—

Howland (accepted)	£183	10	0

For laying main drains, and making embankments on their sewage farm at Flixton, for the Barton Rural Sanitary Authority. Mr. J. Price, engineer. Quantities supplied by the engineer:—

Worthington, Manchester	£459	0	0
Jackson, Walkden	260	0	0
Marsland, Broughton, Manchester	251	17	8
Rayner, Bootle, Liverpool	213	14	0
Claridge, Shaw Heath, Stockport	212	14	2
Harrison, Salford	187	16	9
Turner & Sons, Warrington (accepd)	183	3	6

TO CORRESPONDENTS.

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ILLUSTRATIONS.

Eaton Hall, Chester (double-page Engraving).—Mr. Alfred Waterhouse, A.R.A., Architect.
Double-page Plan of Ground-floor of Eaton Hall, Chester.

CONTENTS.

Warming and Ventilation.

*By a French Author.**

THE chapter in M. Planat's work which deals with hot-water heating at low pressure does not call for any special remark, except in regard to the "Chauffage Mixte," contrived by M. Grouville, and used at present only in one or two large hospitals in France. This is an arrangement whereby each floor or each set of rooms has a separate system of hot-water circulation from its own reservoir, but the whole of the hot-water reservoirs are heated by steam-pipes from one general boiler in the basement, which form a coil in each reservoir. The capability of steam to carry its heat for a considerable distance in pipes is thus utilised to bring a centre of heat to each floor, while the whole can be worked from one fire with the best economy of labour and fuel. The service of baths, &c., with hot-water, is fully illustrated. In the chapter treating of hot-water heating at high pressure, M. Gandillot's method of combining warming with ventilation in large apartments is worth mention. He forms the pipes into a coil at each corner of the room, in a chamber which draws in air from the exterior and passes it, warmed, up the centre of the coil into the room; around this chamber is an outer one, the space between the inner and outer coverings, which of course is more or less warm, communicating with openings in the floor or wainscot through which an *extract* current is formed. Thus the heat of the same coil of pipes is made both to draw in and warm fresh air and extract vitiated air. The contrivance is admirably compact and useful, if it really acts as theoretically intended. Unfortunately, that "if" is always suggesting itself in these matters. Warming by gas receives separate consideration, but we do not find any allusion to a method of applying gas where a gentle heat is required, just sufficient to take the chill off the temperature of an apartment, of which we certainly think something might be made,—that is, to employ gas in very small jets and with slow combustion to impart heat to fire-clay or terra-cotta. This use of gas was suggested a good while ago by a correspondent in our columns, and an instance of its employment cited. We have never ourselves witnessed any experiment with it. It has the advantage, or should have, of using the heat of gas in such a way as to produce the minimum of noxious result from combustion, at the expense, of course, of requiring a little time for the collection of heat in the fire-clay, and thus losing part of the special convenience of gas-warming,—its capability of instant application.

In concluding this part of the subject, M. Planat compares and sums up the advantages of various methods of warming. These must be regarded from various points of view: economy of construction and maintenance; power of assisting ventilation; uniformity of temperature when that is required; and power to change or regulate it easily according to circumstances. The most elementary form of warming is where the products of combustion, as in gas and fires, are merely turned out into the air of the apartment which is to be warmed. Gas has the great advantage of being instantaneously applied or cut off, and this is the one advantage it has; which operates largely, however, under certain circumstances. Open fireplaces are the least economical and the most feeble in result in comparison with the material consumed, of any; yet it may be said that there is no way of warming a room so agreeable, or more convenient, when it is a matter of consequence that each room should have its own independent source of warmth. And this independence is regarded as of much importance in Europe, though the author notes that in America there is an increasing favour shown towards schemes for general heating of a whole house, or even a group of houses. With all that can be said against the open fire, we do not believe any means of warming will ever be so agreeable or so generally liked. The open fire is like the chimney-pot hat; every one abuses it and yet no one likes to part with it. The open fireplace has also the advantage of furnishing a strong ventilating current, which, however, is very unequal unless the fire is constantly attended to and kept at about the same point, and is sometimes even an inconvenience in producing draughts, which draughts, from the position of the fireplace, usually pass along the floor exactly where one wishes it to be warm (an inconvenience we are practically experiencing at the moment of writing this with the back to an open fire), while the really warm air of the room is all at the top. In fact, there is no doubt the open fire is an uncivilised relic of barbarous and pre-scientific times; but, like some other relics of barbarism, it is undeniably picturesque.

Stoves, the author considers, are, when furnished with no special supply of ventilation, very economical and very unhealthy. Their special economy being to burn slowly, they, on that very account, do little to make a ventilation, as a fire does, and should always have a special "*prise d'air*" provided. We do not even agree with M. Planat in saying that it is only in very large public halls that stoves without a special air-supply should be tolerated. However large a public hall may be when full of people, it requires special air-supply as much as, or more than, any other kind of building, and every means possible for keeping the air in a state of flow should be provided. Let any one who doubts this go and sit, for instance, in the balcony at St. James's Hall on a full "Monday Popular" night, and experience the kind of atmosphere in which we are condemned to sit on such occasions in what passes for a first-class hall of entertainment.

In the case of an open fire, the air drawn into the room passes out naturally through the chimney; in the case of a stove with an "*appel d'air*," it either finds its way out through the interstices of the windows and door, through which it would be drawn inward by the open fire, or it escapes by apertures purposely made. The flow of air is thus the reverse way to what it is in an open fire. The air in the room is thus in a state of slight compression,—a state which in itself puts a limit to the inflow of air drawn by the stove, which thus is very inferior, as a self-acting ventilator, to the open fire. Complete ventilation in such a case can only be regarded as secure by the help of some means of artificially promoting the extraction of air, which is not always to be easily or economically managed.

M. Planat is decidedly adverse to the plan of warming our apartments through floor openings; the column of heated air entering vertically, ascends, he suggests, to the ceiling without mixing nearly so much with the air of the room as when the heated air is discharged from the sides and at some little height from the floor; and another practical objection is that an opening in the floor receives a great deal of dust, especially when the room is swept, which is then dislodged and sent up into the room when the current of warm air is in full operation.

Heating by steam M. Planat strongly recommends for heating operations on a large scale, as being capable of conveying its heat a long distance without sensible loss; owing to this latter quality, it can be worked from a furnace outside the walls of the building, and thus removes almost all possibility of danger from fire, and is therefore peculiarly valuable as a means of heating museums, or buildings where important documents are stored. The steam system, on a large scale, however, is liable to be inconveniently complicated in working, and requires a good deal of attention. It has the important advantage over stoves and *calorifères* that it never becomes so heated as to render the air unwholesome. Nearly all that can be said in favour of steam can be repeated in favour of hot-water heating, with the addition that it is more easily manageable when in operation. In regard to the expense of working steam and hot-water heating some observations were made by General Morin and others, the result of which was that the two systems were in that respect pretty nearly balanced. Warming by gas, as before suggested, can only be advantageous under very special circumstances; when there is but a very small space to be warmed, and

* See p. 663, *ante*.

when the warmth is required only at varying and intermittent periods; under any other circumstances gas is one of the least economical or agreeable methods of warming.

There remains, however, the "mixed system," which, as appears from M. Planat's observations, is only of very recent introduction in France, and which he believes has not been introduced in this country as yet. Our author sums up so decidedly in its favour as a system for warming large buildings that it is worth while to quote his remarks:—

"In this combination of steam, water, and hot air, it has been attempted to combine the advantages of all the three systems, and eliminate the inconvenience of each. The system is employed only to transport the heat developed in the ordinary boiler; but it provides also a motor power for all the accessory mechanism, without any necessity for a special boiler for this purpose, as in the case of heating by water. All the complication resulting from the employment of steam for direct heating is suppressed, and all the apparatus for the production of heat is below, in one story, and under the immediate control of the engineers. The water which directly heats the rooms receives its heat from the steam by means of a simple coil; its temperature and its effect in warming the air are the more easy to manage since they are directly influenced only by the steam. The advantages of water-heating,—low temperature, regularity, conservation of heat, &c.,—are thus maintained. Lastly, the hot air has only to accomplish a short journey, as the steam has made the greater part of the transit. At the same time all possible inconvenience from the escape of steam or hot water in the rooms is avoided. It appears, then, this system presents a great total of advantages; it is only to be objected that it is a little complicated."

The complication is apparently, however, in the fixing, not in the working; and, for an important building on a large scale, the objection is hardly worth taking into account.

The consideration of the subject of ventilation is one of the best parts of M. Planat's book; it is treated in a very practical and comparatively concise manner, and not so overloaded with formulas and computations as some other portions of the work. The author directs himself especially to considering the conditions under which ventilation has to be carried on under varying circumstances of atmosphere and inhabitation. In winter the action of the fire or other methods of artificial heating naturally acts to produce an influx of air; but there is no such influence in summer. Most dwellings have no method of ventilation in summer except that of opening windows, which may give rise to inconvenient draughts even in warm weather, and which at night becomes "dangerous." This last opinion is no doubt generally acted upon, though, in our opinion, most people entertain a most exaggerated idea as to the danger or inconvenience of open windows in sleeping-rooms; and, in fact, the danger to health from the close unventilated rooms in which the great majority of persons are content to sleep is a much more real and serious one. Many people have accustomed themselves so completely to the idea of closed-up rooms at night, even in the warmest weather, that if they find a window slightly open in their bedrooms they imagine a draught where there is none except what would do them good rather than harm. Any danger they may be under of catching cold from an open window at night is no doubt much promoted by adopting the constant habit of closely-shut rooms for sleeping in; those who are subject to "catching cold" being usually those who have rendered themselves peculiarly sensitive to such attacks by always bottling themselves up from the air; and then the inconvenience and annoyance of catching cold is easily felt and estimated, whereas the slowly deleterious effects of regularly spending several hours out of the twenty-four in a room closely shut up from change of air are not so readily appreciated by those who do not think about the matter. This is not to say that we should not be better for a special means of ventilation for sleeping-rooms, apart from windows, even in summer; but that until such means are established as a habitual adjunct to a dwelling-house, people will consult their own health much better by getting rid of their superstitious fear of open windows. To return to M. Planat: in regard to the admission of air either by inlets connected with the heating apparatus, or by special inlets apart from it, he recommends that these should always be as large as can conveniently be, in order to admit a sufficiency of air at the least possible rate of travelling,—a small inlet, under the same relative conditions of atmospheric pressure within and without, producing, of course, a much quicker in-draught. On this account especially is it desirable that the number and positions of air-supply entrances should be decided on by the architect from the first in contriving the plans: a remark which seems almost a satire on the practical architecture of the day; for how often, in dwelling-houses at any rate, is any such provision exercised? And yet the necessity for it might be thought to be one of the first principles of practical house architecture. One statement in regard to a supposed practice in English house-building is amusing, whichever way we take it, viz.:—that "In England the influx of fresh air is often provided for through the interstices of flooring-boards with open joints, which are covered with a carpet to better disperse the laminæ of air." This is said so seriously that we cannot determine whether it is a piece of conscious or unconscious satire.

The practical conclusion of our author, however, is in favour of special inlets for the introduction of fresh air, so designed and placed as to admit a sufficient body of air slowly, and without direct draughts. In the case of the exit of the air the draught may be stronger and quicker without entailing any inconvenience on the inhabitants of the room. An influx of air at too great velocity maintains itself as a special current for some distance into the interior air of the apartment, and becomes an annoyance to any one who may be so placed as to come in contact with it. A withdrawal or extract tube, however, at one point in the apartment, acts upon the body of air contained in it equably, without setting up a special suction in any one line or direction; and the evacuation is likely to be more effective in keeping up a ventilating movement of the air the quicker and stronger it is. In short, the theory of effective and agreeable ventilation of an inhabited room is a large but slow influx of fresh air, from various quarters if necessary, and a single but strong current of extraction at one point. We may have many inlets without weakening or confusing the flow of air for ventilation; in general, we can only have one outlet or extract, which must be proportionally strong and rapid in order to control and keep in action the flow of air through the inlets. More than one extract, unless in an apartment so large that practically two systems of ventilation may exist at opposite ends of it, is only likely to break up the movement of the air, and make the weaker extract act in opposition to the stronger one, and become an extra inlet, with the additional disadvantage of forming an inward draught in the apartment. The admitted air may be cooler than that in the apartment under certain circumstances: in hot weather it is sure to be warmer, in cold weather it will be so much colder as to require warming in its passage; but the extract-flue must always be warmer than the apartment, or there can be no certainty, or even probability, of its acting as an extract, except with very doubtful and intermittent effect. In regard to this question of the reciprocal operation of the inlets and the extract, one sentence in the chapter we are considering is either incorrect in printing or wrong in fact:—"Aux points où l'air est extrait de la salle, il est bon de réduire la vitesse plus encore que dans les conduite, pour éviter les courante d'air nuisibles aux personnes placées près des bouches d'évacuation." This is manifestly absurd, as in that case the extract would not act at all; and as the writer immediately afterwards observes that the draught towards the extract has far less operation in inconveniencing any one than the draught inward from the inlets, it is fair to presume that there is some misprint in the text.

In regard to the extraction of air from a room artificially heated, some pages illustrated by small diagrams are devoted to showing that the extraction of the air should always be in the lower and not in the higher part of the room, whatever method of warming is used to set up a current. To extract from the higher part of the room is merely to extract all the warmed air, which rises to the top of the room, instead of assisting it to circulate through the room. All the conclusions and examples on this point seem quite sound and reasonable, except in regard to No. 4 diagram, which shows a room warmed by a central stove with an opening at each side near the floor for exit, rather than extraction, in this case. The warmed air heated by the stove is to rise to the top of the room and thereby induce a down-current, which is to escape by the two exits below. This looks very neat and symmetrical in a diagram, but we do not believe it would act; one of the lower openings would become an inlet. Otherwise this portion of M. Planat's suggestion is worth study, and is very plainly and clearly put. Then we have separate chapters on winter and summer ventilation, by way of emphasising for the reader the fact that the conditions are quite different at the two seasons, wherever the temperature is so different that fires are used in winter and not in summer. For winter ventilation the author suggests a central upcast shaft with a current set up by a fire burning in it. Gas, of course, could be used for this purpose, but would be more expensive, and perhaps would gain very little in regard to convenience in the majority of cases, where ventilation was required to be constantly kept up. The application of this shaft system is treated in three different ways,—"*Appel à niveau*," where the extract from each apartment opens at once into the upcast flue on the same level as that at which it leaves the room; "*appel par le haut*," where the heat is supplied at the upper portion of the building and the extracts from the several rooms rise to that point; and "*appel par le bas*," where the heat is supplied at the base of the extracting-shaft, and the extract from each apartment is carried down to the bottom of the building and there turned into the upcast-shaft. In all three cases, in accordance with the principles before expressed, the extract from the separate apartments is from the lower portion of each apartment. We must leave the reader to follow out M. Planat's *pros* and *cons.* in regard to these methods. We have no manner of doubt that the "*appel par le bas*" would prove the most effective in practice, under proper conditions of working, but it would probably require a somewhat stronger heat in the upcast-shaft to ensure the requisite drawing power. For summer ventilation the author appears to think that the same system would answer without the artificial heating, on the principle that the outer air is in that case warmer than the air in the apartments. We should have some doubt of the "*appel par le bas*" answering in that case, however, and there would certainly be many days in an English summer in which the respective interior and exterior proportions of temperature would be such as to invert the current. On such occasions, of course, there would need to be a return to the winter system of artificially warming the extract-shaft. There are, however, one or two English inventions for generating an up-draught by the mere action of the atmosphere on a "cowl" of peculiar construction, which have been found to answer their purpose well. The concluding chapter is devoted to mechanical ventilation, giving a good many diagrams of apparatus for producing it. In summing up the advantages of the several systems, the author is decidedly in favour of mechanical extraction whenever the building is of sufficient size and importance to justify the expense, which must usually be greater than that of ventilation by warming, except in special cases in which motive power is easily available from some source existing for other purposes in the building. As he observes, we cannot in any other way have so complete and uniform control of the currents of air as in regulating them by mechanism, the action of which can be varied at pleasure and adapted to all the different conditions of heat and barometrical pressure.

In spite of a certain amount of pedantry and an unnecessary and often tedious elaboration, the book published by M. Planat is certainly a most important contribution to the literature of warming and ventilation, and is worth the attention of all who are specially interested in the subject.

Salford Baths and Wash-houses.—The General Baths Committee of the Salford Corporation, in their annual report, just presented, state that the first summer season during which the new baths have been open has been very successful, the total number of bathers being 58,844.

A GREAT FRENCH EXPLORER.

THE recent death of the eminent French archæologist, M. de Sauley, whose name will ever be connected with the valuable collection of Judaic remains he brought to France, and which now reposes in the museum of the Louvre, recalls many memories,—memories of that valiant band of seekers into the history of the past which is daily, page by page, being written by their patient hands. Little by little the history that seemed but a short time since so barren teems with life; quietly the researches of the archæologists people the silent streets of cycle-buried cities, the untrodden high-roads of bygone civilisation.

Of this valiant band was M. de Saulcy, and in the ranks of the army of archæologists his loss will be keenly felt. The day happily has come, however, when even such a gap can be filled in, and many an eager volunteer will be found ready to spring into the place, to lead forward the attack on Antiquity's silent strongholds. From every country these volunteers pour in, as they have done, indeed, within the comparatively few years that the common cause has been proclaimed, from England and from France, from Italy and from Germany, eager to help each other. In this army the list of those also who have already fallen is a long one; all have died sturdily, and not till they had fought the good fight to the uttermost of their powers did they sheath the weapons of their onset.

Very recently an interesting work has appeared in Paris, in which the debt that the world owes to the memory of one foremost among these warriors, Botta, has been gracefully paid.* Botta was an officer of high standing in that army of which we have spoken: his efforts led in a new direction, and, side by side with a brother soldier, Layard, they were crowned with a success that astonished and benefited the world. The sudden evocation of a civilisation, the remembrance of which was kept alive in faded traditions, themselves of no small antiquity, was a pleasurable surprise to the learned world of a generation ago. We of the present day, rendered *blasé* on the matter of discoveries, living as we do when telegraphy, when the electric light, the practical application of steam, the telephone, the microphone, the doctrine of selection, and what not, have come one after another to inure us to receive with perfect composure the relation of anything that but a short time since would have appeared positively wild, can form little or no conception of the effect first produced when the discoveries of Botta and Layard startled the European world of art and letters.

The name of the discoverer of Nineveh has, since that day, become familiar as a household word in every cultured circle, nor is the world likely to forget the services that Botta rendered. But the early life of the archæologist, that preceding the great event with which his name is so indissolubly connected, is less known. It has now been agreeably evoked in the work which Botta's old friend, M. Paul Levavasseur, has edited, and to which he has added an interesting notice of the life and more particularly of the character of Botta.

In 1837, the discoverer of the ruins of Nineveh had been charged by the Museum of Natural History with the pleasant task of an exploration in Arabia, the object of which was to complete the collections made there by Niebuhr. Botta had not at this time acquired his future celebrity. He was a learned naturalist, an excellent Orientalist, who spoke Arab like his mother tongue, and, what is more, the possessor of a mind above common prejudices. At the moment at which he was sent on this mission, his task was not alone to herbalise in Arabia, but to make diligent observations. The French were allies of Mehemet-Ali, and, therefore, to some extent supporters of his policy. Mehemet dreamed of extending his rule over Yemen, and his relations with the Cheikhs of that country it was advisable to watch. In addition, Botta was curious to study in its cradle the Arab nation, of which little else was known than its nomad existence; everything, therefore, combined to add an interest to Botta's journey, and this interest it may fairly be stated remains attached, after forty-three years have passed, to the relation he has left.

What, however, is more interesting than the journey is the traveller himself. Botta was a modest man, who mixed very little in the world, and who, therefore, was personally little known. His name is familiar to many from the fact that his father, Charles Botta, was the author of an excellent history of the Independence of the United States, as also of a history of Italy; but his own reputation he made by the discovery of the ruins of Nineveh. Botta became the founder of Assyriology, and by his researches transformed an almost conjectural branch of history into a positive science. As an archæologist and a scholar, his renown needs no additional remark.

By the few who still survive, that recall the *salon* of Mme. de Mirbel,—we are taken back to the days when the *salon* still existed in Paris,—Botta's place in the little circle will be remembered. Silent and meditative, apparently noticed by none, and yet his presence felt by all, he would sit in the evenings stretched on a sofa in the darkest corner of the room, rolling between his fingers, in Oriental fashion, an interminable chaplet. Evening after evening would pass without his proffering a syllable; his repose was respected like that of a child or of an invalid. Botta was, indeed, both; the baneful habit of opium-smoking, contracted in the East, had undermined his health, while his nature was essentially that of the child, and his timidity, with ladies especially, he never overcame. Mme. de Mirbel was indeed, perhaps, the only woman who ever succeeded in overcoming this, and then alone by the aid of stratagem. In the first place, she was no longer young when Botta knew her, and her tact was of the most refined nature. She waited, before speaking to the *savant*, until the circle had been reduced to two or three intimate friends; in addition, she had established between him and her *femme de chambre*, who was ugly and old, the most confidential relations on all domestic affairs. It was Pauline who ruled the servants of M. Botta; Pauline who settled with the tradespeople; Pauline who superintended the packing of his trunks when he was about to travel; and Pauline it was, above all, who protected the purse of the worthy Botta from pillage. No man was ever simpler in his habits and requirements, but none, on the other hand, was more generous or lavish in his expenditure. It was by dozens that he ordered his boots from his bootmaker. The tradesmen were enchanted to have a customer who was perfectly indifferent to the reception of all their shop-worn or out-of-fashion stock, a good faith equally abused by the eating-house keepers, who would send in fabulous bills for dinners never consumed. Botta, who was never rich, could ill stand such expenses; but through the kindness and affection of Mme. de Mirbel he was saved the distraction so fatal to his pursuits. The affection of Mme. de Mirbel was that of a second mother; she recognised the delicate character of this rare nature, and with a woman's heart protected it; it was her action that placed him in the way that led to his great discoveries; her protection and her counsels obtained his entrance into the Foreign Office; and it was during his stay at Mousoul, where he was named consul, that a good fortune visited him such as the wildest treasure-seeker could never have foreseen.

M. Levavasseur publishes a letter of Botta's, which is interesting, as showing the commencement of those researches which were to lead later on to such astounding results:—

"My successes in antiquities will surprise many scholars. I have unearthed a whole monument on which there are an enormous number of cuneiform inscriptions and historic bas-reliefs. It contains a whole history. If we succeed in being able to read this writing what things we shall learn! I continue, but it ruins me. There is a village built on the monument, and to unearth it I have to purchase and demolish the houses. They do not cost very dear, it is true; ten to twelve francs each; but the diggers cost more,—five francs a day, at least, in all. It is more than I can afford, and I ask the assistance of the Government. In the meantime, and before the decision arrives, which may be long, you must help me. The honour of France is at stake, for the English are ready to succeed me if I interrupt, and it would be a pity to abandon to them the most important discovery that has been made for a long time. I cannot at present afford the leisure to give you any details on my monument; but if you wish to know what it is, ask M. Mohl to come and see you and show you my descriptions and drawings. . . . . Adieu, my dear friend. P. E. BOTTA."

When, in 1848, M. de Lamartine sent him out as consul to Jerusalem, it was a considerate attention on the part of a poet for a brother in culture, for there existed between Botta and the mystic city not a small degree of harmony. Botta's devotion was of no ordinary nature; to the simple faith of the child he added what is a rarer quality, even in divine affection,—disinterestedness. His good deeds were never selfishly actuated. His house was ever open to the pilgrims; a cordial, though simple, hospitality received them. Speaking of his old friend Botta not long since,* M. Villamus expressed how often he had been surprised to know in what manner Botta was able to afford such incessant largesses. As recompense for his discoveries, the French Government had presented him with a national gift of 60,000 francs, and this was all that Botta ever possessed; nor can this sum have remained long in his hands. His income can never have exceeded the modest sum of 500*l.* to 600*l.* a year, and yet he kept in the East open table, and money ran like water through his fingers. M. Villamus tells us further some curious tales characteristic of Botta. One day Botta asked his friend to send him some beer to complete a medical prescription which had been made out for his cook; two barrels was the quantity considered necessary for this object. On another occasion M. Villamus was with Botta when he was purchasing clothes, and not unnaturally expressed his astonishment at seeing his friend buy twenty pairs of pantaloons. "I shall distribute them," replied Botta, "to those about me." Some years later, when he was French consul-general at Tripoli, a friend asked him at table the colour of the ribbon of a certain order,—one of the most highly-valued in Europe. "I do not know," replied Botta. "How!" cried his chancellor; "why, sir, you have the order." "You are wrong, my friend; I do not think I have it." "But, sir, I myself opened the letter containing the brevet and the insignia, and placed them into your hands." "If that be the case," replied Botta, "you will find the ribbon then, I suppose, in the drawer with the others."

In spite of a feeble constitution and of an even excessive nervous delicacy, his irritation never betrayed itself. Above all, he was profoundly religious, and not with that narrow-mindedness the result of a dogmatic belief. His respect for religious believers came from his heart, whether they were Christian, Buddhist, Mussulmans, or what not.

After an active existence, in the first place as a naturalist, and subsequently as an antiquary, Botta, settled in the desert post of Tripoli, slept away his latter years. Opium is a dangerous friend, which attaches itself only too securely to those who court its fatal influence, and Botta's life may be said to have been little more than one long dream, from which he awoke only to do some good deed of charity. His chancellor and his dragoman watched over him as they would have done over a child. Always dying, and yet alive, his trust was fixed on Providence. All advancement or change in the service of the Foreign Office was positively painful to him. "I only desire one thing," he wrote, "that God shall give me my order of retirement, and men shall think no more of me." But this modest wish was not carried out. The time came when Botta, having long passed the limit of age, was able to enjoy the ease of retirement; but what for others would have been a revival of life was for him to be fatal. The sun of the East was alone able to warm this exhausted frame. No family tie called him to France. His father was dead, his mother he had never seen, of his kind friends Mme. de Mirbel was no more; one alone remained,—one, faithful in death, and who has seen through the press the unpublished work of his old friend. Botta returned, however, like a dutiful son, to his mother country, and it was near St. Germain, in the little village of Achère, that he patiently waited his end. On March 29th, 1870, death came to release him, hearing off his gentle soul as the angel reaper in the poet's familiar lines.

The religious faith that breathes throughout his whole career consoled his later years. M. Levavasseur tells us that not least among the few troubles of his last solitude was the thought that the little parish of Achère possessed no regular vicar. On Sunday only an aged priest of more than eighty, but still robust, came several leagues on foot to perform the simple mass in the village church. This priest had himself travelled not a little as a missionary, and Botta anticipated his Sunday visits with a pleasure more than common. "To his (Botta's) funeral came," tells us M. Levavasseur, "all the inhabitants of Achère,—who have not yet forgotten his familiar face in his too short passage among them,—the heads of the consular service, some plenipotentiary ministers, and not a few distinguished savants. A voice retraced the life

* Relation d'un Voyage dans l'Yemen, entrepris en 1837 pour le Muséum d'Histoire naturelle de Paris, par Paul Emile Botta. Précédée d'une Notice sur l'Auteur par Ch. Levavasseur, ancien député. Paris, 1880. 8vo.

* *Revue Politique et Littéraire*, Oct. 9, 1880.

of the deceased; it was that of the old priest of St. Germain, who seemed to have forgotten his long walk of the morning, so firm and round was his tone. I was deeply touched as I listened to this noble and courageous old priest, and I asked myself more than once, by what mysterious coincidence it happened that in this little village church there should be present a priest who himself had journeyed far, and who was now called upon to make a funeral address over another traveller, who, during his life, had honoured France by his learned discoveries, and religion by a sincere and enlightened faith."

Those who will be induced to read the "Relation of a Journey in the Yemen" will find in its pages a faithful portrait of the author himself. The style is simple, the judgments intelligent and benevolent, in true accord with Botta's character. He loved the Arabs, that strange people that have taken so large a share in the progress of humanity. The two portions of Arabia, Northern and deserted Arabia, and Arabia Felix, the Yemen, are occupied by two very different populations. It is in the latter that can best be studied that great people who so many centuries ago civilised Spain and Portugal, and which influenced far more than is generally imagined the manners of Europe.

A STUDY OF THE MEDICEAN VENUS.

"Cleomenes, the son of Apollodorus, the Athenian, made me," is the record on the plinth of the far-famed statue who holds her court in the Tribune of the Uffizi Palace in Florence, without paying the homage of a visit to whom no tour in Italy is complete. As at other shrines, the adoration of her devotees varies both in quality and quantity, and some have even ventured to undervalue her charms; but as for some centuries she has continued to hold her pride of place among the relics of ancient art, a renown so enduring is not likely to exist without some good foundation.

She is, without doubt indeed, a beautiful work of art, and she is of beautiful Parian marble; but when and where she had her birth, ancient record sayeth not; and even Pausanias is silent, not only as regards herself, but even in respect to the very name of her sculptor, Cleomenes, which appears on the marble plinth beneath her feet, but not in the list which he gives of ancient statuaries.

Thus some have questioned the verity of the Greek inscription, and have favoured the idea of attributing her creation to Alcamenes or to Praxiteles, just because they deemed that so fair a daughter ought to have a renowned father. Discordantly, however, with these suggestions occurs the fact that there is no description extant of any work by Alcamenes that in any respect agrees with this statue; nor either does it correspond in character or treatment with any production by Praxiteles that we have remaining to us.

The fame of the perished Aphrodite of Cnidos, by the latter artist, has directed many thoughts to him as the possible author also of her of Florence, or at any rate to the idea that it probably must have been at least a near copy of that marvel of the ancient world. There appears, however, to be no sound foundation nor feasible plea for this theory, except that the position of the left hand is similar. The Aphrodite of Cnidos looked towards the right, and not over the left shoulder, as she of Florence does, and held up with her right hand a fall of drapery which descended to a vase by her right foot, instead of that hand and arm crossing and half concealing her bosom, as it does with her of the Uffizi Gallery; so that the attitude of the two statues must have been quite distinct.

Further than this, those who have surveyed with a careful and deliberate eye the especial graces of pose which Praxiteles peculiarly loved, cannot justly trace them in this work. A luxurious sway at the hips was in great favour and estimation with him; and, in as far as we can judge, was a particular attribute in the works of that great sculptor. It is to be seen accordingly in his Apollo Sauroctonos, his Faun resting on a tree, and markedly is this tendency of his art also illustrated in the lately-discovered mutilated statue of the Hermes of Olympia, by him, of which, as we mentioned some months ago, a cast has been received from Germany by the British Museum; where it may be consulted at leisure. Also on a well-known Imperial coin of Cnidos occurs a representation, somewhat freely translated, no doubt, of this celebrated Aphrodite of Praxiteles, the tutelar deity of the place, in which a similar inclination at the hips is to be recognised; but nothing of this is perceptible in the Medicean Venus.

On the contrary, the graces of this figure, which are, indeed, many, are attained without this lateral sweep of line of the body and lower limbs. They are peculiarly her own, and are not acquired in this manner. She rests, principally on one leg, it is true, but with very little sway at the hips. Her body, although inclined forwards, as regarded from a side point of view, is little otherwise than equally balanced in the front aspect, and the charm of the lines of her attitude, which are admirable, is obtained by other means.

These remarks are addressed to dissipate the idea of the Medicean Aphrodite being in any degree a copy of her perished sister of Cnidos; and to submit, on the other hand, that the two Venuses, Aphrodites, or Divine daughters of the sea-foam, hewn and wrought, both of them, from Parian marble, were, in other respects, pretty much as distinct as two ideals of the sculptural poses of gentle female beauty could well be; the one point of resemblance, which Ovid alludes to in his well-known couplet, being alone visible.

The fact that ancient annals are dumb in respect of the name of the sculptor which appears on the base of the Uffizi Aphrodite, suggests a likelihood that he did not execute many statues. Perhaps even he never did but this one great work,—his tribute to Venus,—to be by her alone immortalised! This appears to derive support from the consideration that, as far as data exist, the style and quality of form and composition of the Medicean Aphrodite are unlike those of any other existing work of ancient art. The Apollino has been said to resemble it, but this has been set forth on feeble grounds, such as may suffice in superficial criticism, but will not bring conviction to a careful student of art. Both these ancient works are statues of great refinement of form, but there the likeness ends. There is not in the Apollino that rich luxury of surface which the Italians term *Morbidezza*, that is possessed by the other statue, nor does there exist in him the lavish harmony of line and composition, in every view, that is a characteristic of the sweetly coquettish goddess that bends and shrinks, and embraces herself with her own arms in the Palazzo Uffizi of the City of Flowers. The Apollino is a graceful youth of a feminine style of beauty, but is of another family from the Venus.

In the position of the arms and hands before the figure, concealing the person, other statues of the goddess, in general action, resemble her, but in their air and quality they are different, and in several instances appear more modest because less conscious. It must be acknowledged that the Uffizi Aphrodite appears aware that she has placed herself in a most becoming attitude, and that she looks as if she had posed herself before a mirror so satisfactorily to herself that she was calling on all beholders to come and admire her studied graces. Her artist also has so fully carried out this undulating sentiment of line and figure in the whole work, that even the adjuncts of support in the marble of the dolphin at her feet, and the *amorini* riding on it, partake of the same character, and are so disposed as to harmonise in all respects with the limbs, insomuch that, in a merely decorative point of view, the *tout ensemble* is a triumph of ornament, just as fully as if it were constituted but of flowers, or of purely conventional forms, instead of its being a representation of a beautiful woman, instinct with animation, hewn from the solid marble, with only such supports left as were requisite to sustain it.

An excellent delicacy of personal presence is remarkable in this statue, but, as is usual with ancient classic works, this quality was not sought by making the extremities small. The sculptors of old, indeed, appear to have had some reluctance to employ this facile mode of obtaining *finesse*, and strove for elegance of proportion rather by refinement of contours than by smallness of parts.

This remark does not apply, of course, legitimately, in this statue, to any portion of it that is not original, and therefore not to the hands, which are restorations; but in respect to the feet, these are certainly not by any means small. The statue represents a woman who, if she stood up to her very utmost height, would scarcely reach 5 ft. 2 in., while living women are to be found in England much taller in stature than this, with feet no bigger, nor indeed even so large. These feet, however, which are original, have apparently supplied the measure of length for the restored lower arms. It is a standard of much value and of ready application in sculpture, and one that has been relied on, among others, by the great Thorwaldsen, that the length from the elbow to the wrist-bone, should coincide with that of the foot from the heel to the tip of the longest toe. This seems to have been known by, and adhered to, by the restorer of the arms of Uffizi Aphrodite, and the feet being of full-size and length, this has been the cause of the lower arms of the restoration being, perhaps, a little long, although this is not striking because of the bent position of the arms.

The statue was in a sadly mutilated state when it was found, having been broken at the middle of the body, at the thighs, the knees, and the ankles, and at the right arm, close up to the shoulder; the whole of that arm having been lost, and just below the elbow of the left arm, that lower portion having also perished; so that, for the arms now on the figure we are almost wholly indebted to the skill of the restorer, so that we have reason to be thankful that the marble creation is presented to us now in so fair a guise as it is.

On a critical examination, however, it cannot escape observation that the restored portions, although apparently correct in disposition, are not in detail so natural as the rest of the figure, although they deserve a high meed of comparative praise for the cleverness with which they are wrought, and the evidently sincere aspirations of the restorer. Impressed by the excellence of the torso and lower limbs, he applied himself to seek a similar perfection of grace and delicacy in the upper limbs, and has in degree sacrificed truth to sweep of line, especially in the right arm, in which he has somewhat bent both bones of the lower arm to meet his views. Both wrists, also, show signs of this yearning for flow of line; but the mark has been somewhat overshot.

There is little doubt that the *soupçon* of affectation which exists in this statue is much due to the conventional character of these restored parts. Had the hands and arms been more natural and more in accordance with the treatment of the rest of the figure, a simpler and more classic effect would have been produced. It may be remarked, however, *en passant*, that they present a notable instance of the force of precedent, even when it is not well founded, as although these arms and hands have no original authority, being but restorations of the lost parts, yet having been so long closely associated with this beautiful ancient statue, they have had a strong influence on these portions of the female form in modern sculpture, in inducing an over-degree of bending of the lower arm; and nowhere is this more perceptible than in some of the works of the great Italian sculptor Canova.

It is apparent, also, that the restored fingers are too slender to accord with the original toes; for in Nature the upper and lower extremities are usually in harmony. Probably the original hands were less like those which have been restored than to that well-known example of "The Roman Lady's Hand," so-called, which has the appearance of having been moulded and cast from Nature, and which has also been romantically attributed to that arch *empoisonneuse*, the Marquise Brinvilliers, the fingers of which in that case may have mixed her deadly potions; and also to the beautiful Princesse Pauline. In this elegant hand the fingers are plumper than those restored to the Medicean Venus, and the wrist is less forced in line than her wrists, which have a certain artificial character, which, although they must be allowed to be graceful, are yet thus, from the above cause, scarcely satisfactory.

As the whole statue was, doubtless, originally in one piece of marble, very noteworthy is the excellence of the workmanship of the portions of the bosom and torso immediately behind, and close to, the hands. This proximity must have been very embarrassing in the execution of the work, and yet perfection of contour and surface has been attained notwithstanding.

One may be allowed to wonder whether the inside of the original hands, so little removed from the body, were worked out with equal completeness, as the slenderness of their detached fingers and their consequent fragility in marble must have added to the difficulty of their execution. Of course, this was easy enough

to do in the restorations, as these were worked separate and away from the figure, and afterwards affixed. It is evident, however, that whatever have been the modern improvements in the working of metals, the tools of the ancient sculptors were of an excellent description, of which, indeed, the clean undercuttings of the highly-wrought draperies of the Parthenaio marbles are sufficient evidence. Thus, also, in situations so difficult to get at as the undersurfaces of hands of this Venus, tools were, no doubt, especially fashioned and bent for the purpose.

Much as this interesting and celebrated statue is prized, she is not well placed in the Tribune of the Uffizi Palace. Fine works of the sister art are associated with her in the same room, which are the frequent subjects of study and of copying by artists whose easels not unfrequently interfere with her being seen freely and to advantage from the best points of view. Most surely she is worthy of an apartment to herself, and should have a little temple or "Ædicula" solely dedicated to her, in the City of Flowers, such as whilom her perished sister is recorded to have possessed in the town of Cnidos.

Far different have been the fate of these two Aphrodites. She of Cnidos,—we know who made her,—Praxiteles, in the fourth century before our era,—held court in that city for a long period; after which, on the spoliation of her native grove and habitation, it has been supposed that she was taken to Rome; whence subsequently she was removed to Constantinople, where eventually she perished in the fire of the Laurian palace. In respect to her of Florence, we know not the period of her birth, but at present she is in safety in that lovely city which is her modern home. She, however, also was the subject of spoliation in the time of the first Napoleon, and went to Paris for a while, from which adventure, however, she returned, without injury, to her former place of rest. So much have we of her latest history, but as to where and when she was originally made seems shrouded in oblivion.

Although there appears not to be any case made out sufficient to invalidate the simple Greek inscription which appears on her base, namely, that she was the work of "Cleomenes, the son of Apollodorus, the Athenian," it by no means follows that she was made at Athens. Several of our finest ancient statues extant were the work of Greeks living in Rome during the Empire, and it may not improbably be that she was one of these; for, at any rate, there is no record of her as having been brought from Greece.

The Romans disdained the grasp of any weapon save the sword or spear, and the chisel was not for the hand of the conquerors of the world. When Imperial Rome desired statues, her patricians did not apply to a fellow-citizen to furnish them, but to some Greek dependent or slave, whose intellect, however, might be far above that of his ruler and master. In following this view, there appears no reason to attribute falsity to the inscription under the statue, or to doubt the truth of its record that it was the work of a Greek of Athenian parentage; but it is somewhat remarkable and singular that the nose of this charming figure should be more Roman than Grecian: at least it is in degree aquiline, and thus a feature which no other Greek female statue possesses. This might have been adopted by Cleomenes, either under order from his superior, or by his own predilection, from some Roman maiden of blue blood, or even from a *piquante* and graceful model from the Campagna. However this may be, it is one of the points in which she differs from other Aphrodites.

In respect to the uncertainty which rests upon her in regard to the date and site of her birth, on the one hand it may be said that the exquisite and much sought marble of Paros of which she is executed was early exhausted from the quarries of that island, and this might favour placing her period not later than the most palmy time of Greek art; while, on the other side, it may be shown that there is nothing conclusive in this, as many blocks of this beautiful marble were doubtless preserved as portions of architecture, or by other means, up to the date of Imperial Rome, which were available for such a small compact statue as she is. Also it is to the point of her period of birth not being early that the name of her author does not appear on the roll of the sculptors of ancient Greece.

No light, either, is thrown on this obscurity by any ray to be elicited from the discovery of this statue in the time of the Renaissance, as an almost equal want of information attaches to the time and place of this event. She is reported to have been found somewhere near Rome, broken into thirteen pieces, in the fifteenth century, but she did not adorn the Villa Medici until the sixteenth, and was transferred to Florence not before the latter part of the seventeenth, retaining as an affix to her title the name of the family to whom she had previously belonged.

That she is the perfection of female beauty is open to grave doubt; but in regard to her being a most beautiful, graceful, and refined work of art, there is none. It has been objected to her that her head is very small for a living woman. Intelligently regarded, however, it is evident that if it were made larger the proportion and grace of the figure would be injured. Rather thus, with due consideration, and without effort, we may justly adopt the view, not that the head is unduly small for the figure, but that the whole figure was advisedly executed on a slightly reduced scale, so as to give delicacy to the larger nude surfaces of the body.

Burke, in his "Essay on the Sublime and Beautiful," entitles one of his sections "Beautiful objects small," and affirms that, "attending to their quantity, beautiful objects are comparatively small." "I am told," he adds in another place, "that in most languages the objects of love are spoken of under diminutive epithets, and this is so in all languages of which I have any knowledge." He might have added as an example of the application of a diminutive, the frequent use of the word "Signorina" in Italy as an address of gentle respect to a lady. And this title might well be applied to the Florentian Aphrodite as a term of admiring endearment, appropriate to one who is a true Signorina among statues. It may be noticed also that a similar slight reduction from the exact scale of female life has been occasionally adopted, even in portraiture, by the most famous painters.

This view of the subject may well afford a certain satisfaction in contemplating this beautiful statue, namely, that her head does not necessarily represent one that is too small for intellect, but rather that the proportions of the whole figure have been somewhat reduced with the object of thereby obtaining superior refinement. Under this view she is to be considered as slightly diminished in scale from life; and if not of the highest order of beauty, she is none the less, perhaps, for that, a marvellously-attractive creature.

Scarcely may she rank as an Olympian goddess of the most elevated level of Homeric poetry, nor of the loftiest period of Greek sculpture, such as Phidias or Praxiteles might have produced, but we may still well cherish the conviction that she was the creation of a consummate Athenian artist, although in response, not improbably, to the behest of a Roman Mæcenas.

THE TWO WATER-COLOUR EXHIBITIONS.

THE Society of Painters in Water-Colours, and its younger rival the Institute of Painters in Water-Colours, as usual opened their private views on the same day, Saturday last, to wit. It would be much more convenient for those who like to attend private views if the two societies would avoid this, and open on different days; and it would probably be better for both of them as far as regards the sale of drawings.

The winter exhibitions of both societies are very good. The "Society," *par excellence*, has almost dropped the pretence of making the winter show a "sketch and study" exhibition, it practically becomes very nearly a second annual exhibition; but there remains still the advantage that a member can send a sketch or sketches, if he has any that commend themselves to his judgment as worth exhibition, without in any way prejudicing himself; and of this advantage some few members avail themselves. At the Institute the "sketch and study" theory is more frankly adopted, and a good many of the contributions come confessedly under this head, more so even than usual, in this year's exhibition.

The Institute shows a very interesting collection, with much less than usual of the mere drawing-master's drawings, against which we have often protested. It is partly from this fact that a certain contrast between the prevalent styles of the two exhibitions seems more than usually brought out this year. The Institute, in its best contributions, is the home of the school which aims at broad and powerful effects; the Society rather represents the refinement of manipulation of modern water-colour. The best landscapes shown at the Institute keep up for the most part the traditions of the days of David Cox, and give us effects obtained by broad washes and powerful touches rather than by minute finish. Mr. Syer's large "View near Wells" is a representative specimen of this school of landscape; a little too rough, perhaps, in its middle distance, but powerful in its foreground, and fresh and bright in its open-air effect. Mr. Collier, who is usually the main pillar of the Institute in this style of landscape painting, only sends some small and comparatively unimportant works this year, of which, however, his "Snowstorm over Carnedd David" is remarkable, and should not be overlooked. Mr. Orrock's "Summer Day on the Yorkshire Moors" is another work remarkable for its true qualities of water-colour effect, and the success with which it represents gradations of distance and aërial effect. "A Cornish Bulwark," by Mr. Philp, is a fine study of cliff, with the sea washing far below. Another remarkable drawing of a similar class is Mr. Aumonier's "A Bit of the Yorkshire Cliffs"; in this case the cliffs are seen from below, with a foreground of vegetation,—very powerfully treated,—and a number of seagulls flying out of the picture, so to speak, towards the spectator, put in with great force and relief. Mr. Harry Johnson's "Wyndcliff, on the Wye," is a fine drawing, with a fortunate combination, in the middle distance, of freedom of style with very tender and delicate effect. Among landscapes of more delicate finish, and perhaps rather more conventional effect, are one or two of Mr. Vacher's Egyptian drawings, especially the "Palace of Rameses III., with the upper portion of the yellow-tinted ruins in warm sunset light. Mr. Houston's "Stonehenge" (by moonlight), is a remarkably careful study of moonlight effect, and the old pre-historic stones, too, are very carefully drawn, and their character well shown. "After Sundown, Lucerne," by Mr. W. L. Thomas, is a fine piece of evening effect, in which nature is perhaps a little helped by art. Mr. Boughton's "Autumn Ramble by the Spey" is charming both in regard to the landscape and the figure which forms the centre of it; in feeling, tone, and composition, this is quite a perfect little picture. Two or three rather finished sketches, by Sir Coutts Lindsay, "The Harbour Fife," and "Desenzano, Lake of Garda," are so admirable in their combination of freedom with fidelity as to make us wish their author had done, or at all events exhibited, more work of this type. Lady Lindsay's "Souvenir," close by, the head of an Italian girl, is also excellent.

Figure subjects are usually rather prominent at the Institute, but less so than usual on this occasion. Mr. Linton confines himself to the single figures which may be termed studies of costume and colour rather than figure studies; they represent two apparently fine young women very much dressed, dressed up to the eyes, almost, under the titles of "Autumn" and "Winter"; the latter, with the rich amber dress and crimson scarf, is a very fine piece of colour, and exhibits that combination of high finish with dignity and largeness of style which usually mark everything from Mr. Linton's pencil. A kindred subject in its nature is the clever and delicately-studied drawing by Miss Gow, "Beggar my Neighbours," representing two little girls at a game of cards, a sofa and other accessories introduced; the children are nice in character, but the real interest of the drawing is as a study of browns and lighter but kindred tones in a combination peculiarly refined and agreeable to the eye. Mr. Edwin Bale's two drawings of a little Oriental-looking child with a brass pitcher, seem painted very much for the sake of the brass pitcher, which is the best thing, at all events, in each drawing. Mr. G. Clausen, whose name we have observed as generally connected with drawings which seemed rather to fall short of their apparent aim, has made a striking success in his small but very powerful and pathetic drawing "Waiting for the Ferry"; in the foreground a strong, sturdy woman, in sabots, stands fixedly waiting for the boat, which is just descried under the dusk of the opposite bank; on the bank some figures are relieved against the evening sky, which is partly reflected in the river. There is nothing unusual in the motive of the drawing, but it is very remarkable

for its power and its complete unity of effect and expression; it is like a picturesque moment snatched out of actual life and fixed on paper, in a style of handling which gives us all the essential poetry of the scene without any disturbing details. Mr. Hugh Carter's landscape and figure subjects are so palpably suggested by Israels, without the pathos of Israels, as to produce rather a sense of annoyance. Mr. Beavis's "Sand-cart, Pyrénées Orientales," is a good work, and a picture with two figures, by Mr. Towneley Green,—an old man and a young girl,—under the title "The Grindstone," should be carefully looked at; the two faces are most beautifully and minutely studied in character, expression, and modelling. The small room contains some very good studies in black and white by Mr. Walter Wilson (who also has among the coloured drawings some original studies of shipping), Mr. Lionel Smythe, Mr. Tenniel (*Punch* cartoons), and others.

The remarks which we made last week as to the too great frequency of exhibitions can hardly apply, it must be admitted, to the Society of Water-Colours, for the extra exhibition in winter is quite as good as the principal one in spring. Two of the lady contributors, Mrs. Allingham and Mrs. Angell, show an astonishing power of keeping up both the quantity and quality of their work in each of these semi-annual exhibitions. The former is quite up to her usual standard; the latter has surpassed herself,—in the matter of flower-painting, at least; her "Chrysanthemums" could not be praised too highly. The beauty of Mrs. Allingham's little idyllic pieces lies not only in the delicate finish of the figures and the landscape taken separately, but in the combined expression of both, the landscape and the figure appearing always such a complete and united whole. If we compare the Society, as a whole, with the Institute, there is in the main a decided difference of aim; the best works in landscape at the Institute are nearly always those which aim at the representation of the simple facts and feeling of nature in the manner to which water-colour best lends itself (only unfortunately such works are often far too small a proportion of the whole number); in the Society a considerable portion of the best landscapes are among those which aim at giving some special and poetic interpretation to nature, or at representing some peculiar effect by peculiar means. And thus there seems to be formed almost unconsciously a peculiar prevalent tone in the Society's exhibitions, in which strong and bold effects are the exception, and delicacy of treatment is the object. Thus such a landscape is Mr. North's "Autumn," which is like a dream of a landscape rather than like one of open day and common air, would be quite killed on the Institute walls. Where it is, it is in keeping with the general key of the place. The general level of intellectual interest is unquestionably, and has been for some time back, decidedly higher at the Society than at the Institute; nevertheless, we think the best of the Institute productions belong to a more healthy and genuine school than many of those very delicate and poetic, but occasionally somewhat unreal, landscapes which we see on the Society's walls. There is no doubt, however, that the present winter's exhibition in Pall Mall East is a remarkable one for the amount of fine work which it includes, of which we cannot profess to mention any but a very small part. Mr. Walter Field has been doing Henley in one or two drawings which happily combine topographical accuracy with effect. A comparatively new contributor, Mr. T. J. Watson (not to be confounded with Mr. J. D. Watson), from whom we from the first expected a good deal, keeps rising, and his "In a Wood" and "Sketch on the South Coast" are fine things, the latter literally a sketch, though very bold and on a large scale. Mr. Thorne Waite also contributes a large and powerful out-door sketch at "Parham Park." Mr. Walter Duncan has not returned to the poetic class of subject which he at first promised us, but his prosaic figures in "The Novel" and "With Wind and Stream" are as good as anything of the kind could be; the former especially, a drawing of a girl sitting sideways in a large chair and absorbed in a book: it is remarkable, though a small work with only the simplest subject, for a largeness and vigour of style which give it high interest. But we are anxiously looking for some more serious effort from this artist. Mr. Marshall, one of the recent members, has a beautiful work, "November's Hail-cloud drifts away," a very finely-composed landscape. Mr. J. D. Watson's corners of places with single figures, character figures, as one may say, are, as usual, interesting and various. Mr. G. K. Johnson's little girl standing on tiptoe to examine "A Sunflower" we like much better than his grown-up young women, who are nearly always (as in "Lilium Auratum") characterless and uninteresting. Mr. Matthew Hale seems to develop some new qualities in this exhibition; he has several admirable sketches, among which "A Lonely Moor" is exceedingly powerful and poetic. Mr. Henry Wallis shows his versatility remarkably in two works, one "In the Uffizi Gallery," an interior study, with the well-known seated figure pulling a thorn from its foot in the immediate foreground; the other, "A Study," a wild scene in a forest where trees have been overthrown, apparently by a storm. Other well-known contributors, Mr. Naftel, Mr. Davidson, Mr. Albert Goodwin, Mr. Tom Lloyd, Mr. Carl Haag, &c., are represented. A word is due to Mr. Parker's admirable studies of picturesque bits of old towns, especially "Place St. Yves, Vitré." Neither Mr. Alfred Hunt nor Mr. Boyce has been able to exhibit, their non-appearance leaving certainly "a gap in our great feast."

A special feature is the collection of some of the works of the late Mr. Dodgson; among others, a large and rather idealised but very fine view of St. Paul's from the river, which we do not remember to have seen before. On the whole, it may be doubted whether Dodgson's works are not likely to be more esteemed when seen separately. His style was a beautiful one, and it was of his own making, but his range was limited, and this fact becomes the more apparent when a good many of his drawings are brought together. Some of them, however, are, as far as they go, perfect works of water-colour, in regard to feeling for nature, rich tone and colour, and purity of style.

WILKIE'S "READING THE WILL."

ENGLISH ART ABROAD.

There appeared some excuse in 1854, when we first visited the Pinakothek at Munich, for finding in the section devoted to modern art but one English and no single French picture, because at that time the New Pinakothek, the work of the architect Voit, had been completed little more than a year, and the pictures which more or less adorned the architect's work might not have exactly found their proper destinations; but on revisiting the famous, and it must be owned greatly over-rated collection, it is somewhat disappointing to see that no additions have been made, or no attempt to support by adequate surroundings the one English picture, the famous "Reading of the Will," the exquisite work of Wilkie. We remember perfectly, on suddenly coming upon this picture, experiencing probably something like the sensation which more recently our countrymen have so often enjoyed in Australia at the discovery of a nugget, after labouring for a long time unsuccessfully in their field of operations.

It has been often remarked that there are painters who owe much of their popularity and distinguished name to the careful and skilful work of the engraver, and doubtless, in not a few cases, such is the fact; but perfectly as the works of Wilkie have been engraved in England, the fame of the engraver has in most instances been enhanced by the association of his work and name with the thoroughly intelligent and beautiful art of the great Scotch painter. It must be conceded that after 1821, when Wilkie painted his "Reading the Gazette of the Battle of Waterloo," a perfect style had reached its culminating point, and from our remembrance of the condition of the Duke of Wellington's picture when last we saw it, it has stood the effect of time very much better, notwithstanding the supposed deteriorating nature of a London atmosphere, than the "Reading of the Will," painted but one year earlier, although it has reposed for so long a time in the clear, high position on which Munich stands. But, alas! the "Reading of the Will" has been in the hands of "the competent restorer," and those terrible cracks that result from the use of asphaltum, or some equally dangerous transparent colour, and which fascinated so fatally our painters of the beginning of this century, and which, when we first saw the "Reading of the Will," twenty-six years ago, had already made a fearful progress throughout the surface of the picture, have now all been reduced to an equal surface, it is true, but there remains something more than a suspicion that the noble picture has been sadly injured.

There are certain galleries and collections of pictures in Europe that have gained, it must be owned, a not altogether well-deserved popularity, owing, perhaps, in many instances, to something euphonious or "catching" in their names; and amongst these both the New and the Old Pinakothek of Munich must certainly be placed.

RAILWAY SERVANTS, THE PUBLIC, AND THE BOARD OF TRADE.

There are sounds in the air which betoken the danger of a railway collision of a serious kind. It is a long time since the facts which tend to the production of this collision have been known to men familiar with the subject. Not a few of them have, from time to time, been pointed out in our own pages. But the deputation of railway guards, signalmen, and engine-drivers, representing the Amalgamated Society of Railway Servants, which waited on the President of the Board of Trade on the 2nd of December, has had the effect of putting the danger referred to in a stronger light. The collision of which we speak is not between one train, or one engine, and another, but between the Directors of the Railway Companies of the United Kingdom and the executive Government of the country.

The object of the deputation was to urge upon the Government the necessity of further legislation for the prevention of railway accidents. On this subject there is no class of men to whose experience more value is to be attached than to that of the operative servants of the railway companies. The force of this remark will be at once seen by referring to the general reports to the Board of Trade on railway accidents. Taking the year 1878, to which an unusual degree of safety has been credited, 1,032 persons were killed, and 3,513 injured, on the railways of the United Kingdom. Of these, 160 persons killed, and 1,307 persons injured, were passengers; and 452 killed, and 1,951 injured, were officers or servants of the railways. In this year the number of passenger journeys (exclusive of those of season-ticket holders), was 562,732,890; a figure which is swelled to more than 670,000,000 of journeys if the season-ticket holders are taken into account. If we suppose that each passenger took on the average two journeys a week, we should have a total of some 6,600,000 individuals, amongst whom the above-named 160 deaths and 1,307 serious injuries would have to be distributed, giving in round numbers one death in 40,000, and one injury in 5,000, passengers, allowing each of them 100 journeys in the year. The number of railway servants is not stated in the Government returns. It has been estimated at 300,000; and if we suppose that to be anywhere near the mark, there will have been one death out of every 666, and one accident, of sufficient gravity to attract the notice of the Board of Trade, out of every 153, servants employed by the companies. We have not seen the subject put in this light before. In fact, as far as we are aware, there exist no data affording absolute information on the subject. The Board of Trade Report, which glories in the fact that in 1878 only one fatal injury occurred to a passenger, from causes beyond his own control, out of 23,540,000 passenger journeys, gives a calculation which is, to a certain extent, highly reassuring to the public. But it selects the rarest of all accidents, and refers these to the largest number of journeys, so that the ratio by no means represents the safety of a traveller, but only his safety in one individual journey. On the other hand, as to the proportion of injuries among the railway servants, the report is not only absolutely silent, but it does not furnish the means of ascertaining the proportion. It states the deaths and accidents reported, but it does not show the danger-rate, or state the number of persons among whom those injuries have been distributed. If this were done, the horror of the public would be great. It should be observed that even if the number of railway servants attains half a million (which, we think, must be very far in excess of the reality), the proportion would still be as high as one death out of every 1,106, and one reported injury out of every 255, servants,

in the course of a single year. It cannot be said that this is a satisfactory state of affairs.

Mr. Evans, the secretary of the Amalgamated Society, urged that immediate effect should be given by the Legislature to the recommendations of the Royal Commission on Railway Accidents; that discretionary power should be given to the Board of Trade, under review by a new appellate tribunal; and that all companies should be required by law to provide all trains, goods and passenger, with sufficient brake power to stop them within 500 yards. We cannot but regret that a deputation with which our sympathy is so strong should have been so ill-advised as to suggest remedies which are so crude in their conception. If the deputation had developed the considerations which we have above indicated, and shown what was the death-rate and what the injury rate among that picked and highly deserving body of public servants in whose hands the safety of the travelling public lies, and had asked for a public inquiry into the causes of this danger, and the means, of a more thorough kind than those attempted by the Commission of 1877, that might be adopted to avoid them, they would have had the public with them altogether. But in suggesting details of legislation the deputation went *ultra crepidam*, with the usual result. Mr. Chamberlain pointed to the Report of the Accidents Commission to the effect that they were "not prepared to recommend such an interference with railways as would impair in any way the responsibility of the companies for injury or loss of life caused by accident on their lines." To place the proposed discretionary powers in the hands of the Board of Trade would be to take the most objectionable part of the plan for transferring the management of railways to the Government, without gaining any of the advantages of such a transfer. And the proposed spectacle of the Board of Trade contending with the companies before a new tribunal would be one hardly reconcileable with the dignity or utility of the Government of any civilised State.

Again, while we are fully of opinion that trains are now frequently unprovided with sufficient brake-power, we have the firm conviction that the efficiency of very powerful brakes in producing absolute safety has been much over-rated; and that the new sources of danger which arise from the use of such brakes have been wholly left out of sight. If we look on the series of disasters that occurred some few weeks ago, we find that at least as much danger was caused by reliance on these brakes as was prevented by their adoption; while it was only the presence of mind of a guard (of whose reward by the company we have not heard) that prevented a calamity more frightful than any yet recorded from automatic action of a self-acting brake at the wrong time. It is both idle and mischievous to take up a cry as to one out of many precautions, as if that was all that is required.

Mr. Chamberlain, however, took the bull by the horns, when he said that "if the companies will set their backs to the wall and defy public opinion, there will be no alternative but for the Government to lay a statement of the case before Parliament, point out how ridiculous is the position of the Board of Trade, and ask for such further powers as may be necessary!" There is no doubt that in the matter of railway inspection, (just as is the case in that of sanitary inspection), the absolute want of initiative power on the part of the Government is a great public evil.

The recent number of *Fraser's Magazine* contains, under the head of "The Problem of Railway Safety," remarks on this subject which deserve attentive perusal. The refusal of the directors of the English lines to supply the information of which the Board of Trade reports have been so long vainly declaring the need, is contrasted with the procedure of the French and the Belgian Legislatures, and with the full and detailed official information given by the Commissioners of the Railways of New South Wales. The direct relation between the variation of speeds (as between different trains), and both the earnings and the safety of the lines, are pointed out. And it is shown that, if it can pay the great trunk lines to carry minerals at rates of freight kept down by the competition of seaborne coal, it would pay them no less to carry passengers at one-sixth of a penny per mile.

The great thing that we now wish to show is, that the interests of the railway servants are identical with those of the travelling public. As to this, we think there can be no contention. Further, it is our opinion that the interests of those two great classes of persons are identical with those of the railway companies themselves, intelligently considered. And we therefore anticipate that if the companies continue, as the President of the Board of Trade said, to set their backs against the wall, collision with Parliament and with public opinion will come, sooner or later, and the later the worse for all parties.

THE CONVERTIBILITY OF THE IMPONDERABLE FORCES.

THE PHOTOPHONE.

THE lecture of Professor Graham Bell, which we announced in our number for the 27th ult., and of which we gave some anticipation in an article on "Noises" in the same number, was delivered at the Society of Arts on the 1st current. Our readers cannot be unaware of the fact that the last forty-five years have witnessed the successive discovery and application of a number of different methods for appreciating and utilising vibrations so small that "to any thick vision they are indiscernible." The first occasion, so far as our personal knowledge of the matter goes back, on which it was sought to apply to the service of daily life the results of the scientific probings of the phenomena of vibration, was in 1835, when Mr. Robert Stephenson was making what was called the Euston Extension of the London and Birmingham Railway; that is to say, the line from the Camden Station to Euston-square. The inclines on this line are what was then considered very steep. There is one gradient of one in seventy-five, and one, if memory serves, of one in sixty-six. To draw the trains up these inclines it was considered that it was necessary to use stationary power; and winding-engines with large drums were erected at the Camden Station, while sheaves were laid in the middle of each track of way to carry the rope of four miles long. The question of how to give to the engine-man at Camden a signal from the station-master at Euston much exercised the mind of Mr. Stephenson during the construction of the line; and Professor Wheatstone was one of the men of science whose co-operation was requested. The first experiments of Wheatstone were made with a view to the conduction of the vibrations of sound. Among other experiments, a wire was led from the sounding-board of a piano for some distance, and connected with the resonance-box of a violin. When the piano was played, the violin gave forth the tune, and that in the notes of the original instrument rather than in its own. Then followed the application of the electric current to the transmission, not of sound, but of motor vibrations, leading to the admirable results of the various electric telegraphs, the construction of submarine cables, and finally the creation of a new alphabet, the Morse code, which has already attained an unrivalled excellence, although the printing tapes used still admit of great improvement and simplification. For some forty-two years the attention of physicists was chiefly directed to the improvement of the mode of transmitting vibrations that would produce motion at a distance,—telemotors, in fact,—although in such minute doses as only to be available for signals. But even in this work, the introduction of the imponderable index of a ray of reflected light, the invention of Sir W. Thomson, was needed to afford a mechanism sufficiently delicate to be acted on by the small force transmitted through a long cable.

Some two years ago, the attention of telegraphists reverted to the original aim of Mr. Robert Stephenson, the transmission of sound, and since that time a whole continent of vibratory facts has been explored,—explored so far as to lead us to believe that we are yet only on the confines of discovery. The telephone was lectured on by Professor Graham Bell at the Society of Arts in 1878. By this instrument the vibrations impressed by the human voice on a disc placed at one end of the line of electric connexion are audibly thrown out as repeated by a corresponding disc at the other end. Then came the phonograph of Edison, by which the effects of the vibrations were so impressed on a yielding metallic surface that the sounds which made the dents could be reproduced from those same dents at will,—a wonderful invention, the full utility of which is yet by no means realised. Then came the microphone of Professor Hughes, in which, by taking advantage of the different vibratory elasticity of different bodies, a series of sounds committed to the magic custody of the transmitting wire can be magnified, even as visible objects are magnified by the microscope. The last invention, the photophone, seems to sum up the labours of the previously-named discoveries. It grasps Sir W. Thomson's imponderable lever; it utilises Wheatstone's insulated wires; it uses the telephone and the microphone ideas; and it crowns the whole by taking advantage of the discoveries of Baron Berzelius and Mr. Willoughby Smith as to the special electric qualities of the rare and newly-discovered metal, selenium, in its two allotropic forms. So sensitive is this metal to the influence of light that its power of electric transmission varies, with incalculable delicacy, according to the incidence of light on its surface. Thus if a plate of selenium is made to act as the receiving surface of a telephone, the sound received by this plate, or rather absorbed by it, will vary according to the light which falls upon it at the time of reception. That modification is effected by the use of a mirror, placed near the mouth of the speaker, the light from which is collected by a parabolic reflector, and sent through the selenium cell into the telephonic circuit.

We hope that a full and illustrated account of this last physical triumph will be published. It often occurs that the most brilliant inventions, like new-born infants, sleep much and for a long time after their birth. Some of the inventions to which we have referred have seemed to slumber in this way. How soon the photophone will find its place in the great order of vibratory movements, utilised for the service of man, it is impossible even to guess. All that we can see clearly is that we are collecting the elements of a new physical science and industry of which it is impossible to imagine the range or the limit. What Grove did in opening men's minds as to the co-relation of the physical forces, Graham Bell, Edison, Hughes, Sir W. Thomson, and others are doing for what used to be called the imponderables. We hardly like to use the term "conversion of motion into electric tension," but such, at all events, is the phenomenal explanation of the electric light. Now, the extreme delicacy of the relation of the vibrations of light and of sound has received a most unexpected illustration. And the result is that we are reconsidering our conception of the nature of solid matter. We have had to throw overboard the ideas formerly implied by the words solid and material. We form some faint idea how intimately heat enters into the constitution of matter; how light and heat and sound are, so to speak, allotropic forms of the same energy. All this is only paving the way for that transmission of electric force, not in doses that can move a needle, but in hundreds and thousands of horse-power, of which Sir W. Thomson and Dr. Siemens have given us such magnificent (though somewhat contradictory) forecasts. Instead of limiting our inquiries into the subject of "Heat, a mode of motion," we shall have to study the relation of vibration to physical condition, or of "motion, a mode of matter," or "matter, a mode of life."

THE STAFF OF LIFE.

ALL persons who lay to heart the welfare of the industrial classes, to say nothing of their own, ought to take interest in that question as to the best mode of bread-making, to which just now public attention is being pointedly directed.

For ourselves, our readers may do us the justice to remember, the subject has not the charm of novelty. The costly waste with which the Wiltshire agricultural peasant lays out the greater part of his weekly earnings in white bread, eaten hot from the oven,—which the Scotch would term "fizzenless,"—has before now been lamented in our pages. It is with great satisfaction that we see earnest attention directed to the subject. The first wish that we have to express in the matter is, that the reformers, with whom we have so much sympathy, should not ride their hobby to death, and throw away the real advantage of their position by claiming further advantages, which may be regarded as only imaginary.

Nothing, we are convinced, stands more in the way of any necessary and well-considered improvement than the excess of zeal on the part of its advocates. We were about to write igno-

rant zeal, but it will be more correct to say zeal partially instructed. A thing may be freshly proved to a certain mind to be an evil; but the probability is, that it has been long known to be, more or less, an evil. The zealous man sets his lance in rest and rushes to the charge. The wise man pauses to inquire how it was that the evil became rampant. Some reason must exist. And it is only by the detection of the *raison d'être* of the evil which it is wished to obviate that any steps that are adequate for the purpose are likely to be taken. Thus, it is not enough to say,—"White bread is costly and less nutritious than brown bread." That is no new discovery. Those persons who wish to utilise it have first to explain to themselves how it is that that costly artificial product,—the baker's loaf,—has established itself as so universal an institution in this part of Great Britain.

The ground taken by recent lecturers on the subject is that of chemical analysis. Of the extraordinary value of that method of putting nature to the torture we should be the last persons to speak with anything approaching to disrespect. The progress of exact knowledge in chemistry we regard as amongst the greatest triumphs yet attained by human genius. But nature must not be examined under torture alone. Especially as to those more subtle of her products which are beyond the direct cognisance of the chemist, must we be content to listen to her unconstrained utterances; at all events, in control of the results of the analyst.

Now, we are told that one shilling's worth of wheat meal bread will form a substantial meal for nine people, and that it contains forty per cent. more nourishment than an equal weight of white bread, which will cost much more. That is a proper subject of investigation; and, moreover, one in which personal experience is not absent to qualify the judgment. But when the lecturer goes on to say that it contains three times more flesh-forming material, seventy times more heat-forming material, and three times more bone-forming material than one shilling's worth of beef, it seems to us that the argument breaks down. It deals with the test-tube and scales instead of with the human stomach and the phenomena of consciousness. Take a working-man exercising the harder kind of labour, that is to say, a public writer, an architect in full work, or a busy barrister, either in the discharge of his daily toil, or when he is seeking new health on a Scotch moor or an Alpine pass. Place before him for breakfast a meal loaf, as good as the Bread Reform League have got to offer, and a pat of butter, with tea or coffee. He asks for a small bit of beef steak or a hot mutton chop, with perhaps a glass of ale. You meet this request with a pamphlet containing statements such as that bit of information about seventy times more heat-giving substance. He says, "As to all that I can say nothing. I know the difference that the little bit of hot meat makes to my comfort all day, and I leave analysis to chemists." Personal experience leads us to sympathise with the working-man in question. And to such, and thus to the great majority of those who influence the less-educated classes, the efforts of the bread-reformers assume a sort of fantastic, unreal aspect from the over-statement arising from relying on chemical analysis alone.

While we wish more power to the elbow of the Bread Reform League, we speak simply in support of the view that English people can, if they will, have much more nutritious bread than they usually eat, at a considerably lower price. We do not, however, think fit to join in a cry against the bakers. It is quite true that, from time to time, the want of conformity between the price of wheat and that of bread attracts angry animadversion, which, after a while, either produces its effect, or from some other reason sinks into silence. Nor do we in any way agree with those who cry out for legislation on the matter. We are of that ancient, unpopular, but robust school which holds that people ought to exhaust the means at their own command before they go to others to help them. In this case of bread, as in most others, it is the consumer who dominates the producer. The consumer elects what bread he will eat, and if the peasant who earns nine shillings a week insists on eating, and on giving his children to eat, the whitest bread that is made, but out of the oven, with, if he can by any means compass it, a bit of butter spread on the smoking slice, it is not by Act of Parliament that the wasteful and pernicious taste will be eradicated. Neither will it be by lectures. Example will, in such a case, go farther than precept. We are not undervaluing the importance of sound chemical knowledge as to the value of food. We think that if the Bread Reform League will study the files of the *Builder*, they will find very much of what is now being announced as new to have been stated very plainly in them. But all means of publicity are good for the purpose. Our annual consumption of wheat is now about 20,500,000 quarters, which is worth on an average some 54,000,000*l.* Of this, 32,000,000*l.* is allotted to home produce, and 22,000,000*l.* to importation. How much of this is lost to human consumption by our eating fine flour bread instead of meal bread, it will be an instructive sum to work out. As between wheaten and oaten bread, the proportion of nourishment is very much greater in the latter. Wheat contains 146 parts of flesh-forming material to 698 parts of carbon, or heat-forming material. Oats yield the proportion of 17 to 664. But beans, be it remembered, yield 240 parts of flesh-forming substance to 577 parts of heat-giving. The value of the bean as an accessory, where rice (with its low proportion of 65 flesh-forming to 795 heat-giving element) is the staple grain, is practically well known in India. And in Southern Italy, where the best white bread in the world is made from the superb Carozelle wheat of the Apulian plains, the peasantry may be said to live for at least two months out of twelve on beans.

It appears to us that for this matter of bread reform an ounce of practice will be worth a pound of theory. The first thing to do is to show that meal bread may be made not only economical, but palatable. The idea of the grinding of the wheat by a steel mill seems to us a very good one; and that the more so because it is not intimated that the inventor of the mill seeks to make undue capital out of his invention. How much of the discomfort produced by some kinds of meal may be due to the local nature of the millstones, is an interesting subject for inquiry. In his well-sung journey to Brindisi, Horace complains of the "stony" character of the bread of Canosa. "*Nam Canusi lapidosus.*" At the present day the traveller over the same route will do well to take care of his teeth. The bread of Canosa is still full of a grit which can hardly be produced by the fine corn of the district. Not that it is necessary to supply from mechanical sources a kind of impurity which is only too much to be regretted in some vegetable grains. In Australia, a plant of the family *Marsileaceæ* covers the ground, in some places, with its little black spores, about the size of sweet-peas. The albuminous matter contained in these spores makes a nutritious food, when properly prepared. As a porridge or stir-about, it is said to be delicious. But the skin of the pores is so irritating to the stomach, that, if it is not carefully removed from the meal, the food, though still palatable, becomes poison. It causes such disturbance in the digestive functions that one of the most famous explorers of that region, the man who first went through Australia from north to south, perished of absolute starvation, though never failing to eat daily meals. He had not the means of removing the husk, and, in the absence of other food, absolutely perished of hunger.

We had written thus far when we read, to our great satisfaction, two letters which have anticipated, in the most accurate manner, the recommendations which we were about to offer to the League. One of them is from Miss Yates, a member of the Ladies' Sanitary Association; the other from Dr. Bartlett, who spoke on the subject at the recent meeting at the Town-hall, Kensington. We were about to suggest that the first step to be taken for the practical furthering of the object in question would be to supply to the public such a sample bread as should avoid the objections raised, as above hinted, at such a price as would allow a living profit to a baker who could command a fair amount of custom. We are told that the Bread Reform League has now a list of nearly 100 shops where the bakers are willing to sell, at the same price as white bread, wheat-meal bread, made from meal ground in a steel mill. This is a step in the right direction. We may observe that, if all said be true, the meal bread ought to be cheaper than the white bread,—but let that alone for the present. Stern and sad experience leads us to caution the committee against relying on "lists of shops." To do justice to an important movement of this nature, it will be necessary that there should be a constant, unobtrusive, vigilant visitation of these shops. Some one fit for the task must look in from time to time and buy a loaf. He will have to note how often the shopkeeper "happens to be out of" meal bread; whether from having "already sold that day's supply," or from some mysterious failure in the mill, or the oven, or part of the machinery in the production. We shall be agreeably surprised if these hitches are not found to be more frequent than was at all anticipated. Next, our suggested visitor must take the pains to take his loaf home, and to eat it, or at least to eat enough to enable him to judge whether it is the real article, or some more lucrative imitation of it. If this he done, and if, with some care to suit the public palate, such meal bread as we know can be made be regularly supplied to the public at the price which accurately corresponds to the cost of production, plus a fair tradesman's profit, there will be a standing ground for the lecturer or the public writer; and we may hope to see the steady but certain introduction of a better and cheaper kind of bread.

THE SANITARY CONDITION OF UPPER-CLASS LODGING-HOUSES.

There can be no question that those who have for years been urging that more attention should be paid to the sanitary condition of our dwellings are at length beginning to see their efforts bearing some fruit. The more intelligent householders are showing some signs of an appreciation of the value of a good sanitary condition of a dwelling, though we fear that it will be a long time before the proper appreciation of this matter is taken hold of by the large mass of the population. There is, however, one class of dwellings which as yet is, it may be said, wholly uninfluenced by sanitary improvements. These are what we have termed in the heading to this article,—upper-class lodging-houses. These lodging-houses are most numerous in our large towns. London contains by far the greatest number, which are inhabited by all kinds of persons,—young noblemen, young barristers, young merchants, and every kind and manner of professional or non-professional person. In the larger towns, such as Liverpool and Manchester, they are chiefly occupied by young men engaged in the business of the place. And we venture to affirm, without fear of contradiction, that an examination of the numberless houses used as lodging-houses would show them to be in a very backward sanitary state. Can this be wondered at when the matter is considered for a moment? The ordinary lodging-house keeper is, no doubt, a very respectable person. In the best class of London lodging-houses the proprietor is usually a retired domestic servant, very respectful and civil, with no mean idea of the desirability of comfort, with a dislike of ventilation, and absolutely ignorant of the value of a good healthy house. In the large towns in England the proprietor is less often an old domestic servant; he is very often,—if a man,—a clerk, or is engaged in some lower kind of business occupation, whilst his wife attends to the house. But, again, he is a person with small appreciation of the necessity of a healthy house. In London most of the proprietors hold their houses on seven, fourteen, or twenty-one years' leases, and under the usual London system,—one which sets a premium on doing as little as possible to make a house healthy,—the tenant must bear the cost of any improvements which he makes. The natural consequence is, that in addition to ignorance of sanitary matters, there also exists a desire not to spend money upon anything which shall in any way diminish the profits to be taken from lodgers. This is perfectly natural. Lodging-house keepers work hard and do not make much money. They have rent, wages, and other expenses to provide for, and may not always obtain the tenants to pay for the outgoings, or to bring in the margin of profit. They are under fear of no authority to rummage into their pipes or drains or closets. The tenants, taken as a whole, consist of young men who have not yet given much thought about sanitary matters. As long as the cooking is fair, the rooms pretty warm in winter, and not overpoweringly hot in summer, they are content with their quarters. The larger portion of the day is spent in some other place, and it is

the evenings and nights which see them mostly at home. If sewer-air happens to make its way into their rooms and causes them to feel ill in consequence, they will say they are "seedy"; will lay it down to a hot theatre, had wine, or some cause quite different from the true one; and if healthy and strong, will very likely throw off the sickness. In many cases, too, the lodgers remain no very long time in the house; if they find the smells disagreeable they perhaps change, and change in all probability from Scylla to Charybdis. And so the time goes on, and the drainage and ventilation remain unimproved and a constant source of danger to the inmates of the house.

If we take, for example, an ordinary good lodging-house in Liverpool which possesses a bath-room, we shall in most cases find that a water-closet is in the bath-room, or, if it is not, that the waste-pipes of the bath directly communicate with the soil-pipe. This is only one instance of an unwholesome condition of a house, which is liable to breed disease and consequent illness. If we penetrate into the lower regions we shall find sinks, and drains, and traps which would set the mind of a sanitary reformer a-thinking on the uselessness of his endeavours. And all these defective drainage arrangements are the more dangerous in lodging-houses, because, as a rule, they are not counteracted by the open windows, good fires, open chimneys when no fires are burning, and general cleanliness, which a lady who is mistress of a house takes care to see exist. It must, in fact, be a matter of almost common knowledge to an observant man that the sanitary condition of lodging-houses is not what it should be. And let it be remembered that we are now treating not of lodging-houses for workmen, but of lodging-houses for the upper classes, who are, as a rule, engaged in some business or profession, and who, generally, are part of the rising generation of Englishmen, and we much doubt whether any improvement can be looked for for a long time. There is one reform which might do something, but which would be much opposed. That reform is the inspection of every lodging-house in a town by a competent inspector. The ordinary Englishman hates anything like inspection; the inspector is a man to be abborred, and we feel quite certain that any such reform would be greatly opposed. It would be opposed both by lessors and lessees or yearly tenants. It would be wholly unfair to make tenants (we are putting lodgers now aside for the moment) pay the cost of structural repairs, such as new drainage, alteration of sinks and closets, and ventilation of drains, and in London the ordinary landlord will not, if he can help it, do anything for a tenant. Therefore, to make any such reform just, it would be necessary to make the cost of such repairs a burden upon the landlord,—at any rate, to some extent; and, therefore, as we say, there would be two classes in opposition to such a reform. That any change for the better can for long years take place without a compulsory inspection of lodging-houses from time to time, we feel sure cannot be expected even by the most sanguine reformer; and, at the same time, there can be no question that the sanitary condition of upper-class lodging-houses is a subject which deserves very careful consideration, to settle the measures which should be taken to improve such condition.

THE CAFÉS OF MUNICH.

Whatever may be said for or against the views of a great part of the public with regard to the question of temperance, there can be no doubt that the movement in favour of what has been called coffee-taverns is exceedingly active, and to a very large portion of the population of our great cities these coffee-taverns must have come to supply a long-felt want; it is not too much to say that we may view them as one of the most beneficial of our adaptations from foreign ways. In the case of our coffee-taverns, adaptations they certainly can only be termed, for they differ singularly both from the ideal and the reality of the foreign *café*. But there are *cafés* and *cafés*, as any one familiar with the Continent knows, and the full-blown *café* of the Paris boulevard, the now adopted model of such institutions throughout the world, differs as strangely from the characteristic and dark little *café* of a Venetian bye-street as must the seventeenth-century Grecian Coffee-house in Devereux-court,—whose model, by the way, would be taken from this latter,—from the most recently-built *café* in the Avenue de l'Opéra.

The *café* is an institution which takes in the life of the Continental far more the place of the English club than is usually supposed, and he begins his acquaintance with its pleasures at an age when the club is, for ten years at least, shut to the Englishman. It is no new theory that it is in great part owing to this early training that the Continental acquires that familiarity with life and the world, and ease in manner, which in the present day are more than ever considered essential. The ways and habits of the mug-house must infallibly give way, and the coffee-tavern, it is not unjustly hoped, will tend greatly to aid in refining the habits of a large number of the inhabitants of our cities. In foreign *cafés*, side by side with the most ceremonious and formal of military martinets, the most punctilious and severe priestly or scholarly manners, will be seen the free-mannered *bourgeois*, the comfortable *boursier*, the radiant student, or the humble shopkeeper.

The *cafés* of all foreign towns offer their peculiar features of interest, and as snob have always afforded writers gifted with the happy power of "touching off character" ample field for the exercise of their peculiar abilities. One may be excused, therefore, in writing from Munich, in feeling that the *cafés* of the Bavarian capital offer some character by which they merit notice; their peculiar comfort, and the exceptionally generous consideration to what might be termed the literary accommodation, form a feature which, at a moment when there is a movement in favour of the spread of the consumption of coffee at home, is particularly worth note. When these same *cafés* assume the proportions of important architectural features of the city,—features in the decoration of which the wealth of the capitalist has been expended in the employment of art which falls little short of the art of the best days of decorative painting,—they present another claim to our notice.

The subject is not an uninteresting one to treat, as all who have visited Bavaria will concede that not least among the impressions they may have borne away, even of a short stay in King Louis's capital, was that connected with the numerous *cafés* scattered over the town. With the thorough-paced Parisian *café* we have all long since become familiar; nor is it, perhaps, going too far to say that with an increasing amount of familiarity has come its proverbial accompaniment. The Parisian *café* has ceased to be what it was; it has ceased, in fact, to be a *café*, and since it has lost this great feature it no longer possesses the charm that made it in the past the resort of the choice spirits of letters and of art; nor has the Parisian *café* any longer that fascination for the stranger,—we speak from an English point of view,—that once prevailed. In Munich the traditions still exist of the old days of the *cafés*. There we find much of the old comfort, and that absence of the too-clearly-expressed modern feeling of one's room being worth more than one's company; there one is induced, and, indeed, invited, to stay, by the accommodation afforded, by the smallness of the outlay, by a welcome from the proprietor or proprietors,—no syren-like *dame du comptoir*,—and by what appeals to the Anglo-Saxon peculiarly, a large supply of journals; German (of which there are several dozen ranged round the room) and foreign, always an English daily paper to tell one of the doings at home; the *Illustrated London News*, or its equally popular sister, and the ever-familiar face of Dicky Doyle's dear old *Punch* and his dumb companion, with all the picture papers from Leipzig, from Vienna, and from Paris, while further amusement is supplied by billiards, and cards, and chess, which replace in Germany the fast-dying science of dominoes in the Paris *cafés*, and, what is by no means the least uninteresting or unpleasant feature of all, a service of bright, intelligent, almost, perhaps, too well-looking girls, whose rapid movements and attention to the wants of the frequenters are a constant source of delight to the stranger, as well as evidently of amusement and pleasure to the native *habitués*.

Most of the *cafés* at Munich, and there are not a few, are arranged on this principle, though, as may be imagined, throughout the town the age of the different establishments affects not a little the interior style and decoration, but each as the date approaches more nearly the present day is more gorgeously decorated than the last. Among the more recently built no restriction seems to have been placed on the architect in his design, exteriorly and interiorly. It would seem as if we were indulging in an extravagant dream of splendour were we to describe fully one of the most recently completed of these establishments, for here is employed the largest and noblest style of modern Italian architecture in solid stone-work, enriched interiorly with carving and gold, and the walls and ceilings of the rooms are adorned with highly decorative paintings, executed by artists who are all but famous in the history of modern art.

It is not a little characteristic, and a point to which perhaps till now we have not drawn sufficient attention, that in each and all of these establishments, coffee, the genuine extract, not a decoction of the Mocha berry, is supplied at an excessively modest rate (2½d.), and forms the speciality, the only deviation from this rule consisting in the very small consumption of mild liqueurs in the regulation liqueur-glass. It is easy to trace the influence of Venetia in the large glass of pure water,—drawn from the continually flowing fountain in the middle of the room,—which is immediately brought one on entering, though it is more German to have supplied at all hours of the day coffee with milk in it, together with the three regulation lumps of sugar in lieu of the little cup of *caffè nero*, and the measure of pounded sugar, of Italy.

In many parts of the world there must be artists, especially musicians, architects, painters and sculptors, and decorators of all kinds, literary men and scholars, and teachers in many ways, who look back to the pleasant hours they have passed in the *cafés* of Munich with affectionate interest; and how often must even the casual visitor to this part of the world remember the courteous welcome that is always so liberally given both by the host and hostess. Whatever may be the system by which these establishments are made profitable investments (and this is difficult to understand), it is quite certain that they are capable of affording to any observant person an admirable lesson of the advantages to be derived from the strictest economy in every detail of their management, and the most careful desire to supply the clients with the utmost possible return for their outlay.

EATON HALL.

We publish in our present number a double-page illustration of Eaton Hall, near Chester, the seat of his Grace the Duke of Westminster, and a plan of the ground floor. Our view is taken from the south-west, and includes the main building and the chapel. The illustration sufficiently sets forth the character of as much of the exterior as it comprises, the style being Early Pointed, freely treated. We shall, however, call attention to some of the features on the east of the garden front. On this side of the house is the Grosvenor wing, containing the suite of family apartments, connected with the main building at the north-east angle by a vaulted corridor over a bridge. Between the Grosvenor wing and the main building stands the north wing, which sets back, and is lower than either, forming an important connecting-link in the general view. Behind the north wing rise the clock-tower and the chapel-turret, so that from certain points of view in the garden the Grosvenor wing stands as a central feature; on its right the main building, while on its left the stables and other inferior parts of this immense establishment stretch into the woods for a considerable distance, the chapel-tower forming, even from this side, the culminating feature.

The main entrance is by the *porte cochère*, which forms a conspicuous feature in our engraving, and which leads, by a flight of steps, and beneath a lofty doorway of alabaster, into the hall. This consists of a large square apartment, 32 ft. by 32 ft., extending through two stories of the building, with lateral extensions towards the north and south, which are only separated from it by two large arches, and are but one story in height. A double arcade at the further or eastern end leads to the saloon. The floor of the hall is a sumptuous one, of "opus Alexandrinum," in an elaborate arrangement of porphyry, serpentine, *giallo antico*, and Parian marbles.

The ceiling is of panelled wainscot, and the lower part of the walls is lined with

alabaster and Genoa green marble, while seats of red granite are ranged between the arches and the east and west walls on either side, and cover the arrangements for heating the apartment. The chimneypieces are principally of alabaster; that in the northern bay has a long sculptured panel, in the centre of which King Richard II. is represented delivering his famous judgment as to the right of Scrope or Grosvenor to bear the arms *azure*, a bend *or*. The *personæ* on either hand of the king are all of historic interest, and are recognisable by their semblance to known authorities, or by their armorial bearings, amongst them being John of Gaunt (the king's uncle), Geoffrey Chaucer, Hotspur, the clergy and notables of Cheshire, &c. The chimneypiece in the northern extension has a similar sculptured panel. In the centre is King William I. bestowing the sword of Chester upon Hugh Lupus, the present duke's namesake and ancestor; the groups on either hand displaying family or local incidents of historic importance.

The grand corridor, which passes between the eastern end of the hall and the saloon, leads towards the south to the great drawing-room and the library, and northward stretches right away, though diminished in width, throughout the whole length of the building to the cross corridor, connecting the chapel with the bridge which leads to the Grosvenor wing. The northern portion has a groined ceiling.

The library occupies nearly the whole of the south front, and is 90 ft. by 30 ft. It has a deep bay in the ground-story of the tower, which is conspicuous in our view, and two large bay-windows, which are also to be seen in the engraving. Two angle bays at the west end further diversify the plan. It is fitted with walnut. At the east end stands the organ, in a richly-carved case, and the bookcases extend round the walls of the room. The various panels, friezes, and cornices are brilliant with inlay of mother-of-pearl and boxwood. The chimney-pieces are on the north side, and are of walnut, and they are enriched with carving and the inlay of pearl and box. The upper portions of them project, and are supported by caryatides representing the relation of all ranks to a library,—royalty, the church, chivalry, minstrelsy, husbandry, &c., being represented. The hexagonal panel in the centre contains in the one a clock and in the other an anemometer. The ceiling consists of walnut-cased beams and plaster panels, highly enriched with foliage, &c. The windows will be filled with heraldic stained glass. Over the entrance to the library is the "Caxton Memorial" which was illustrated in our volume for 1877, p. 687. The floor is to be of oak parquet.

The great drawing-room, 45 ft. by 36 ft., communicates with the grand corridor on the west, the garden, porch, lobby, and library on the south, and ante-room on the north. At the east it has one large recess, in which we understand will be placed Mr. Thornycroft's "Artemis," exhibited this year in the Royal Academy. The old plaster groined ceiling is retained, with certain modifications, and has been re-decorated. The chimneypiece is one of various marbles, purchased by the Duke while in Italy.

The ante-drawing-room adjoining has also its old ceiling, which has been decorated afresh. This room will be celebrated for its twelve panels of birds painted by Mr. H. S. Marks, R.A. The saloon has a high wainscot dado, and the walls above are painted also by Marks, illustrating the "Canterbury Pilgrims." The chimneypiece is of alabaster, and the central panel contains a procession of world-famous lovers, from Antony and Cleopatra to Raffaelle and the Fornarina. The smaller panels in this and the other chimneypieces before described contain allegorical figures, which have all some reference to the principal subjects, *e.g.*, Truth, Valour, Constancy, Love, &c. The ceiling is groined, and of wainscot. It is of very elaborate design, and is to be decorated with colours and gilding.

We now come to the ante-dining-room, with its walnut dado, in the panels of which family portraits by Gainsborough, Millais, &c., are framed. As in the drawing-room, the old plaster ceiling is retained, and has been re-decorated.

The great dining-room is of the same shape and size as the drawing-room. It is being fitted up with all-becoming magnificence in walnut. At the north end is the sideboard recess, which has a groined walnut ceiling, and a serving-room adjoins. To the west of the dining-room, and on either side of the corridor, are the billiard and smoking rooms. They are treated similarly, and have wainscoted dados, with dark oak panels. The ceilings are also of wainscot, and the walls are hung with stamped leather. The floors are of parquet.

The grand staircase is enclosed in walls of Grinsbill stone, with bands of Robin Hood and Forest of Dean. The steps are of Portland, and the balustrade of alabaster, carried on small shafts of various granites, in pairs. The ceiling is of oak, and is supported by massively-framed principals, filled in with tracery. At the second-floor level a bridge is thrown across for the use of the servants. The corridors in the east side are glazed with tinted quarry glass, and those on the west side with clear plate, so as to command a view of the park and the Welsh mountains. This staircase leads to the state apartments, which are on the first floor.

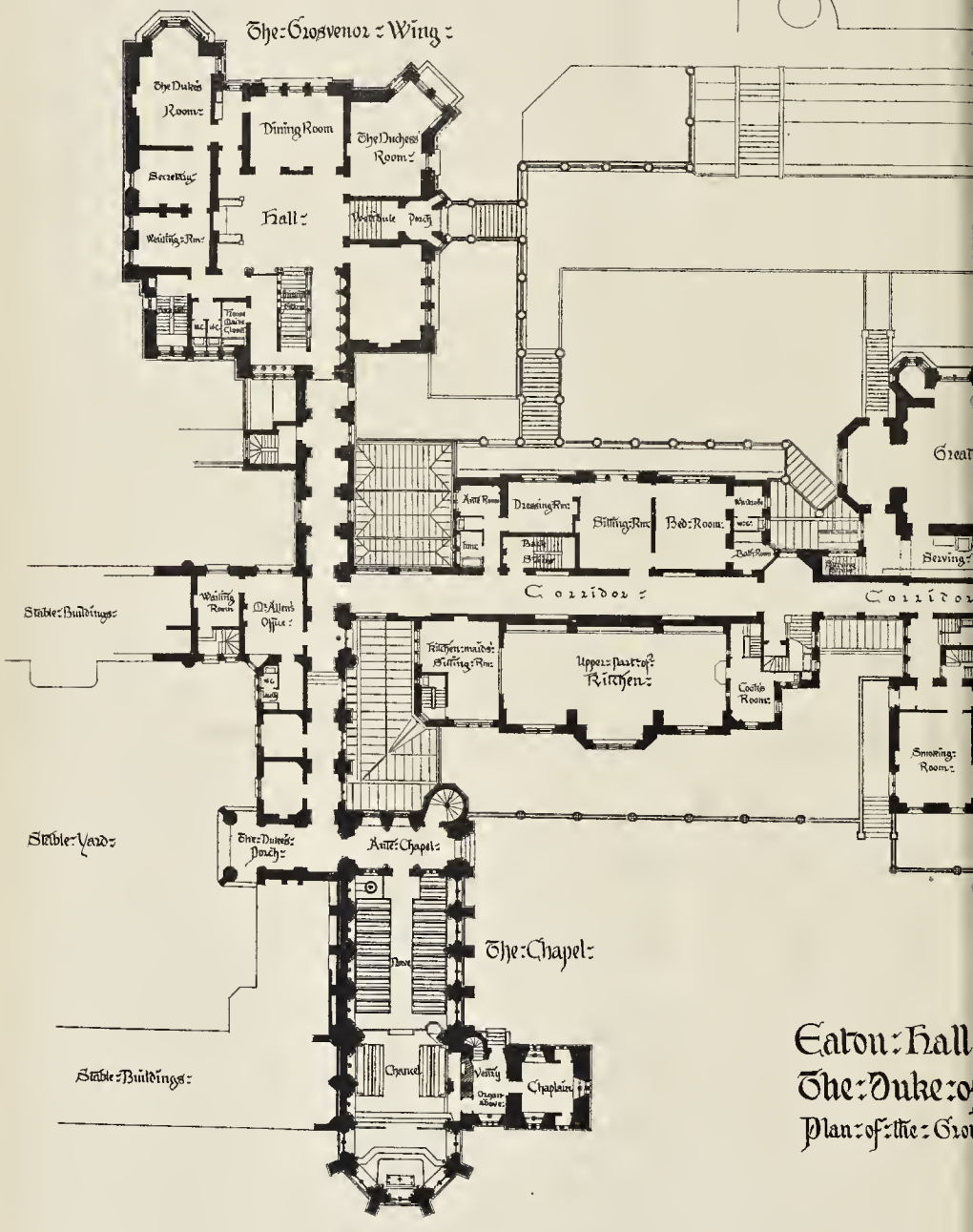
We have now described the principal apartments in the main building, and proceed to the north wing, the Grosvenor wing, the stables, &c.

In the north wing is the magnificent kitchen, lined with terra cotta, and a groined ceiling filled in with the same material. The Grosvenor wing is in itself a large house, and much space might be occupied with a description of it. It has a central hall, round which the principal apartments are ranged, and which is lighted by a centre light. From this hall, the principal staircase rises, and at the first-floor level a gallery is carried round it which gives access to the various rooms. The floor is of coloured mosaic, and the ceiling is decorated with heraldry. The apartments on the ground-floor generally have parquet floors and wainscot fittings and dados, and ceilings of plaster panelling in geometric patterns, enriched with colour. The duchess's room is panelled with views of Cliveden, Trentham, and Dunrobin, by O'Connor. The chapel was fully described in this journal in 1879, when an illustration of the exterior of it was given (p. 888). The stables, which in many respects are as well worth a visit as anything at Eaton, stretch away further still to the north, and are arranged round a large court-yard, in the middle of which is an ornamental basin with a central equestrian group, by Mr. J. E. Boehm, A.R.A. Beyond the stables are the coachmen's cottages, and the establishment is completed by the gas-house, water-works, and laundry, still further away by the side of the Dee. Large tanks in the library and chapel towers (the latter in reserve) supply water for the hydraulic lifts and in case of fire. On the west side of the house is the Belgrave Avenue, which is about two miles long, and on the east side the corridors of the grand suite of entertaining-rooms command an extensive view of the terraces, the river Dee, and in the distance the Peckforton Hills and Beeston Castle.

SCIENTIFIC AND ARTISTIC ASPECTS OF POTTERY AND PORCELAIN.*

The third of Professor Church's series of Cantor Lectures on "Some Points of Contact between the Scientific and Artistic Aspects of Pottery and Porcelain," was delivered on Monday evening last, when the division of the subject dealt with was "Stoneware and other Wares glazed with Salt." The lecturer said that the stonewares to which he wished more particularly to allude were those which had been chiefly made in Germany and in Staffordshire, and at Lambeth and Fulham, and which were for the most part glazed with salt. With regard to the body, or paste, of these wares, it might be said generally that stoneware led up from earthenware, through the beautiful jasper ware of Wedgwood, to hard porcelain. What was the structure of the ordinary stoneware and of the jasper ware first of all made,—and, indeed, invented,—by Wedgwood? It was essentially a fire-clay or china-clay, made less plastic, or less greasy, as the French would say, by the addition of silica in some form or other, generally in the form of fine sand or ground flint, which took away to a great extent its "soapy" feel when it was moist, and gave it a greater degree of hardness when fired in the kiln. At the same time, however, the addition of silicious material to the clay imparted a certain degree of brittleness, which, in so far as it went, was one drawback of stoneware. At the same time, the addition of silica imparted to the product a peculiar and characteristic property which stoneware did not share with any other kind of pottery. If a piece of stoneware were examined under the microscope, it would be seen to consist, first of all, of a great mass of small particles of clay, not very much altered by firing; and the six-sided outlines of the crystalline fragments of the mineral which formed the chief constituent of the clay, and the little angular fragments of the sand or flint, could be seen. But there was something which held all these fragments and particles together, viz, the glassy material which was formed at a high temperature in the kiln by the action of a minute quantity of alkaline matter which existed in the clay and united with the silica, forming a hard silicate of potash or soda, and lime. The lecturer then entered into the subject of clay analyses, pointing out that Stourbridge fire-clay, which contained only ½ per cent. of alkaline matter, was the least fusible of all clays, and hence its practical value in the industrial arts. Watcombe clay contained about 7 per cent. of alkaline matter, and Poole or Dorset clay 4 per cent. All clays were not equally adapted for stoneware, those with the larger percentages of alkaline matter being too fusible. The contraction of the clay in the kiln was a very serious matter, various clays contracting in very different degrees. In the Jermyn-street Museum there would be found a beautiful series of specimens of the different clays, arranged geologically, which could be used for potting purposes, each clay being represented by experimental slabs of the same size burnt and unburnt, so as to show the amount of contraction. Mr. George Moore, who made the experiments, presented the specimens to the Museum of Practical Geology, and had contributed to the catalogue of the pottery exhibited there an elaborate series of tables showing the results he arrived at. Stourbridge clay would contract only from 1 to 2 per cent., while other clays would contract from 18 to 20 per cent., or about one-fifth of their whole bulk. As to the progress of the manufacture of the body of stoneware in this country, the lecturer observed that Simeon Shaw, whose valuable book,—not to be trusted in every particular,—was published in 1829, said that at first the Staffordshire potters used a mixture (for stoneware glazed with salt) of brick, clay, and sand. They subsequently used a clayey marl and a grey clay from the coal measures mixed with clean sand. Shaw stated that to each bushel of salt thrown into the kiln for glazing, some manufacturers added one pint of red lead. Another manufacturer effected an improvement in the body of the ware by introducing ground flint into the clay, and his successor introduced another improvement by thoroughly washing the clay to get rid of ochreous and other matter. Wedgwood, in making the body of his jasper ware, instead of mixing sand with his pipe-clay and china-clay, used sulphate of baryta (heavy spar), which was opaque, or nearly so, when finely ground. There was a great deal of difference in the Wedgwood ware made during Josiah Wedgwood's lifetime and that made subsequently, and any one studying the porous open texture of the body of modern Wedgwood ware must, he thought, attribute it to the less careful uniformity in the grinding of the materials. Referring to some stoneware jugs exhibited, the lecturer said they presented some peculiarities which would at first sight lead one to suppose that they were English. They were globular in form, with straight necks, and were well potted and glazed with salt. They generally bore as a monogram either "G. R." or "A. R.," and, more rarely, "W. R.," but they all bore indications of being of an earlier period than that of George I. Many persons had accepted the notion that "G. R." stood for "Gulielmus Rex," and that the jugs were really of the time of William and Mary. The specimens exhibited were not, he thought, English, but were, no doubt, made for the English market about the end of the seventeenth century. Similar jugs, but inferior in material, shape, and finish, were made by Dwight, of Fulham, about the same time. As to "Bellarmines," some of them made at Fulham by Dwight were as good as any made in this country. Having referred to the development of stoneware in Staffordshire (where he believed it was no longer produced), the lecturer referred to Continental productions, and finally referred to modern stoneware as produced by Messrs. Doulton and Messrs. Stiff at Lambeth.

* See *Builder*, p. 654, *ante*.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Waiting Room
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Ante Room
Dressing Room
Sitting Room
Bed Room
Bath Room
Serving
Corridor
Stable Buildings
Waiting Room
Mr Allen's Office
Kitchenmaid's Sitting Room
Upper part of Kitchen
Cooks Room
Smoking Room
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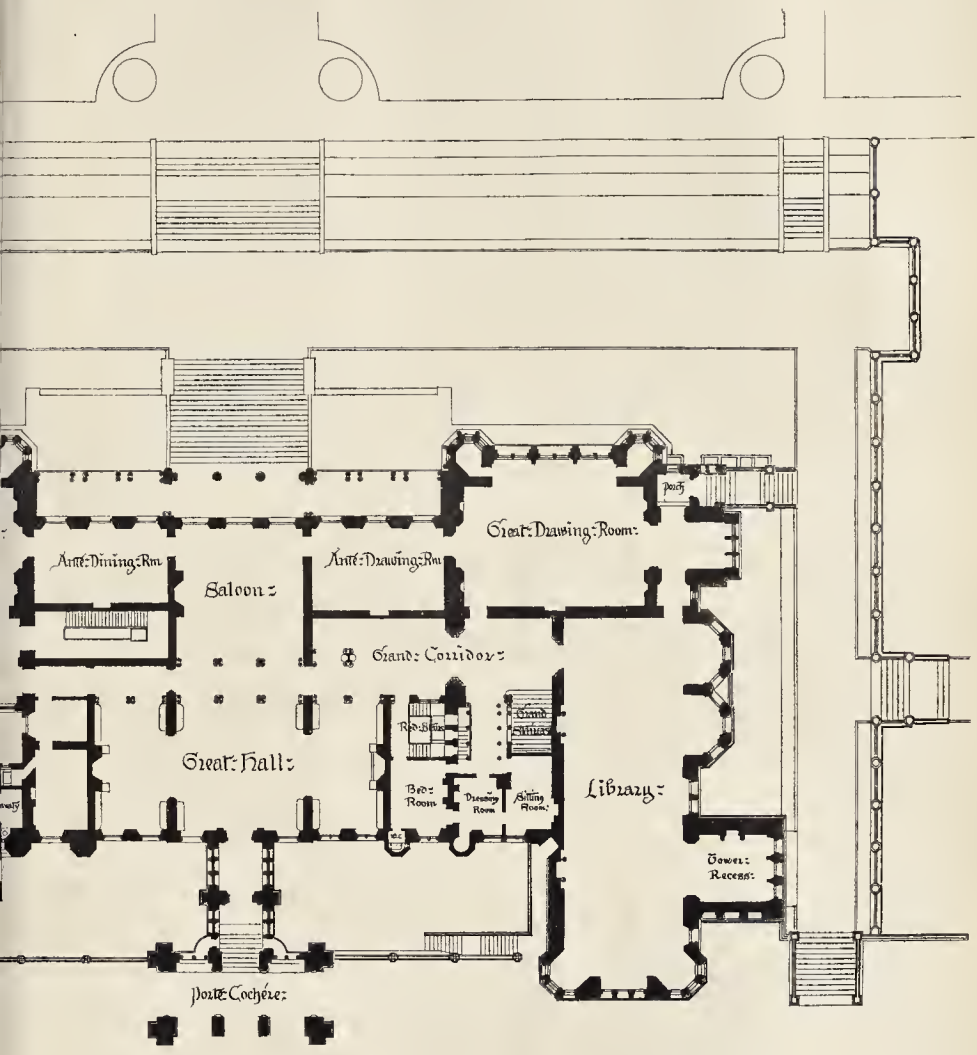

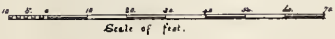

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EATON HALL, CHESTER.—Mr.

Waterhouse, A.R.A., Architect.

ARCHITECTURAL ASSOCIATION.

At the ordinary fortnightly meeting of this Association on Friday, the 3rd inst., Mr. Ernest C. Lee, president, in the chair, about thirty gentlemen were nominated for election as members.

Mr. R. Phené Spiers said:—I desire, by leave of the meeting, to say a few words as to

The Origin of the Architectural Association.

The precise date of the origin of the Architectural Association has so often been mooted in committee when a new "Brown Book" was being collated, that I have thought the matter sufficiently interesting to note down a few facts concerning it, especially as it was alluded to in the President's address this year, and as I am able to present the Association with what may be called the first "Brown Book" in existence. The society from which the Association sprang was called the "Association of Architectural Draughtsman." It was instituted on the 1st of September, 1842, and its objects, five in number, are set forth in the prospectus attached hereto. In this paper the rooms are stated to be at 33, Southampton-street, Strand. In the *Builder* of July 15, 1843, however, a notice is given of the society, wherein it states that the members meet on the first and third Wednesday in every month at the *Café Royal*, 42, Castle-street, Holborn; and a letter to the editor of that paper from Mr. J. K. Colling, who appears to have been one of the most active members of the society, states,—

"Sir,—It may not be known to you that a society exists called the British Association of Architectural Draughtsmen, having for its object, by union and co-operation, the providing with employment those of its members who may require it. For this purpose a register is kept of those unemployed, and which is available to architects who require assistants; also, each member of the society furnishes quarterly a drawing of some executed architectural subject, which drawings are kept in the portfolio of the society, and not only form the means of collecting vast professional information, but a sure guide to architects by which to judge of the ability of the assistants they may select. Connected with the society we have also established a benevolent fund, for assisting those of our body who, through misfortune or ill-health, may require it."

Mr. Colling then goes on to say that he has much pleasure in forwarding a drawing for publication, and hopes to be able to supply others. This drawing, of the chancel-window of the church at Little Maplestead, was published,* being, however, the first and last of the series. On the 2nd of September in the same year some one writes to the *Builder* to suggest a more extended plan, and asks why original drawings should not also be sent in. Nothing more is heard of the society till February 3rd, 1847, when Professor (then Mr.) Kerr, reads a paper on "Architectural Education" at the rooms in Southampton-street, Strand. This paper was a very important one, and led to the immediate formation of the Architectural Association, which sprang phœnix-like out of the embers of the decaying Association of Architectural Draughtsmen. The next notice I find in the *Fine Arts Journal*, in which it appears that a meeting was held on the 3rd of March, to put into operation one of Mr. Kerr's proposals, viz., to embody "a school of design," and it was then stated that the object of Mr. Kerr's paper, and from which this scheme (the formation of a school of design) emanated, was to form a society upon an enlarged scale, with a comparatively trifling subscription, which would induce every student of the art to avail himself of its privileges. Some amended rules were read out and approved of, and a number of new names were proposed for membership. A sub-committee of the old society was then appointed to meet a deputation of the newly-proposed members, and to arrange at once upon the actual working of the new schools. The next notice is on the 5th of May of the same year, when a paper was read by Mr. Colling before the already-formed society, still meeting in Sonthampton-street. On the 7th of July, 1847, a paper on "Architectural Style" was read by Mr. Kerr, who had been elected president; and on October 8th, the first *conversazione* was held at the new rooms in Lyon's Inn Hall, at which over a hundred persons were present, when the president, Mr. Kerr, delivered his opening address.† It then numbered eighty new members. The Association remained there till April, 1859, when it removed to its present quarters in Conduit-street.

* See *Builder*, vol. i. (1843), p. 275.

† A report of the speeches will be found in the *Builder* of that year. The assistance rendered by the *Builder* in the formation of the Association has been referred to more than once.

The following is a copy of the prospectus of the Association of Architectural Draughtsmen (instituted on the 1st of September, 1842):—

"This Association has for its chief object facility of communication between its members and all others of the architectural profession. The means employed to effect this, and no less the advancement of members in their art, are,—

I. The establishment of a registry of draughtsmen unemployed, and of architects requiring their assistance.

It is needless to dilate upon the advantages of this compared with any system which either makes a profit upon the remuneration of the draughtsman or depresses it without benefit to the architect.

II. The collection of drawings of existing subjects (by quarterly subscription), the first of which returns to the contributor's possession upon the production of the ninth, and so on in the order of contribution.

The drawings are open to public inspection on the undermentioned evenings of meeting, and serve the architect in forming his judgment upon the abilities of the member with whom he contemplates engagement.

III. Publication, in lithography, of such of the drawings as are suitable, each member being entitled to a copy of all published during his membership.

IV. Meetings held on the first and third Wednesday evenings in each month throughout the year, for the purposes of conversation and reading of papers upon professional topics.

V. A Book Club, for the purchase and circulation of professional works.

It should be observed that the Association has formed the nucleus of a benevolent fund, an object deserving of the liberal consideration of the wealthier members of the profession. Subscription to this is optional with members of the Association.

The Association commemorates the anniversary of its formation by a dinner to the town members at Freemasons' Tavern.

Members of the profession are respectfully invited to visit the meetings. Those intending to join are requested to communicate with the secretary at the rooms of the Association, 33, Southampton-street, Strand.

E. C. SAYER, Hon. Sec."

[*Copy of Card.*]

"ASSOCIATION OF ARCHITECTURAL DRAUGHTSMEN,
33, Southampton-street, Strand.

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E. C. SAYER, Hon. Sec."

Thanks having been given to Mr. Spiers for his communication,

Mr. W. Hilton Nash read a paper on "The Architects of the Italian Renaissance." This we print elsewhere.

Mr. H. L. Florence, in proposing a vote of thanks to Mr. Nash for his paper, said that the examples which had been mentioned in it were certainly typical of the schools treated of, but the author had not given any particulars of the distinguishing characteristics of those schools. Now, those who had seen the buildings in question would have understood the reasons which gave to each style its peculiarities and the characteristics of the artist himself, because many of the buildings referred to were not by architects alone,—and the circumstance that they were by men who were designers in other arts, painters and sculptors,—materially influenced some of the buildings. With regard to Michelangelo, many of his works, especially the Farnese Palace, were well worthy of study, but they exemplified much that had better be avoided than copied. Of course, the great ideas which he had, such as were realised in his domes and other structures, were to be admired, but the admiration could not be extended to the details of execution.

Mr. Hugh Stannus, in seconding the motion, observed that Mr. Nash had incidentally referred in his paper to the varying conditions under which architecture was practised. He had spoken of the princely patronage that the old architects received during the two centuries dealt with in the paper, and had by implication suggested that the architects of the present day lacked the princely pay, and that therefore they were not able to do such good things. He (Mr. Stannus), however, did not think that architects had any reason to complain of, either as to the patronage or pay accorded to them in the present day. There were princely patrons now as there were of old time, and the remuneration of architects was reasonably good. In his opinion, one great reason why the architecture of the present time could not compare with that of some previous epochs was that the architects themselves were so greedy that they took too many jobs, and some of them, when occasion offered, sought to obtain and did obtain important works in styles in which they were not reputed to excel. So far from seeking work in a style alien to that in which they worked, the older men would have refused it when offered to them; and any one who read the pages of Vasari would find that there were not wanting instances in which architects of established reputation showed a considerate feeling for the youngermen. At the present time the younger men in the architectural profession were starving, while all the pluralists, who would take any number of commissions that they could not possibly attend to, flourished. The reason why modern architecture could not compare with the old work was simply that modern architects themselves could not compare with the architects of old. With regard to Raffaelle, Michelangelo, and Leonardo da Vinci, he thought it was to be just as much regretted that they had ever laid their hands upon architecture as it was to be regretted that Sir Christopher Wren had been called upon to build the towers of Westminster Abbey. Raffaelle, Michelangelo, and Leonardo da Vinci did not understand architecture, and thought it consisted in sticking columns and pilasters on to building. Mr. Nash had not alluded to what Sir Charles Barry did at the College of Surgeons in Lincoln's Inn Fields. There was to be seen a façade without an order, and it was one of the finest façades in London. His façade of the Travellers' Club was also very good. With regard to Palladio, architects ought to be grateful to him, not for what he built, but for his book. His buildings were very bad, and in many points of grammar would not be at all creditable to one of the Association's students in the Class of Design. The great debt of gratitude which architects owed to Palladio was for the publication of his book,—a book which had done more, perhaps, than any other to popularise and to systematise the study of architecture.

Mr. R. Phené Spiers said that Mr. Nash had appeared to regard it as a misfortune that the present generation possessed no painters of distinction, nor, indeed, any painters at all, who had carried out architectural works. But in his (Mr. Spiers's) opinion, if we in the present generation found ourselves placed in the same position as the people of Italy in the fifteenth century, there were several of our most distinguished painters who would be called upon, by reason of their talents and position, to design important buildings, just as painters and sculptors were called upon at one time to design buildings in Italy. The President of the Royal Academy (Sir Frederick Leighton) had perhaps a greater knowledge of Greek architecture (so far as its general artistic spirit as distinguished, perhaps, from its practical conditions, was concerned) than any architect now living; and no one could vie with Mr. Alma Tadema in his knowledge of Roman and Pompeian work. There was not the least doubt that if Mr. Alma Tadema were to be called upon to design buildings of that character, he would produce works of great beauty and merit. There were, he need not say, several instances of men who had begun life as architects, and afterwards turned to painting, as, for example, Mr. W. W. Deane, who was a distinguished member of the Society of Painters in Water-Colours, generally giving his attention, however, to architectural subjects. It was said that he was what was called a "disappointed" architect. He was one of the best designers of his day, and used to colour drawings for other architects. His original designs were such as would have brought him credit and honour had they been put into execution, but he could get no practice, and therefore left the profession. There was undoubtedly a very large number of young men who had abilities fitting them to be excellent architects, who joined the ranks of the painters. If they had seen any chance of getting a practice, they would have become architects. It would therefore probably be an easy thing to find several painters who would be capable of becoming excellent architects. Of course it should not be forgotten that many of the distinguished masters of the Italian school were not only great painters and sculptors, but great mathematicians and men of science. Leonardo da Vinci was an example of this in Italy, while in England we had Sir Christopher Wren, who at a very early age made an import-

ant astronomical discovery, and at the age of twenty-five was Professor of Astronomy at Oxford. He afterwards travelled in Italy, and later on produced the wonderfully-varied and numerous spires and towers of the London churches. Many of the distinguished architects of Italy devoted some years at the outset of their career to the study of mathematics and science. They then turned their attention to art, practising the drawing of the figure and probably modelling their figures before painting them,—a practice followed in the present day by Sir Frederick Leighton. Later on, when they had made their reputation either as painters or sculptors, they were called upon to carry out buildings. Such a system of training for architects, however, was impossible under present-day conditions, and any one who allowed himself to reach the age of forty before he took up architecture, would be unable to make himself acquainted with all the details of modern practice. Nearly all the chief architects of France had to go through, in their early training, severe mathematical courses, and if, having entered the École des Beaux Arts, they obtained the Grand Prix, they went to Rome, returning at the age of from thirty-two to thirty-five, without having acquired any practical knowledge as to the strength or properties of materials, or as to the details of construction. If appointed to some public or Government building, their practical knowledge was so deficient that they had to trust almost entirely to their inspectors. Some of them, it was true, had the courage, at that time of life, to turn their attention to the study of the nature and properties of building materials, but others confined their thoughts entirely to design. In England we had no architect who would be content to take the extraordinary position which the late M. Duc occupied for so long with respect to the Palais de Justice, to which building he devoted the whole of his architectural life. Of course, under such circumstances an architect was able to give more thought and care to his building, but it was not, he thought, a system which would find favour in England.

Mr. Nash having briefly replied, the proceedings terminated.

THE ARCHITECTS OF THE ITALIAN RENAISSANCE.*

It is almost impossible, within the limits of a short paper, to do justice to the number of illustrious names which crowd upon us at this epoch, and we can, therefore, only dwell briefly on the lives of the architects of the fifteenth and sixteenth centuries, and the motives which actuated these men to produce works which daily increase in interest, and compel us to offer our tribute of respect to the energy of mind and purity of thought as exhibited in them. Although many may take exception to the over-elaboration of detail, and to the naturalistic treatment of ornament in Late Renaissance works, yet we may discover in nearly all instances a freedom of design which, in earlier times, and especially during the Middle Ages, was often cramped and fettered by ideas which emanated from the seclusion of the cloister and the austerity of monastic life.

The architecture of the Italian Renaissance may be roughly divided into four schools,—the Florentine, the Roman, the Venetian, and, lastly, the Baroque school.

To the first belong the palaces of the Medici, the Pitti and the Strozzi at Florence, both having in them traces of Mediævalism and predominating strength. The house of the Florentine noble was literally his castle; the dark portal, and massive walls pierced with narrow openings, and the rugged rustication of the walls, all point to the troublous times in which these nobles lived.

The Roman style is less massive in treatment, and ornament is introduced less sparingly; a more refined taste was being developed, as evidenced in the works of Fontana, Sangallo, Bramante, and Michelangelo,—such as the Farnese Palace, the Palace of St. John Lateran, and the numerous villas with which the environs of Rome are studded. As to the churches of the Roman style, that of St. Peter's gives the keynote to all the others, and as almost all the first architects of the two centuries we are considering were engaged upon it, we may see in it the embodiment of this style.

The Venetian school is characterised by greater lightness and elegance, and includes among its ranks such men as San Michele, Palladio, and Sansovino; and the library of St. Mark at Venice, by the latter architect, forms a typical example of this school.

The Baroque style, introduced by Maderna, Borromini, and others, marked the decline of Renaissance art; its effects were, nevertheless, novel and striking, but were wanting in dignity and repose, and figures in impossible attitudes clinging for dear life to broken pediments marked the degenerate taste which prevailed.

First among the architects of this century, when the first faint glimmer of the dawn of the Renaissance was stealing over the land of Italy, stands the name of *Filipo Brunelleschi*, son of Lippo Lapi (born 1377, died 1444), who, though educated for far different pursuits, at an early age brought his powers of mind to bear, first on geometry, then on Dante and his writings, and eventually applied himself wholly to architecture, and, by earnestly studying the ancient masters in Rome and elsewhere, became imbued with the true spirit of the antique, and revived the ancient orders of the Doric, Ionic, and Corinthian. The two greatest works of this architect were the Pitti Palace at Florence, and the cupola over the cathedral, Santa Maria dei Fiori, in the same city. The Pitti Palace has a rugged simplicity, which makes this building astonish us, rather by its broad treatment of masses than by any delicacy or refinement of detail. The entire building is covered with rustic work, the blocks of stone in the lower story and in the wall of the terrace flanking the courtyard being of such an enormous size that they look like the work of giants. Some idea of the large proportions of this building may be obtained from the entrance-doorways, which measure about 28 ft. in height by 14 ft. in width. But Brunelleschi did not live to complete his work, and only carried the building as high as the second story, and later on Ammanati added mouldings and triangular pediments to the windows, to the detriment of the original design, which, as has been before stated, owed its beauty in a great measure to its simplicity of treatment.

When Brunelleschi's grand conception of raising a dome over the church of Santa Maria dei Fiori at Florence was first promulgated, his project was hailed with derision, and to prove that he was capable of performing what he undertook to do, he had recourse to the trick afterwards practised by Columbus. When the persons who had been clamouring to see his design were assembled, he produced an egg, and asked each one present to make it stand upright on the table. All tried, but failed, when Brunelleschi, striking off the end, accomplished the feat. "We can do that also," exclaimed those assembled. "So you will say when you have seen my design," replied the architect. The height of the cupola from the ground to the summit of the cross is 385 ft. It consists of an outer and inner shell connected together at intervals by walls, and it is octangular on plan. Other cupolas had been constructed previously to this, as at St. Sophia's, Constantinople, St. Mark's at Venice, and the Baptistery at Pisa; but this one outrivalled them all, both in size and ingenuity of construction. Brunelleschi was great not only in civil and ecclesiastical, but also in military architecture, for he designed the fortresses of Vico Pisano, the old and new citadel at Pisa, and he also built fortifications on the Ponte Amare. He died respected and beloved, and was buried under the shadow of his great dome at Florence; posterity has, moreover, awarded him the highest honours, for to him we owe the re-establishment of pure architecture and manly design.

Leon Battista Alberti (born 1398, died 1472) was a nobleman by birth, and son of Lorenzo and nephew of Cardinal Alberto of the Alberti, a Florentine family. Educated with the greatest care, and having a knowledge of mathematics, painting, and sculpture, and possessing a natural taste for the fine arts, he was not long in deciding on the profession which would be most suitable to a man of such varied acquirements. The church of San Francesco at Rimini bears witness to his powers of design, and is perhaps the most talented of all his works. The interior is still in the Gothic style, but the whole of the exterior was remodelled from his designs, and embellished with choice marbles. At Florence Alberti built the circular chapel of the Annunziata, which is wanting in many of the graces distinguishing his other works. The semicircular arches being circular on plan, have, as is usual in such cases, a distorted appearance, which mars the effect of the composition. The principal façade of Santa Maria Novella is attributed to Alberti; but Milizia, in his "Lives of Celebrated Architects," states that it was probably built by Giovanni Bellini. His life was passed as a true nobleman's should be, in liberality and courteousness to all, and he died at an advanced age in his native land.

During the early part of the fifteenth century, when the revived art was only feeling its way, and had not obtained that firm footing on the soil of Italy that the following century established, the names of great architects were few in number, and the two whose lives we have just considered,—namely, Brunelleschi and Alberti,—were the guiding stars of this epoch. Nevertheless, other architects flourished, some of whose works were of no mean merit, and amongst these were *Michellozzo Michlozzi*, a Florentine and a pupil of the sculptor Donatello. This architect succeeded in making a design for the palace of Cosmo de Medici, by which he secured the patronage of that influential man, and superseded Brunelleschi, who had previously made a design which was considered too sumptuous. Michelozzo built the famous library of the Benedictines at San Giorgio, Venice, to which city Cosmo had been banished in 1433, and whither his architect followed, with a devotion rarely witnessed in modern times. He made designs for and built the palace of Cafaggiulo, in Mugello, by order of the Duke Cosmo; also an ingenious villa at Fiesole, near Florence, on the side of a hill, with large cellars and stables under part; also the palace of the Tornabnoni, now belonging to the Marquis Corsi. Michelozzo died at the age of sixty-eight, and was interred at the church of St. Mark, at Florence.

Giuliano da Majano was also a Florentine, being the son of a stonecutter residing near Fiesole. Having studied architecture, he had the good fortune to be patronised by King Alphonso at Naples, where he built the great palace at Poggio, which is an exact square on plan, and is chiefly noted for the clever arrangement of its staircases.

About the middle of the fifteenth century flourished the celebrated architect *Bramantino*, whose field of operations was chiefly in Milan and the surrounding district. He erected the Church of St. Satiro in that city, which has been much praised, more, however, on account of the sumptuousness of its decoration than for its beauty of design; for the numerous arcaded corridors, and the many statues with which it is adorned detract from the main features of the design, and render them somewhat confused. Bramante, of whom we shall speak later on, is said to have benefited by studying his works, and we see tokens of this in many buildings erected by him.

Giovanni del Pozo and *Francesco di Giorgio*, of Siena, rank among the lesser lights of this epoch. The latter, however, erected some very creditable buildings, chief among which is the famous palace of the Duke Frederigo Feltre, at Urbino.

The sister arts of painting and sculpture were frequently combined in these times with the more practical art of building, and the appellation of "painter and architect" was as common then as "architect and surveyor" is in the present day. The artistic ideas of the nineteenth-century architects are often deadened by the worry of business; and this is greatly to be deplored, for the real artist should be free from the petty cares and anxieties which engross the bustling matter-of-fact people of the present day.

A liberal emolument will not evoke talent; nevertheless, architects, to do their work truly and thoroughly, require to have sufficient means to enable them to drive away anxious thoughts for the morrow, and the ancient architects were undoubtedly treated in a more liberal manner than those of to-day, or they could never have bestowed that painstaking care on their buildings which is so frequently exhibited, since their whole time and thoughts were often confined to one building, while the multifarious duties of the nineteenth-century architect disqualify him from taking that high position which was so acquired by the architects of Renaissance.

Having now briefly considered the architects of the fifteenth century, we pass on to those of the sixteenth century.

When on some bright summer's night we gaze upon the cloudless heavens, and see there some grand constellation which rivets our attention, and

* A paper by Mr. W. Hilton Nash, read before the members of the Architectural Association on the 3rd inst.

become for a time almost forgetful of the lesser luminaries, so it is when we pass in review the architects of the sixteenth century. Their names stand out so boldly among the lesser lights of art that we are for a time unaware of the existence of preceding or posterior artists, and we cannot help asking ourselves the cause of this great uprising and rebirth of intellect at a period when all true art seemed lost in a hopeless chaos. This great awakening to the study of the beautiful and the true, was mainly attributable to the cultivated tastes and judicious patronage of the leading families in Italy. They were the great motive-power which set the machinery of art in motion, and evoked the slumbering talents of men capable of greatness in every department of art,—in painting and sculpture, in poetry, music, and architecture. Well might Michelangelo and other contemporary architects have said of the Cosmos and Leos of the Medici family, as Horace said of Mæcenas, "O et præsidium et dulce decus meum," for had it not been for this opulent and cultivated family, many a talented artist who now illumes the page of history would have died "unwept, unhonoured, and unsung." Art patronage, however, is not the prerogative of the many, but rather the privilege of the few; and, like other good things, it must be judiciously administered, or its effects will be more baneful than productive of good; for far greater detriment is done to art by the ignorant patron, who enriches those who unjustly deserve it, than by the man who, though appreciating talent, fails to render it its due reward.

Bramante d'Urbino, though born at the end of the fifteenth century at Castel Durante, is generally classed among the architects of the sixteenth century. His talents were directed at an early age to painting, but he quitted it for the sister art of architecture, having studied and measured the principal ancient buildings at Rome, and the remains of the villa Adriana at Tivoli. His chief patrons were the Cardinal Caraffa, the Popes Alexander VI. and Julius III., and the Duchess Eleonora Gongaza, the latter of whom commissioned Bramante to build a palace for herself and her husband, the Duke d'Urbino. The greatest work of this architect was undoubtedly the re-building of the Church of St. Peter at Rome. In this design he equalled, if he did not surpass, the ancients, in the massiveness and unity of treatment which pervades the whole edifice. Strongly impressed with the grand proportions of the Pantheon at Rome, which, no doubt, he had studied in the days of his pupilage, he founded his design on this model and made his cupola of similar dimensions, adding the four arms of the Latin cross, forming, when completed, a building of unequalled vastness and grandeur.

Bramante could boast of having Raffaelle for a pupil and Michelangelo for a friend and adviser, and the great sculptor states his opinion that "Bramante is superior to all others since the time of the ancients."

Shall we praise or blame Bramante for the revival of the use of plastering and stucco ornament? There is much to be said in favour of the way in which he employed it, namely, on a wooden foundation; but unfortunately it latterly fell on evil times, its true place and use being forgotten, and the stucco, instead of assisting to decorate the buildings served only to overburden them with vulgar ornament. This is specially noticeable at Vicenza, where Palladio, not having had funds sufficient to erect his sumptuous designs in stone, has had recourse to plastered columns on a brick core, and the effect of time on these buildings has made them look pitiable in the extreme, and has given occasion to architects of the opposite school to decry all architecture of the Palladian school as a sham.

The most beautiful erection by this architect is the palace of the Cancelleria at Rome. The windows on the "primo piano," or first floor, have served as models for countless others, but none have surpassed the original. The façade is constructed of blocks of travertine from the Colosseum, which, during this century, served as a sort of quarry for numerous Roman palaces.

The beautiful dome of the Church of Santa Maria delle Grazie, at Milan, is certainly the most satisfactory of any of Bramante's works, and, as Fergusson says, in his History of Modern Architecture, "Had the architects of the succeeding age been only content to work with the moderate amount of classical feeling found in this building, we should have had no cause to regret the loss of the Gothic style; but the temptation to employ great pilasters and pillars, whose real recommendation was that they covered the greatest amount of space with the least amount of thought, was more than human nature could resist, on the part, at least, of men who were more artists and amateurs than architects."

The dome of Santa Maria is 65 ft. in diameter, and is consequently one of the largest constructed by Bramante, that at the church at Lodi being 50 ft., and the dome of the little church of San Pietro, in Montorio, at Rome, being only 15 ft. in diameter.

Bramante died in the year 1514, at the age of seventy, and was buried in great state in the church of St. Peter, the grand work of his lifetime, and which, had it been executed as originally designed by him, would have been a church worthy of the golden age of Renaissance art.

The two brothers *Giuliano* and *Antonio di Sangallo* flourished about this time (1443-1517). They were sons of an architect, Giamberti, whose works have not been greatly praised, and, being educated as engravers, ultimately turned their attention to architecture. The principal works of Giuliano were the cupola of the church of the Madonna di Loretta, at Rome, built by order of Alexander VI., the fortifications of Ostia, the castle of Monteflascone, for the Duke of Valentino, and he latterly superintended the building of St. Peter's at Rome under Leo X. His disinterested motives, and his affection for his great patron Lorenzo de' Medici, are exemplified by the following story narrated by Milizia. After completing the fortifications of Ostia, he journeyed to Naples and presented a magnificent model to the king for some work at Castel Nuovo, which so pleased the monarch that he presented him with horses, clothes, and a silver cup containing one hundred ducats. Giuliano, however, refused to accept them, stating that he was still in the service of Lorenzo de' Medici, and the king, surprised at his noble independence, allowed him the choice of whatever pleased him, and he accordingly chose some fragments of antique sculpture, which he presented to his patron Lorenzo on his return to Florence. Antonio or Sangallo the younger has left many excellent works as evidence of his talent, and his designs for St. Peter's at Rome were replete with originality, and differed greatly from those of Bramante. The most ingenious work of this architect was the well at Orvietto, which is of great depth, and has two spiral staircases,—one inside the other,—descending to the well, so that one set of mules laden with waterskins might be descending while the other set were ascending. Sangallo began the Farnese Palace when Paul III. was cardinal, and when the building had reached the roof, the Pope, anxious to have a cornice which, in beauty and richness of design, should eclipse all former efforts, instituted a competition among all the able artists in Rome, but even the Pope's infallibility could not ensure a satisfactory termination to it, for the decision, as in nearly all modern competitions, was as absurd as it was unjust. Sangallo competed, but his design was set aside for one by Melighino, formerly the Pope's groom, and he was unable to restrain his righteous indignation at this unfairness, and explained to the Pope that this man was a mere mountebank of an architect. "We wish Melighino," said the Pope, "to be really an architect, and will therefore take care to provide for him." But the groom did not carry it out after all, and the execution of it was entrusted to Michelangelo.

Simone Pollainolo (born 1454, died 1509) was a Florentine by birth, but he visited Rome at an early age, and there acquired a strong passion for architecture. He superintended the erection of the Strozzi Palace at Florence, which was designed by Cronaca, and built the beautiful little church of San Francesco, on the hill of San Miniato at Florence, which has, however, been over-praised, on account of the notice taken of it by Michelangelo, who surnamed it "La Bella Villanella."

Sansovino (born 1460, died 1529) was the son of a peasant, and became famous in his early years for sculpture, but especially for the two tombs in the church of Santa Maria del Popolo at Rome, and afterwards became equally noted for his architectural works. He built the beautiful Capella del Sagremento at Florence, adjoining the church of San Spirito, and as the compartments of the vaulting were not placed centrally over the piers, his clients found great fault with him, but he brought ancient examples to justify his design, and so silenced all criticism. The west façade of the Duomo at Florence was then, as at the present day, unfinished, and Sansovino placed against it a false façade of wood, of admirable design; but as the design was of the Classic type, with Corinthian pilasters, it is, perhaps, well for the harmony of the edifice that it was never executed. Sansovino made a design for a magnificent church at Rome, his drawings being preferred before those of Raffaelle, Sangallo, and Peruzzi, but the execution eventually devolved upon Sangallo, who was a better constructor than his contemporary. The library of St. Mark, at Venice, has, however, immortalised his name, and the building has a rich Doric order on the ground-floor, with a graceful Ionic above. Venice has, more than any other Italian town, been richly embellished by this architect. Having resided nine years in Portugal, at the invitation of Leo X. he returned to his native land, laden with rich gifts, and eventually built himself a villa near his birthplace, Monte Sansovino, where he spent the remainder of his life.

We have now to consider the character of a man who combined all that was manly and noble with a delicacy and refinement of thought which have seldom been surpassed. *Leonardo da Vinci*, the great painter, sculptor, architect, and anatomist, who was skilful in music and poetry, and added to a beautiful exterior the charm of graceful manners, was born in the Castel da Vinci at Florence. We are not acquainted with many of his architectural works; nevertheless, it is evident from his writings that he had studied the subject, and he was employed by Ludovico Sforza to conduct the waters of the Adda to Milan, and he made the canal of Montesano navigable for 200 miles. It was his habit to write on whatever he executed, but as all his writing, like Hebrew, is from right to left, it is not easily deciphered. His ingenuity was marvellous, and when the king of France, Louis XII., visited Milan, he fashioned the model of a lion, which, when the king was seated in the great hall of the palace, moved towards him by the aid of machinery, and on arriving at the throne it suddenly stopped, tore open its breast with its claws, and displayed on its heart the royal arms of France. Jealousy for his contemporary, Michelangelo, caused him to quit Italy, and at the invitation of Francis I. to visit France, but he was taken mortally ill at Fontainebleau, and the king immediately set out to see him. On the arrival of the monarch, Leonardo endeavoured to rise to pay him homage, but the exertion hastened his death, and he expired in the king's arms.

Raffaelle d'Urbino (born in 1483, died 1520) was the son of Giovanni Sanzio, a painter of some note, but whose name was eclipsed by that of his illustrious son. One of the first works of Raffaelle was the façade of San Lorenzo at Florence, for Leo X., and the palace of the Pandolfini. The stables of Agostino Chigi, in the Strada Longara, Rome, were designed by him; and here we see the coupled pilasters which were a constant feature in Raffaelle's designs; but this building is too much broken up to have a wholly satisfactory effect. He was one of the architects of St. Peter's, and in his design divided the Latin cross into nave and aisles, with recessed chapels in each bay. The arms of the cross were semi-circular, and were ornamented with numerous columns and pilasters. The idea is said to have wanted grandeur, and, in fact, it required an almost superhuman genius to master all the difficulties which were connected with the construction of so vast a work. But although Raffaelle's architectural works were great, his powers of painting were far greater, and he was treated with every mark of reverence and respect, and after endeavouring to imitate Michelangelo in sculpture, in which, however, he failed, especially in the nude, he devoted his whole time to painting. He died at the early age of thirty-six, and was buried in great state at Rome, Cardinal Bembo writing his epitaph, which has been thus translated:—"To the memory of Raffaelle. Nature feared to be conquered by him while living, and to be annihilated at his death."

Let us now briefly consider the strange and varied life of *Baldassare Peruzzi* (born 1481, died 1536), who was the son of Antonio Peruzzi, a Florentine noble. The civil wars which were then raging in Italy caused his family to be left in great distress and poverty, and Peruzzi

accordingly journeyed to Rome, and devoted himself to painting and architecture. He, like his illustrious predecessors, was engaged in superintending the building of St. Peter's, and made some improvements on Bramante's original design. The peculiarity of this design was the semicircular termination to each arm of the cross, and the porches were also semicircular in plan, with three doorways in each, and the high altar was placed centrally. This arrangement has been much commended, and has been partly carried out, but the cupolas which covered the whole have not been executed. Peruzzi built, and afterwards decorated, the palace at Longara, now called the Farnesina, built originally for Agostino Chigi, and he has been especially praised for the ornamentation of the loggia, which is in such accurate perspective that Titian is said to have climbed up to ascertain whether the corbels were real or painted. At the sacking of Rome in 1527, when the Spanish soldiers were plundering the city, Peruzzi was seized, and, on account of his aristocratic person, was thought to be some Italian noble, but was freed on stating his profession,—not, however, before he had been barbarously treated by the soldiery, and he arrived eventually at Siena, naked and wounded, having been robbed of his clothes on the road. His stern refusal to enter the service of the Pope, who wished to employ him at the siege of Florence, shows that a spark of patriotism existed in him, and that the Papal rewards were incapable of corrupting him. Besides the Farnesina, already mentioned, Peruzzi built some other palaces in Rome, among which may be mentioned the Massimi palaces, and that which bears the name of the Ossoli family. It is stated that his extreme modesty prevented him from ever asking a reward for his labour, and he consequently died in poverty, his only support being his salary of 200 crowns as architect to St. Peter's. He lies buried in the Pantheon beside the illustrious Raffaelle, whose works he had studied, and in some instances surpassed.

The last three men whose lives we have been considering were almost as much painters as architects, and, in the case of Leonardo and Raffaelle more so, and it has been before remarked that this was not an uncommon occurrence in the fifteenth and sixteenth centuries. In the present day, however, we have no great artists who have attempted to combine the two. We frequently find an architect who devotes his leisure to painting, but where can we name a painter who has shown any aptitude for the nobler art of architecture, which not only requires an artist's eye to originate the design, but a constructor's skill to carry that design into effect, and employ the materials most suitable in each particular case?

It would be well if the importance of architecture were more fully appreciated, for nothing shows the character, the wealth, or poverty of a nation, more clearly than the style of its architecture. "I cannot touch the lute," said Themistocles, "but I can make a small town a large city": and were the aristocracy of England and the wealthy merchants of London to take that pride in architecture which prevailed among the nobility of the Italian States, and the princely merchants of Florence, we might then find more earnest desire on the part of our architects to execute their work with that painstaking care and devotedness of which we see so many proofs in bygone times.

We are now in the full tide of the Renaissance, and all Italy has felt the influence of this stirring up into artistic life, which awoke the latent energies of the sixteenth-century artists. The bright and comely flower of Renaissance art has been nurtured and cultivated by rich and poor alike; warmed by the sun of genius, and gladdened by the freshening dews of intellectual effort, the tender stem has grown vigorous and healthful, and although not possessing the same energy as the hardier plant of Gothic art which preceded it, but partaking more of the character of a hot-house plant, it has, nevertheless, a charm and gracefulness of which antecedent artistic efforts were often sadly destitute.

Michele Sanmichele (born 1484, died 1559) was the great military architect of this age. He was taught the elements of architecture by his father Giovanni and his uncle Bartolomeo, who were both architects. He was sent by Clement VII, after having completed his studies, to visit and report upon the fortresses in the Ecclesiastical States; and having accomplished this, he started again to inspect the fortifications of Venice, for the purpose of improving his knowledge of these subjects. Verona, the birthplace of San Michele, has been embellished more than any other Italian town by the works of this artist, and the bastions which he built to fortify the town were on an entirely new principle, which has been adopted and improved upon by Vauban and others; but it was this architect who in reality invented the triangular or pentangular bastion with plain fosses and flanks, which doubled the support, and thus entirely superseded the ancient square and circular bastions. His fortifications at Venice were on an enormous scale, and those who were envious of his popularity suggested that the firing of the heavy artillery required for the defence would reduce his forts to ruins, and Sanmichele accordingly ordered the largest guns procurable to be brought and placed in the forts and all to be fired simultaneously. Many of the timid inhabitants fled when notice was given of his intention, and a terrific firing took place; but after it had ceased, not a crack or fissure was discovered in the fortress, and the fears of the multitude were converted into exuberant joy. He built the Porta Nuova, the Porta del Pallio, and the Porta San Zenone at Verona, and also the exquisite Pellegrini chapel, a work of small dimensions, but of the highest excellence. The stone of which it is built is found in the quarries of Verona, and is called "Bronzina," as when working it sounds metallic like bronze. He built five palaces at Verona, of which the Palazzo Pompei is the most harmonious in design, possessing a dignity of repose which is one of the essential elements of a Classic composition.

The universal genius of *Michelangelo* (born 1474, died 1564) cast such a refulgence over the tracts of Renaissance art, in painting, sculpture, and architecture, that all other artists seem lost for a time in the vigour and grandeur of the work of this great man. He did not devote himself vigorously to architecture till he was forty years of age, and his masters were his own talents, aided by his observations of ancient edifices. Two of his earliest works were the Medicean Library at Florence, and the second Sacristy at San Lorenzo, which is undoubtedly one of his finest designs. Michelangelo also made designs for several gates at Rome, but the only one which he erected was the Porta Numentana, or Porta Pia, as it was named, after Pope Pius IV., during whose pontificate it was built. He designed the Strozzi Chapel at Florence, and made many other designs for churches, few of which, however, have been preserved; and it was his constant habit to destroy any drawings which did not justly convey to paper the grand conceptions of his mind. His work at St. Peter's at Rome gives evidence of the sound knowledge of construction which he possessed, but his ornaments and mouldings are none of the purest, being frequently so whimsical as to border on ugliness; and he used sometimes to confess, perhaps only from modesty, however, that he knew nothing of architecture. It is well known that when pressed by Pope Paul III. to accept the office of architect to St. Peter's, he agreed to take it on condition that he received no salary, stating he did so "for the love of God."

Galeazzo Alessi (born 1500, died 1572), having studied mathematics, and shown an aptitude for mechanics when a youth, after perfecting himself in these subjects repaired to Rome, to be under the tuition of Michelangelo. His works in Genoa were very numerous, including the Palazzo Spinola, in the Strada Nuova; a handsome palace in the Porta Romana, for Signor Laoli; and the villas for Count Pallavacini, above Zerbius, and Signor Giustiniani, in Alharo. His church on the Carignano Hill, at Genoa, is sufficient in itself to make his name illustrious.

We now have to consider the lives of the two last great architects of the Renaissance, Vignola and Palladio. The former, whose real name was Giacomo Barozzi, was the son of Clementi Barozzi, a Milanese gentleman (born 1507, died 1573). He studied painting at Bologna, but eventually applied his mind to architecture, and produced a treatise in his later days, the outcome of his early studies in Rome, which has done more to perpetuate his name than all his works in stone and marble. He built many churches in Rome, and was employed by Pope Julius III. and the Cardinal Alessandro Farnese, who engaged him partly in the erection of the Farnese Palace. The celebrated Caprarola Palace, however, gained him the greatest encomiums, and eclipsed all his former efforts in ecclesiastical architecture. After the death of Michelangelo, Vignola was appointed architect of St. Peter's, and erected two cupolas on either side. His fertile invention often led him into extravagances, and induced him to depart from the correct forms and outlines of the ancients.

Palladio may be considered as the last great architect of the Renaissance. His finest ecclesiastical work is the church of the Redeutore at Venice; but the work which has brought most renown to his name is the Basilica or Town-hall at Vicenza. In this city Palladio reigns supreme. Whichever way we turn we meet with his works, many of them finely conceived, but executed in plastered brick, so that their true grandeur cannot be justly estimated. The peculiarity of his style were lofty columns running through two stories, pedestals without panels or raised mouldings, simple architraves, doors, windows, and niches of simple design, and crowned with unbroken pediments. The *Quarterly Review* and many amateur critics have endeavoured to prove that Palladio's architecture was false in principle, since the internal arrangements did not always accord with the external effect; but we must remember that Renaissance architecture never aimed at this, external symmetry being its chief characteristic, while Gothic architecture had for its primary object the exposing of the bones and muscles of the structure to which it was applied. For the beauty of Palladio's architecture we must look to his façades, which are bold and imposing.

In the latter days of the Renaissance the art which had once adorned churches and palaces confined itself almost entirely to the interior decoration of the dwellings of the nobility, and the Baroque style succeeded the bright and cheerful efforts of the earlier designers. This universal decadence was the precursor of utter annihilation of all genuine æstheticism, and with the close of the sixteenth century the curtain fell on all true art.

I do not pretend in this short paper to have exhausted the subject with which I am dealing. There are many architects of this age whose works it has been impossible even to touch upon; my object has been rather to turn the current of your thoughts in the direction of pure Italian architecture, so that each one of us may for himself, if he so desire, enlarge the subject, and contemplate with fervid admiration, as I have done, the beauties of this noble style.

ST. LEONARD'S TOWER, WEST MALLING.

Sir,—To the short but valuable account of St. Leonard's Tower, West Malling, given by "G. T. C." in the *Builder*, November 27, I am desirous to add, with your permission, a few additional notes. That in architectural interest it comes up to, and quite deserves, every single word which Mr. J. H. Parker, C.B., has written regarding it, is most unquestionable; for few other specimens of this period probably throw more light on the state of building art, directly after the Conquest, than does it and the two other *early* works of Gundulph, in its near neighbourhood,—namely, "Gundulph's Tower" at Rochester Cathedral, and that portion of the wall of Rochester Castle, which is his work (that next the river); the whole three presenting curious variations of construction which induce me (though undoubtedly inclined to pay the very highest deference to the opinion of such a veteran and able authority as Mr. J. H. Parker) to believe the earliest in date of the three to be "Gundulph's Tower," *now* of the cathedral, but then merely built on the town wall, and originally intended as a protection to the members of his new monastic establishment, their valuables and documents, prior altogether to the reconstruction of his cathedral.

The quoins of the St. Leonard's Tower, supposed by "G. T. C." to be of some "local ragstone," are there (as in all his other works) of *tufa*. The bishop nowhere, I believe, uses any other material for dressings unless in the case of his monolithic columns, with their caps and bases, in the crypt of his cathedral (which material he seems to have brought from Northamptonshire by water). The singular plan of producing "weatherings" by simply setting back the courses, is another of his peculiarities here produced, as "G. T. C." states, by two recessions, but at "Gundulph's Tower" by merely one; as I take it, a further mark of its priority of date and rudeness of execution.

The further fashion of his work in rising

from the ground (or, at least, footings) without any plinth, takes place even in the remains of his cathedral, as does also the square order devoid of mouldings, save only a label,—a rule which, with him, seems invariable.

I am not altogether clear as to "G. T. C.'s" intention where, in describing the "abbey" church at Malling, he refers to its west end. No part of this is of Gundulph's date, though its transept is, and eastern parts were. The west end is later than the period of the bishop's death, and was itself, in its lower part, much tampered with at the end of the eighteenth century (see Hasted (?) or Thorpe). A careful study of the peculiarities of construction presented in the rubble walling of the two towers, that of St. Leonard's and the "Gundulph Tower" of the cathedral at Rochester, reveals variations in the herring-bone work used, and in the items of bonding, tending, equally with the simpler recessing of pilaster "weatherings," to prove that the last named is the earlier in date. On the whole, considering, indeed, that the bishop had a palace or residence in Rochester itself, it seems not unreasonable to believe that the new monastic establishment would take precedence over any of his country seats. In his work at Rochester Castle *wall* (the keep is none of his, of course, nor is there reason to believe he built there any, nor could he likely to desire such a next-door neighbour if it could possibly be avoided). He has introduced what is a most unusual method of construction. On the Cliff, buttresses, no doubt, would he of little use outside, and if placed inside, would he in the way. He has, therefore, introduced a sort of *better* rag ashlaring pillars, if it can be so called, formed at certain distances in the solid walling, *flush with its ordinary face.* Whether similar work exists outward I know not; but at that point of his wall next Rochester Bridge its destruction presents a section by which it is seen to present the square set-backs, which was his plan of producing "weatherings," as stated above.

In regard to the St. Leonard's Tower, while adding the conjecture that the top room may have been most likely the private chapel of Bishop Gundulph, and that I very much doubt if any other defences of the bishop's time on the spot were of more than wood only, I would join with your able correspondent, "G. T. C.," in urging the wish that that excellent society, the Kent Archæological, should at least give one *careful* illustration of the construction of, say, the north front. Or better, perhaps, for the benefit of mankind in general, that some one would carefully draw it, with parts of the rag ashlar, to a larger scale, and send it for publication in your valuable journal; for, in spite of the wide facilities for good and cheap illustration which now exist, one often sighs for the want of that wealth of illustration on such practical details for which the world had to thank the works which will hand down the name of Mr. J. H. Parker to all posterity, and are still the text-books to which we refer.

J. T. I.

MACHINERY AND APPLIANCES AT THE SMITHFIELD CLUB SHOW.

THERE is, as usual, a good display of agricultural machinery and implements, roots, and seeds, at the eighty-third annual Cattle Show of the Smithfield Club, in the Agricultural Hall and its adjuncts. The principal contributors of purely agricultural machinery are such well-known firms as Aveling & Porter, Rochester; Clayton & Shuttleworth, Lincoln; John Fowler & Co., Leeds; Richard Garrett & Sons, Leiston; Richard Hornsby & Sons, Grantham: J. & F. Howard, Bedford; Marshall, Sons, & Co., Gainsborough; Messrs. Ord & Maddison, of Darlington (who exhibit the "Koldmoos" weed-eradicator,—an ingenious machine); Ransomes, Sims, & Head, Ipswich; Rohey & Co., Lincoln; and Ruston, Proctor, & Co., Lincoln. Most of these exhibitors, and many others, show a large variety of portable and other engines available for purposes other than agricultural, but none of them calling for any special notice. The heavier exhibits are as usual arranged under the galleries, and among them we need only mention Messrs. Aveling & Porter's well-known traction engines (Stand 15), Messrs. Clayton & Shuttleworth's 10-h.p. fixed engine (Stand 8), very well finished, and simple in action; Messrs. John Fowler & Co.'s (Stand 7) single-tipping wagon, suitable for contractors' use, and their 10-h.p. patent compound "Yorkshire" engine. Messrs. Barrows & Stewart, of Banbury (Stand 5), show some good portable engines. The Bristol Wagon Works Company (Stand 19) have a goodly show of carts and wagons for agricultural purposes; and Messrs. Hayes & Son, of Stamford and Peterborough, exhibit their "Royal Society" tip-wagon, which would appear to be as well suited for scavenging as for agricultural purposes. Messrs. Crosskill & Sons, of Beverley, also make a good display of excellently-built carts and wagons. The great bulk of the exhibits is contained in the spacious galleries, but out of the mass we can only mention those which come within or are closely connected with our own special province. Messrs. Bayliss, Jones, & Bayliss, of Wolverhampton (Stand 123), exhibit a variety of iron hurdles and fencing, including the "Victoria" rivetless hurdle, in which the ends of the horizontal bars are turned down and brought back again through the uprights, and then clenched. Mr. John Bellamy, of Millwall (Stand 84), exhibits wrought-iron water-tanks, corn-bins, troughs, &c.; and Messrs. Burney & Co., of Millwall Docks (Stand 72), have a display of similar goods, wrought and galvanised. Messrs. Croggon & Co., of Upper Thames-street (Stand 86), are exhibitors of galvanised iron tanks, corn-bins, wire netting, &c. Messrs. Hill & Smith, of Brierley Hill (Stand 158), exhibit iron fencing, including Gillett's patent rivetless hurdle, the horizontal bars being secured in the uprights or standards by hydraulic compression whilst the iron is cold. Mr. J. C. Humphreys, of Knightsbridge (Stand 97), exhibits models of galvanised iron buildings for agricultural purposes. Messrs. F. Morton & Co., of Liverpool, have a good display of galvanised corrugated iron roofing and wire fencing, the former shown in its application as a covering for ricks, &c. Messrs. Penney & Co., of Lincoln (Stand 32), exhibit flat and rotary screens for gravel, lime, &c. The St. Panoras Iron Works Company (Stand 100) have a good display of iron cow-stall fittings, piggeries, &c. Messrs. J. & B. Sainty, of Wisbech (Stand 126), exhibit their new patent "Universal" fencing, which possesses several good points. The wrought-iron standards are very light, yet require no fixing in the ground, standing as they do on a broad base. The horizontal bars, of wood, can be quickly inserted or removed, so that the fence is easily portable. Messrs. R. Waygood & Co., of Falmouth-road, Great Dover-street (Stand 194), exhibit some good horizontal steam-engines, and a new gas-engine (Robson's patent) manufactured by them.

Not included in the official catalogue of the Smithfield Club Show are a large number of exhibits, most of which do not come within the purview of agriculture, and these are arranged in the arcade by which the show is entered from Islington-green, and in St. Mary's Hall. In the arcade entrance, Messrs. F. W. Reynolds & Co., of Acorn Works, Blackfriars-road, exhibit a small but representative collection of their many well-known wood-working machines, including the "Eclipse" mortiser. Messrs. F. Rosher & Co., of Upper Ground-street, exhibit stable bricks, terra-cotta and stoneware garden edging, &c. Messrs. Tracey & Sons, of Ilford, show their system of glazing without putty, and their metallic tubular sash-bar. Messrs. Wurr & Lewis, of Laurence Pountney-lane, are exhibitors of hand-sawing and other wood-working machines.

In St. Mary's Hall there is a heterogeneous collection of articles, including perfumery, marking-ink, and stencil-plates, the thousand-and-one "notions" (American and English) in regard to domestic appliances, and such other things as those with the mention of which we conclude this notice. Messrs. Robert Boyle & Sons, of Holborn-viaduct, exhibit their air-pump ventilators and a new chimney-cowl for preventing smoky chimneys. Messrs. Ewart & Son, of Euston-road, exhibit their "Empress" ventilators and "smoke-cures," together with bath-heating apparatus and a large zinc dormer. Messrs. Jones & Willis, of Euston-road, show their "Hesperns" lamps. Messrs. Charles Powis & Co., of Gracechurch-street, are exhibitors of sawing-machinery, and Messrs. Pfeil & Co., of St. John-street-road, and Messrs. Selig, Sonnenthal, & Co., of Queen Victoria-street, show engineers' tools and specimens of iron of different brands. Messrs. Hamilton & Co., of Leadenhall House, exhibit their pavement-lights. Messrs. S. & E. Ransome & Co., of Essex-street, Strand, show a variety of small domestic appliances. The Sun Auto-Pneumatic Lighting and Heating Company exhibit their portable gas apparatus. Messrs. John Tomlin & Co., of Capland-street, Lisson-grove, exhibit a new mode of shoeing horses with a view to "roughing" in frosty weather. It should be added that the whole of the piggeries and other parts of the Show are disinfected, apparently with perfect success, by the Sanitas Company's products.

IN THE ENGLISH SECTION OF THE MELBOURNE EXHIBITION.

Mr. George Jennings.—An especially fine and exceedingly large display of baths, lavatories, and general sanitary appliances is sent by Mr. G. Jennings, Lambeth, London, for whom Messrs. Alston & Brown, Melbourne, are agents. There is shown a beautifully fitted-up lavatory, for gentlemen's residences, first-class hotels, &c. It combines all the essentials of compactness, with elegance and convenience. In addition there are less expensive appliances of a similar character, and every household convenience which can be mentioned. The local papers say, "We can quite believe the statement of the official catalogue, that Mr. Jennings's display has taken the highest award at every exhibition."

Messrs. George Wright & Co.—The above well-known stove-grate makers, of Burton Weir Works, Rotherham, and Queen Victoria-street, London, exhibit a few specimens of their manufactures in the shape of open fire-grates, fenders, fire-iron rests, &c. This firm earned its reputation as inventors and sole manufacturers of the English stove, the "Bivalve," which is an improvement on the Stevens principle. Of this class is their drawing-room stove (No. 555), which is a good illustration of artistic grace, while showing the rich effect that may be arrived at by combining in proper proportions ormolu and bright steel. No. 500 is also a drawing-room stove, and was, we understand, specially designed to exhibit the most beautiful of hand-painted panel tiles. Between the above stoves stands a massive dog-grate in the style of the Renaissance. The tile and slow-combustion grates, &c., suitable for general use, are, like all the work of this firm, simple in design and extremely neat in appearance.

Messrs. Arrowsmith & Co.—Interior decoration as an art has now reached great perfection among us. The firm of Messrs. A. J. Arrowsmith & Co., decorators and upholsterers, of 80, New Bond Street, London, has long been very favourably known in connexion with this subject. Especially have they become famous for the beauty and durability of their excellent patent solid parquet flooring, and their exhibits at Melbourne cannot fail to greatly conduce to their renown in the colonies. Their exhibit consists of the following objects:—Various specimens of solid parquet flooring, showing portions of floors laid for the Queen at Windsor Castle, and numerous public buildings and mansions; a very elaborate hand-carved staircase balustrade, in oak, polished; a very handsome bedroom suite in walnut and olive wood, inlaid brass finishings, &c.; a beautiful drawing-room cabinet in satin-wood, with hand-painted panels picked out in gold, in French style of Louis XVI.; dining-room suite,—light oak sideboard, bevel mirrors, carved panels, brass finishings; light oak chimney-piece, designed to harmonise, hand-painted tiles at the sides, marble linings, fender, dog-stove, &c., complete; light oak dinner-wagon table, side tables, chairs stuffed morocco. There are also several specimens of inlaid, carved, and parquet dados and wood panelling, and finally, there is a good selection of decorative drawings. The specialty of Messrs. Arrowsmith & Co.'s solid parquet flooring (patented) consists of being 1 in. thick, grooved and tongued together with marine glue, keyed at back, and traversed to a uniform thickness. For this ten prize medals have been awarded at the various exhibitions. We recommend colonists in London to pay a visit of inspection to the showrooms in New Bond-street.

The Worcester Royal Porcelain Company (Limited).—This old-established company have made a fine display of their productions, not specially got up for the Exhibition, but consisting for the most part of "every-day articles, neither expensive nor elaborate, but likely to be serviceable to the Australian colonist." The Royal Porcelain Works at Worcester were originally established in 1751 for the manu-

factnre of fine porcelain, and in 1789 they received the first Royal patent. Since then, in consequence of the great increase in business, the mannfactory has been much extended, and the variety of its prodnctions greatly increased, and in every respect it now stands second to none.

THE SEWERAGE WORKS FOR PETERBOROUGH.

The sewerage works now completed for the corporation of the city and borough of Peterborough involved the construction of thirteen miles of brick and pipe sewers, with the necessary manholes, ventilators, flushing arrangements, and penstocks; the construction of duplicate tanks for the straining of the sewage at the outfall, and two miles of concrete carriers; the preparation of 96 acres of land out of a farm of 300 acres purchased by the corporation for the utilisation of the sewage by irrigation; the erection of two pumping-stations, with the necessary machinery, and the erection of two cottages.

The sewage from all parts of the borough is brought together and discharged at one outfall. It is conveyed by the water-carriage method on the separate system. As about seven-eighths of the entire population of the borough dwell on the north side of the river Nene, it is consequently in this portion that the largest and most costly sewers are constructed; but the peculiar situation of the southern district renders the conveyance of the sewage to a suitable outfall a matter of considerable difficulty.

The borough on the south side of the river is drained by 3¼ miles of stoneware-pipe sewers, and the sewage brought to the river side, whence it is carried in an iron-pipe sewer under the river and across the wash-lands. After passing under the protecting bank of the north level, it is emptied into a tank sewer, devised for the reception of the sewage during the time the pumping engines are at rest. It then flows into the wells of the southern outfall pumping-station, and is put into the gravitation main close to the outfall.

The borough on the north side of the river is drained by nine miles and three-quarters of brick and pipe sewers. The northern arterial main is a brick sewer, egg-shaped in section, of 3 ft. by 2 ft. internal diameter, and 3,670 yards long. The main intercepting brick sewer is 1,235 yards long, and comprises 149 yards of 3 ft. by 2 ft. egg-shaped; 612 yards of 2 ft. 9 in. by 1 ft. 10 in., egg-shaped; and 474 yards of 2 ft. barrel sewers.

These sewers discharge into a barrel culvert, 3 ft. 4 in. in diameter, and 508 yards long, which empties into a penstock chamber, whence the sewage is taken by two 24-in. iron pipes, laid side by side, and for the most part in embankment to the straining-tanks at the outfall. The sewage from the districts north of the river flows directly on to the irrigation area by gravitation.

The geological formation through which the trenches were excavated includes principally members of the oolitic group, but in the south ward gravels of the post-tertiary period overlay the jurassic rocks. The thick beds of hard stone met with in nearly all parts of the north and east wards have caused the excavations to be difficult and costly; but the stone was utilised in the construction of the roads and the concrete carriers on the sewage farm.

The pumps by which the sewage at the southern outfall is lifted into the gravitation main are two duplicate three-throw lift-pumps, driven by two high-pressure non-condensing horizontal engines of six-horse power. The normal speed of the engines when working with a boiler pressure of 45 lb. is 100 revolutions a minute; and each pump working at twenty double strokes a minute will lift 400,000 gallons in twelve hours.

The sewage on arriving at the outfall is discharged into settling-tanks, built in duplicate, and provided with wrought-iron strainers. Passing thence, the liquid sewage is conveyed in a concrete carrier to the land prepared for irrigation. On arriving there the carrier divides into two smaller ones, from which the sewage is distributed over the irrigation area by land-carriers. The larger concrete carrier is 1,098 yards in length, and has a water-way of 6·5 superficial feet. The two smaller carriers are 2,159 yards long, and have a sectional area of 4·8 superficial feet. The irrigation-channels are 1 ft. wide at the top, 6 in. at the bottom, and 6 in. deep. All the carriers are laid in horizontal lengths, with sluices and drops at every change of level. The soil on the irrigation area is of a light alluvial character overlying silt, and has a natural filtration and drainage of 4 ft.

As the farm is situated near the Bedford Level, and within the protection bank of the North Level Commissioners, the effluent water is not allowed to be carried off by their drains, except in dry seasons, and must consequently be lifted over the north bank into the New Cut of the river Nene. This is effected by two 12 in. centrifugal pumps, driven by two 25-horse power high-pressure condensing engines. The normal speed of the engines is sixty revolutions per minute, with a boiler-pressure of 60 lb. The cylinders are 1 ft. 4 in. diameter, and the stroke 2 ft. The fly-wheels are 10 ft. in diameter, and weigh 2 tons. Each pump, when making 400 revolutions per minute, will deliver over the bank 1,600,000 gallons in six hours. The boilers are Galloway's patent, with shells 18 ft. long by 6 ft. diameter.

The works were designed and carried out by Mr. John Addy, C.E., of Peterborough, with Mr. John C. Gill, C.E., as resident engineer. The contractors for the buildings were Messrs. S. & W. Pattinson, of Ruskington, near Sleaford; and for the engines, pumps, boilers, and machinery, Messrs. Seekings & Ellery, of Gloucester. The works on the main drainage and irrigation farm were partly executed by Messrs. J. S. Cooke & Co., and partly by the Corporation.

LIVERPOOL ARCHITECTURAL SOCIETY.

The third meeting of this Society was held at the Royal Institution, Colquitt-street, on the 1st inst., the President (Mr. C. Aldridge, F.R.I.B.A.) in the chair, when a discussion took place with reference to "Some City Improvements."

Mr. Wm. Parslow, in opening the discussion, explained that the subject would probably induce the belief that it was his intention to propose some grand general scheme for street improvements, but such was not the case: his thoughts were of much smaller matters. He had seen and heard of so many accidents arising from carelessness in hoisting goods into warehouses in crowded business thoroughfares, such as North John-street, that he thought the corporation should take some decided step towards insisting upon proper protection being afforded the public. The next evil that suggested itself to him as requiring consideration was the danger to which wayfarers were subjected owing to there being no by-law compelling plumbers and slaters to provide against broken slates and other material falling from roofs under repair, and undoubtedly provision was necessary on all houses to prevent loose slates falling into the streets. There had been serious accidents recently from this cause, one ending fatally. There was great want of protection to life and property at the foot of Leece-street also, where there were accidents almost weekly from runaway horses; and last, but not least, there was no waiting-room and convenience accommodation for women in any part of the city; men had been fairly well cared for in this respect, but women had been entirely neglected. He thought that this subject should be taken up by the Corporation, and proper accommodation provided at different points; and if each were partly free, and a small charge made for the use of the remainder, the income would cover the cost of the whole.

In the course of the general discussion that followed, it was stated that a new Building Act was being compiled by the Corporation authorities, and the hope was expressed that the society and the Master Builders' Association would be invited to send representatives to act on the committee in whose hands the drafting of the Act lay, in order that the best information on all points might be obtained.

It was suggested that the question of warehouse-hoists, and protection to the eaves of roofs, might very well be dealt with in the new Act, together with the foundations of new buildings, with regard to which great laxity appeared to prevail with the authorities, instances being brought forward of large ponds in the outskirts of the city being entirely filled with refuse of the worst description, and houses being planted upon them directly the operation was completed.

The President explained that, in London, front walls were carried above the eaves to form parapets, which effectually prevented the fall of slates, &c., into the streets, and, at the same time, the gutters behind the same formed a safe means of escape from house to house, in case of fire.

Previously to the holding of the ordinary meeting there was a meeting of the class of design and construction in the small library, presided over by Mr. Aldridge, when thirteen designs for a "cemetery chapel" were handed in by students, several exhibiting considerable merit.

SOCIETY OF ENGINEERS.

At a meeting of the Society of Engineers, held December 6th, 1880, in the Society's Hall, Victoria-street, Westminster, — Mr. Joseph Bernays, president, in the chair,—a paper was read by Mr. Frank W. Grierson, member of the Physical Society, London, &c., "On the National Value of Cheap Patents," in which he showed that the stamp duties on a patent in this country lasting over fourteen years, are 175*l.*, while those on an American patent, lasting seventeen years, are only 7*l.* A table was given of the applications and grants of the British and American patent offices during the last ten years, from which it could be seen that our 50*l.* stamp duty at the third year kills 70 per cent. of the patents granted; and that our 100*l.* duty, at the seventh year, kills 20 per cent. more, leaving only 10 or 11 per cent. to complete the full term.

From a comparative table of average results for the last ten years it was seen that the applications for patents in the United States and Great Britain respectively are 19,770 and 4,496; and the grants are 13,355 and 2,980. The average cost to the inventor for one patent, including patent agent's charges, are there only 19*l.*, but here 190*l.* Only one patent is granted in this country to three that are granted in the States, after allowing for the difference in population; and the duties on one patent here would pay those on twenty-five there. We may, therefore, say fairly that the British inventor is handicapped at twenty-five to one in favour of the American; and it is to be remembered that in handicapping the inventor we handicap the nation.

LIABILITY OF BUILDING-OWNERS.—THE HAYMARKET ACCIDENT.

PERCIVAL *v.* HUGHES.

This was an action brought to recover damages for injuries alleged by plaintiff to have been caused to premises belonging to him through the defendant's negligence in re-building the adjoining house. It was tried at Westminster last week, in the Queen's Bench Division, before Mr. Justice Manisty and a special jury.

Mr. W. G. Harrison, Q.C., and Mr. M'Call, appeared for the plaintiff, and Mr. Philbrick, Q.C., and Mr. Kingsford for the defendant.

Mr. Harrison, in opening the case for the plaintiff, stated that his client was the owner of a house in Panton-street, Haymarket, adjoining the new building belonging to the defendant at the corner of the street, which, when roofed in and far advanced towards completion, fell with a crash in January, 1878, dragging down with it a house adjoining it (on the Haymarket side) and killing the occupier of that house,—Mr. Baron. In falling, the new building partially pulled over the party-wall dividing it from plaintiff's house, and the latter sustained certain damage to its structure and internal decorations. The learned counsel proceeded to explain, by means of photographs and plans, the appearances presented by the ruins after the accident, and after citing many of the statements made at the inquest * on the body of Mr. Baron, argued that the fall of the building was due to negligence on the part of the owner or his agents.

After considerable arguments between the counsel, his lordship expressed the opinion that it was unnecessary to go further into the case, and, in deference to this opinion, no witnesses were called on either side, although

Mr. Philbrick addressed the jury for the defendant, pointing out that he had employed an architect of considerable experience, Mr. W. Wimble, to prepare plans and specification, and

* Reported in *Builder* for 1878, pp. 227, 249—251 274—276.

to superintend the erection of the new building, and had employed a respectable and reputable firm of builders (Messrs. Newman & Mann) to carry ont the work. He contended that every and all the usual means had been taken calculated to ensure the safety of the adjoining properties, and that the accident was due, as stated hy witnesses at the inquest, to the cutting away of the lower part of Mr. Baron's party-wall, for the purpose of fitting a new staircase,—an act unauthorised by the defendant or his architect, or by the clerk of works representing the architect, and one for which the builders alone were responsible.

Mr. Justice Manisty said he was of opinion that there was no question in the case for the jury. He did not think the present case could be distinguished from that of Bower *v.* Peate (1 Q. B. Division, p. 321). There it was held "that a man who orders a work to ho executed on his own premises,—lawful in itself, hut from which, in the natural course of things, injurious consequences to his neighhour must be expected to arise, unless means are adopted by which they may he prevented, is hound to see to the doing of that which is necessary to prevent the mischief, and cannot relieve himself of his responsihility hy employing some one else to do what is necessary to prevent the act he had ordered to be done from becoming wrongful." He had no reason to suppose the decision in the case was likely not to he upheld, and therefore, taking the facts relied on by the defendant to be as stated, he should direct the jury to return a verdict for the plaintiff.

This having heen done,

His Lordship gave judgment for the plaintiff for such amount as might he agreed upon or ascertained to represent the damage he had sustained by the falling of the defendant's house.

ROMAN WORK IN ENGLAND.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

THE second meeting of the session was held on Wednesday last. Mr. Thos. Morgan, F.S.A., in the chair. Mr. Gordon M. Hills exhibited a large collection of Romano-British fragments of pottery found at Manor Farm, Wanhorough Plain, Wilts, where foundations of buildings have been met with, and others are believed to exist. Mr. Hills described the position on the line of the thirteenth Iter of Antoninus, and suggested that it was the site of a lost Roman station, being where one may reasonahly be supposed to exist in relation to the next one on the line of road. Mr. Way exhihited some Roman coins recently found at Exeter; and the Rev. Mr. Maude a large series of foreign silver coins. Mr. Batcher produced a fragment of Roman Samian ware from the wall of London now opened at the back of America-square; and the chairman a perfect tile from the same place. It measures 17½ in. by 12¾ in., and is 2 in. thick. Mr. Loftus Brock exhibited a drawing of the wall, and, after a description of the discovery, pointed out its resemblance to the wall in the Tower of London, which was then described in a short paper. A vote of thanks was proposed and carred unanimously to Major-General Milman, C.B., Major of the Tower, her Majesty's Office of Works, and to Mr. J. Taylor, for their united efforts in having the fragment cleared for inspection in response to the wishes of the Association. The Rev. Dr. Hooppell then described at length the very remarkahle discoveries that have rewarded the exploration of the Roman station of Vinovium, the modern Binchester. This costly work has been undertaken hy Mr. J. Proud, of Bishop's Auckland, under Dr. Hooppell's directions. The external walls have been traced and found to be built on an earlier British wall. The plinth is chamfered similiar to the wall in America-square. A paved road, 30 ft. wide, extends through the station, and the walls of many private dwellings still remain, many of the doorways having bases of pillars in position. A large circular huilding was cleared out, and here and elsewhere the walls were found to he lined with hot-air flues of terra-cotta kept in position by T-irons. Traces of reconstruction were found in every direction, and a mutilated statue of Flora was found serving as a support to some paving. The lecture was illustrated by a series of large coloured drawings, which gave a clear idea of these important and extensive discoveries. A large portion of the station remains to be opened out, although so much has been done.

HOUSE-BUILDING AT LEWISHAM.

AT the last meeting of the Lewisham District Board of Works, attention was drawn hy one of the members to buildings going on in the neighhourhood. He stated that something like five-sixths of the more modern houses in the district were huilt on grass, and in many instances on absolute mud. Several other members of the Board also complained of the growing evil, various houses being named. After some discussion on the matter, letters were ordered to he written to the various district surveyors, calling their attention to these infringements of the Metropolitan Board's bye-laws, which order the foundations to he huilt on concrete. These directions of the Lewisham Board to the surveyors do not, however, appear to satisfy some of the residents, who wish more peremptory action to be taken against the offending builders. In a communication to the authorities, one of them states that he can vouch for the truth of the complaints which had been made to the Board, having seen many of the houses in question.

FROM SAVOY-STREET TO THE THAMES EMBANKMENT.

To the different streets leading from the Strand which have in succession been opened out for carriage-traffic on to the Thames Embankment, Savoy-street may now he added. Hitherto communication with the Strand from the bottom of Savoy-street, abutting on the Embankment, has been confined to a footpath, but the enclosed space at the lower end of Savoy-street, immediately under the buildings in Lancaster-place, has been thrown into the carriage-way, and is now being curbed, paved, and otherwise laid ont for vehicular traffic, by the Metropolitan Board of Works, with a spacious curbed footpath in the direction of Waterloo Bridge, forming a junction with that on the Embankment. The works are expected to be completed in a few days.

"SANITARY SCIENCE IN ITS RELATION TO CIVIL ARCHITECTURE."

SIR,—Out of the many similar difficulties with which architects have to deal, let me call attention to two little ones, both mentioned in Mr. E. C. Robins's interesting paper at the Royal Institute of British Architects on the 29th ult.

1. Is it quite settled that soil-pipes must never be put inside buildings? Again and again this is repeated till it seems almost criminal to listen to doubts ahont it. Yet I am assured that not unfrequently, in exposed situations,—after a severe winter has heen doing its worst,—soil-pipes have been taken indoors and kept there. In hitter cold a thin film of ice had formed itself on the inside of the pipe; no sun or warm wind came to thaw it; it was added to from time to time until nothing could pass through the pipe. Some of the best foremen urge this sort of argument with great force. Which is the worst?—to expect to find that such a pipe placed inside the building will some day be out of order, and will need repair, or to put it up and take it down at least once in every winter in the midst of intense frost? Every soil-pipe may very well be carried up, full size, above the roof, and fresh air be passed through it; but must an architect rush thus from one sort of peril into another? Does "should he" in Mr. Robins's,—"(3) The soil-pipe *should* he fixed outside the house," mean "must he"?—unless even mild persons are to talk of "gross ignorance and culpahle carelessness,"—and return verdicts of manslaughter as matters of course?

2. I should like to ask for the results of experience in the use of a soil-pipe with open ends,—as applied by Mr. Norman Shaw. Are there any instances of such pipes being in use for a good length of time without stoppage?—without the pipes becoming foul, and needing to be renewed?—without the grating at the ground level giving off very offensive smells? No true test of such a system has been made at the end of a couple of years. Many people hesitate still to think of using the system, believing that a complete renewal of the pipes must be inevitable after they have been in use a very few years; hut even these careful persons look with interest for information, and, indeed, seem to hope that their doubts may be gradually dissolved.

3. Has the last word been said about trapping sink wastes? Professor Corfield and Captain Galton, in the discussion at the Royal Institute of British Architects, went a certain length,—pointing out that mischief may come through waste-pipes which are not trapped at the top, even though the pipes convey nothing more suspicious than the water of London water companies. But, can the traps themselves be trusted? I do not simply mean that the water in the traps will be tainted by air in the foul pipes below them, but that the interiors of the traps will not escape from the influences which corrupt the pipes. An instance may be given from my own observation. A small lead-lined sink is placed in the corner of a cupboard in a room. A fixed brass grating in the bottom of the sink has below it 4½ in. of lead pipe,—that is, a dip-pipe entering a lead ⊃-trap,—dipping about 1½ in. below the water-line of the trap. The trap is a well-made (6 in. total depth) trap, with a brass screw-cap on the face of it. The 1-in. lead waste-pipe is carried about 10 ft. vertically, and discharges on another lead sink, on the story below. Here are no connexions with drains; nothing but water practically pure (no slops, &c.) is put down the sink; the inside of the trap is kept thoroughly clean,—yet a very strong smell has, I am told, at intervals made the room noisome. The short pipe from the sink to the trap seems to be the offending part. If there were a syphon-trap below the grating there would be a similar bit of pipe above the water-line. The substitution of a tight-fitting plug for the open grating may be a radical cure in this instance; but is there no detergent which would take all the evil out of the pipes, and leave all sweet, if applied say once a month? Most people treat lightly other people's experience; but are we to believe that butlers and servants generally are not so wrong after all in their belief, that very perfect sinks *will* smell at times, when they have been used for a while? Will somebody put the finishing-touch to the teaching about sink-pipes, which has afforded scope for a good deal of patient perseverance already? Till that is done, it is to be feared that good sanitation will still be sniffed at.

A.R.I.B.A.

MR. SAGE'S WORKMEN'S CLUB.

ON Friday evening, the 3rd inst., a Workmen's Club and Institute was very successfully inaugurated in connexion with Mr. F. Sage's shop-fitting establishment, at 80-84, Gray's-inn-road.

Impressed by the great inconvenience suffered by his *employés* in obtaining their meals at the very indifferent cook-shops, public-houses, &c., in the neighhourhood of his factory, Mr. Sage has placed a large room at their disposal, rent free, and also the materials for the fittings, such as tables, forms, shelving, &c., which have been manufactured by the members of the club in their spare time, and the result is a really comfortable apartment, capable of accommodating a very large company seated.

Four daily and two weekly papers are at present taken in. Additional literature will soon be provided, and a library is in course of formation.

The club is entirely self-supporting, by means of an entrance-free and small weekly subscription, and the members are amply repaid for these small disbursements by the daily saving in the cost of meals, the conspicuous cleanliness, and the quality of everything supplied, all stores being bought and examined by the committee of management.

The meeting on Friday was the occasion of a supper, a which Mr. Sage and some friends were entertained, to commemorate the opening of the club.

The stewards of Mr. Sage's club express themselves willing to render any assistance in their power to others who may wish to form similar institutions.

COMPETITIONS.

Tipton Gas Works.—The Tipton Local Board have awarded the first premium of 100*l.* to Mr. Proud, of Birmingham; and the second of 50*l.* to Messrs. Bromilow & Cheers, of London and Liverpool. Provision had to be made for an annual consumption of 60,000,000 cubic feet.

Wesleyan Middle School, Truro.—The directors of the Wesleyan Middle School, Truro, decided some time ago to erect new schools and master's house, providing for 100 boarders. In an open competition, Mr. Etwell, of Birmingham, obtained the first place. The designs submitted by Messrs. Bromilow & Cheers, of Liverpool and London, gained the second premium.

Board Schools, Isle of Man.—The design under the motto of "Simplex," for the Douglas (Isle of Man) Board Schools, submitted by

Messrs. Bromilow & Cheers, of Liverpool and London, has been awarded the first place, and those gentlemen have been appointed architects to the committee. Fifty architects entered the competition.

Burton-on-Trent Market.—Competitors are inquiring for the result of this competition, designs having been sent in some five months ago!

COMPENSATION CASES.

THE WIDENING OF LUDGATE-HILL.

The case of Smith *v.* The Corporation of the City of London was tried in the City Court of Sessions, before the Recorder (Sir Thomas Chambers, Q.C.) and a special jury.

The plaintiff was the owner of 33 and 35, Ludgate-hill, and in March last, having made preparations for the pulling down the old premises and erecting more commodious ones, he was served with an order by the Commissioners of City Sewers to put them back a considerable distance, under the powers of the Act of Parliament for the widening and improvement of the hill. The claim, which was for 16,007*l.*, was made up of various charges for loss of extent of premises, and the decreased rental consequent upon it. There were other claims for loss of profit on stock purchased in anticipation of the proposed enlarged premises, and for extra expense in building, the present smaller premises requiring a stronger wall to carry the weight of the rooms over them.

On the part of the Corporation it was contended that the claim was an excessive one, and should have been nearer 4,400*l.* than 16,007*l.*

The jury found for the claimant—damages, 9,691*l.*

In the case of Glover *v.* The Corporation of the City of London, which was also heard in the same Court, the plaintiff was the lessee of 15 and 17, Ludgate-hill, where he carried on the business of a ladies' and juvenile warehouse. He claimed 11,500*l.* in respect of having received similar notice to put back his premises, by reason of which he lost space, and the value of his leases was reduced.

The jury found for the claimant—damages, 6,330*l.*

CHARGE OF DEFRAUDING BUILDERS.

At the Guildhall Police Court, on the 7th, George Charles Adolphus Smith, of 11-4, Fenchurch-street, and 3, Downs-road, Clapton, colonial merchant, was summoned before Sir Thomas White for obtaining goods under false pretences. Mr. Besley prosecuted; Mr. Mead appeared for the defendant.

The case was only partially gone into, and as far as the evidence went it showed *primâ facie* that the defendant purchased some freehold land from the London Financial Association (Limited) in November, 1879. He afterwards entered into a contract with Messrs. Perry & Bartlett, builders, of Stratford, to build a house for him. They went on with the building, and after they had put about 2,300*l.* worth of material and labour on the ground and received 500*l.* on account, the defendant became bankrupt. It was then discovered that the defendant had made over the land to his wife in charge of trustees, and they claimed everything on the ground in right of the wife. Upon that Messrs. Perry & Co. prosecuted him for obtaining the goods by false pretences, and the allegation was that he held himself out as the freeholder, and by that means he induced the prosecutors to part with their goods, which they would not have done if they had known that the freehold of the land was vested in the wife. Mr. Perry was examined in full, and his cross-examination reserved. Mr. Vernon, the architect, was partially examined, and the case was adjourned.

THE MYSTERIES OF FIGURES.

Sir,—I was in company, a little while ago, when some one present requested another to write down any amount in figures. Then he desired that all the figures should be added together, and afterwards subtracted from the original quantity. This being done, the propounder of the "trick" (as it was termed) requested that all the figures,—of the remainder, except one, should be called out, and on this being done he immediately added the missing digit.

This was very mysterious to all present, especially as the propounder could have had no knowledge whatever of the figures set down by the other. We were afterwards enlightened a little on being told that it was done by adding up the figures mentally as they were being called, and "casting the nines" out of the result.

It seems to be a fact then, that on the figures representing any amount being added together, and their sum subtracted from the amount itself, the remainder will always be found to contain a certain number of "nines" exactly.

An example will show this clearly. Take 7,982,147 to be the amount, the sum of these numerals is 38, which, deducted from the original quantity, leaves a remainder of 7,982,109 = 36 = 9. Suppose we omit the figure 8, then the rest add up to 28 = 10 = 1. The 1 being left out, the rest will equal 35 = 8. It will be plain then that 8 and 1 are severally required to complete the "nine."

Most people are acquainted with the fact of this peculiar property of the 9 in proving all sorts of calculations, and for my part I consider it has some deep significance in the construction of our numerical tables.

I have never yet met with one who could tell me the *whys* and the *wherefores* of it, but I hope now to get an explanation of it through the publicity of this communication in the *Builder*.

J. H.

STRENGTHENING EMBANKMENTS.

Sir,—The Editor's note to a letter by "E." in the *Builder* of the 20th ult., reminds me of what I saw in Egypt a fortnight since, viz., the fellahs at work repairing the embankments which retain the waters of the Nile for irrigation purposes by means of vegetable growths. I refer particularly to the embankment which leads across to the Sakkara Pyramids, which is about 15 ft. wide at the top, and the sides slope at an angle of about 45°. It was then about 7 ft. or 8 ft. above the water, and as it leads to the desert, of course it is only a camel and donkey track, and being formed apparently entirely of alluvial deposit, if not attended to, the water soon makes inroads into its banks, and slips occur. The repairs were being done chiefly by mud, rushes, and occasional stakes. The stumps of a layer of rushes were first laid against the bank; then mud was pressed against it, and secured by the stakes; then another layer of staked rushes, and sometimes of palm-branches. There is, no doubt, great strength in such work. It makes a firm embankment to resist the inroads of the water, and consequently it is with considerable difficulty the mud is washed out,—not until the stakes or rushes rot, or the rats burrow into the banks; for when the waters of the Nile rise, thousands of rats are driven to the higher level. This mode of repairing embankments must of necessity be of very great antiquity; for the desert and almost naked plains offer no other means for repairing them.

H. H. Bridgman.

THE CAUSE OF BAD WORK.

Sir,—I can endorse every word of "A Clerk of Works'" admirable letter in the *Builder* of December 4th, after forty years' experience in London and the provinces, and two years in the United States of America. A great deal of scamped work is due to the system of letting-off work. If architects were to specify in their contracts that the work should not be sublet, and that it should be done by experienced workmen, there would be less scamping done. Take plastering, for instance. I do not believe there is a building to be found where plaster and Keene's cement are not mixed. It is the same with Parian cement; and in plenty of instances where it is above the ground level of large buildings, colouring material is put into the water that putty and plaster are gauged with to imitate Keene's cement.

A great deal of the scamped work is owing to architects specifying that the work must be done by a given time, or else the builder is liable to heavy penalties. That is a wrong system if you want good buildings; in fact, the whole building trade wants the broom of reform applied to it, as well as other institutions.

It would be a good thing, Mr. Editor, if you could devote a little space of your valuable journal for the ventilation of this and kindred subjects, under the heading of "Trade Grievances," week after week. I believe it would bring about a better feeling between employer and employed.

M. A. S., Plasterer.

LONG SUCTION PIPES.

Sir,—I should be much obliged if any of your correspondents would inform me to what distances (giving total height to which the water is raised) long suction-pipes have been found available for shallow wells. I should like to know the diameter of the suction-pipe and the power required to work the pump, *i.e.*, whether a child or woman using the ordinary lever-handle could overcome the friction; and I should be glad to know of any instances where a great length of suction has been found successful. What is the best practical work on hydraulic engineering, having especial regard to machines for raising water,—wheel, turbine, ram, &c.?

Surveyor.

The New General Post-Office, Manchester, which, according to the local press, has been much needed for the last twenty years, will, it is hoped, soon be commenced. It is stated that plans have already been prepared in the Office of Works.

CONCRETE IN PARLIAMENT-STREET.

Sir,—A letter in your paper of last Saturday, bearing the anonymous signature "Westminster," has misrepresented the composition of the concrete laid by this company in Parliament-street for the wood paving. As a fact, the concrete for the reception of the blocks was not, as represented in the letter, different in proportion from that used in covering the trenches, but of precisely the same proportion, viz., one to five.

The Portland cement was supplied by Messrs. White Brothers. The water poured on the concrete, and represented as "extremely dirty," was taken from the mains of the Chelsea Water Company, and is, therefore, I conclude, the water that the members of the Whitehall Club and the Institution of Civil Engineers have for drinking.

A. R. Grenfell,
Chairman of Improved Wood Pavement Company.

*** Our correspondent is a perfectly well-informed person on the subject, and we have no reason to doubt that he described correctly what he saw.

VARIORUM.

"Electric Light: Its Production and Use," by J. W. Urquhart, C.E.; edited by F. C. Webb, M.I.C.E. (Crosby Lockwood & Co.), gives plain directions for the working of batteries, lamps, and dynamo-electric machines. It may be recommended to those who wish to get clear ideas on the subject. The editor, to whom the book owes much, Mr. Frank Webb, will be agreeably remembered by many of our readers as a courteous official some years ago at the Royal Institute of British Architects. Mr. Webb is now connected with the Society of Telegraph Engineers, by whom his acquirements are duly appreciated. Mr. Urquhart's book is fully illustrated.——The new volume of the "British Almanac and Companion," now in its fifty-fourth year, presents a varied budget of articles in addition to the annual reviews of science, architecture, picture exhibitions, music, and metropolitan philanthropy, which have formed a marked improvement in its recent issues. The contents include:—"Weather Forecasting," by Robert H. Scott; "Sketch of the History of the Royal Observatory, Greenwich," by W. T. Lynn, B.A.; "Egypt in Liquidation," by J. Crowdy; "Proposed Ship Canal at Panama," and "Schemes for a Euphrates Railway," by G. Dodd; "Watchmaking by Machinery in England," by C. S. Murray; "The Food of the Poor," by W. E. A. Axon; "Parks, Gardens, and Open Spaces," by F. G. Heath; "London Hospitals and their Management," by the Editor (Mr. Charles Mackeson); "Bee Farming," by James F. Robinson. The Stationers' Company may fairly take credit for the contents of this useful volume.——The December part of "Cassell's Family Magazine" forms the commencement of a new volume, and affords the natural opportunity for new subscribers to commence taking it. Two interesting serial stories are commenced in it.

Miscellanea.

A Big Weathercock.—One of the largest linen-drapery establishments of Paris is constructing, near the Champ de Mars, where land is comparatively cheap, a vast building which will serve as coach-house and stables for the numerous horses and wagons belonging to the firm. There is nothing peculiar about these stables; the spirit of novelty and originality has manifested itself solely in the erection of a gigantic weathercock, which will be as remarkable in the artistic character and execution of its design as in its size. In height it will measure 26 ft., and its width no less than 13 ft. Nor will the design resemble that of ordinary weathercocks. It will consist of an heraldic lion rampant, holding up with its fore legs a gigantic initial; and the design of this monster has been entrusted to one of the most able heraldic engravers of Paris.

Proposed Infirmary for Kensington.—The Kensington guardians have decided on purchasing from the Vestry of St. Margaret and St. John the land adjoining the Kensington Infirmary and the buildings thereon, for 55,000*l.* The area is about 3¾ acres. The cost of adapting the premises, it is stated, will not be great.

A Mortuary for Kensington.—At a recent meeting of the Kensington Vestry, it was stated that the Guardians had refused to consent to a public mortuary being erected by the Vestry on their land at Notting-hill, and it was resolved to take steps for the purpose of constructing a mortuary in the parish churchyard, at the rear of the Town-hall, with the consent of the churchwardens.

The Love of Art the Love of Beauty.—On the occasion of distributing the prizes at the City School of Art, Skinner-street, Bishopsgate, Mr. Bryce, M.P., said,—"For those who lived by manual labour of the higher kinds nothing was more to be desired than that they should enjoy their work as an exercise of skill, calling out their faculties of invention and their dexterity of execution. The true spirit of the artist is the love of one's art, the desire to do work well for its own sake, and not merely because one is to be paid for it; and the more we can give to the artisan the character and feelings of the artist, the better and happier man he will be. There are many lines of life into which this kind of pleasure can hardly enter; but it is now absent from many others in which it might exist, and one of the chief services of art-schools is that they diffuse it, that they teach some workmen to design who could not have done so without training, while to a far larger number they give the power of appreciating and imitating or reproducing what is graceful and right, of feeling the harmony of colours and the elegance of form. And it was not only those directly occupied in production, workers in metal, or in earthenware, or in textile fabrics, to take the most important industries, who profited by a diffusion of knowledge of and taste for art, but through them the whole community. The true love of art, and not merely that love of fashion which often mistook itself for the love of art, was nothing less than the love of beauty. Material beauty, which came to us through the eyes, was of two kinds,—the beauty of Nature and the beauty of what man made for himself following or representing Nature. The latter was always accessible to us if we were trained to enjoy it, and, the more the taste for it is spread through the artisan class, so much the more rapidly would it leaven the whole population, and so much the commoner and easier to procure would artistic work become. We might just as well have beautiful things as ugly things before our eyes,—in our streets, hanging on our walls, standing on our breakfast-tables. Rich and rare they could not always be, but they need not be ugly; for plainness and simplicity are all the distance in the world from ugliness. The untrained eye may not always know the difference at first between a good wall-paper, for instance, and a bad one; but it soon gets to know, and the more it surrounds itself with pretty things the more it enjoys them.

Fogs and Mahogany.—After a paper on Fogs had been read at the Balloon Society the other night, Mr. W. H. Lefevre, C.E., the president of the society, said that he had conferred with Mr. Prim, the engineer of the Houses of Parliament. That gentleman said that the fog in the Houses of Parliament, which was occasionally found even when no fog existed outside, was due to the quantity of mahogany wood employed in the building. Mr. Lefevre gave an illustration of this phenomenon by lighting a cigarette and keeping the smoke over a table in the room. It was found that the smoke adhered to the surface of the table in a thin layer for about a minute. He claimed that, if a pipe was taken up to the top of Victoria Tower, the upper end would be above the fog, and that pure clear air could be brought down from that altitude for the ventilation of the House, and at the same time getting rid of the fog. Is it a fact that when London is in a fog the air is clear at the top of the Victoria Tower?

Artisans' Dwellings at Wolverhampton. At the Town-hall, Wolverhampton, on the 2nd inst., a county jury was sworn before Mr. M. F. Blakiston, the acting under-sheriff of the county of Stafford, to decide an appeal made by Messrs. Lowe & Jones, owners and mortgagees of property situate at Stafford and at Wolverhampton, and required by the corporation under the Artisans' Dwellings and Streets Improvement Scheme, against the award of Sir Henry Arthur Hunt, C.B., the arbitrator under the scheme, who assessed the compensation to be paid to the owners at 2,300*l.* After hearing evidence on both sides, the jury awarded the claimants a total sum of 2,600*l.*, with costs against the corporation.

Proposed Memorial to Caxton.—It is proposed to erect a memorial to William Caxton, England's first printer, in the shape of a stained-glass window in the church of St. Margaret, Westminster. A committee has been formed to carry out the object, with the Rev. Canon Farrar as chairman, Mr. G. A. Spottiswoode as treasurer, and Mr. A. Powell as secretary.

Overcrowding at Plymouth.—At a meeting of the Plymouth Mercantile Association last week, Mr. Pethick opened a discussion on the subject of providing improved dwellings for the poor. He adduced instances of shameful overcrowding, saying that in some instances eight or ten persons were living in one room, and in the case of the miserable hovels in which this state of things existed there was only one water-closet for the use of eight or ten families. Alderman Derry, who presided, referred to Mr. Cross's Artisans' Dwellings Act as unworkable, and added, "My own feeling is that we shall do nothing in this town until we get a special Act of Parliament. The state of things existing now in Looe-street, in this town, is most deplorable. There is one house at the bottom of Looe-street which contains sixty persons, with a water-closet 5 ft. 7 in. square, and all the persons in the house are obliged to go to that closet." (Mr. Pethick: 2 ft. broad and 5 ft. long.) The opinion was strongly expressed that the Sanitary Authority had not been doing its duty, and a resolution was passed directing the attention of the Town Council to the matter. Mr. Square, in the course of the discussion, referred to the financial difficulty involved in the asserted inability to erect workmen's dwellings to pay more than 3 or 4 per cent. Mr. Pethick (who is, if we mistake not, a well-known builder and contractor carrying on business in the town), in reply to that point, said,—"I may mention that I have two houses containing twenty-eight rooms, for which I receive 24*s.*,—less than 1*s.* a room,—and I say that others can be built inexpensively and substantially, and with due requirements, that may let in the same way and return 5 per cent.; and the rooms may be as they should be,—from 12 ft. to 14 ft. square, and not less than 9 ft. high." Quickly following on this discussion, a company has been formed in the town to erect dwellings for the poor. It should be added that the *Western Daily Mercury* has done good service in directing public attention to the matter.

Civil and Mechanical Engineers' Society. The opening meeting of this Society for Session 1880–81 was held on Thursday evening last in the Society's new rooms at 7, Westminster-chambers, when the President (Mr. H. Ellis Hill, A.-M.I.C.E.) delivered an inaugural address. The following is the syllabus of papers to be read during the session,—Dec. 23, "The Patent Laws and their Influence on Trade," by Mr. A. T. Walmisley; Jan. 6, 1881, "Account of Sombrero Island, West Indies, with description of submarine quarrying of phosphate of lime," by Mr. R. Harkness Twigg; Jan. 20, "Application of Hydraulic Machinery to Mines, Gasworks, Grain Warehouses, &c.," by Mr. J. Coates; Feb. 3, "Drainage and Embanking, with regard to River Outfalls," by Mr. W. C. Street; Feb. 17, "Water-bearing Strata of the Thames Basin," by Mr. A. F. E. Grant; March 3, "Steep Gradients *versus* Heavy Works," by Mr. J. B. Walton; March 17, "House Drainage and Sewerage," by Mr. R. E. Middleton; March 31, "Lifts for Warehouses, &c.," by Mr. G. J. Child; April 7, "Rainfall," by Mr. B. Hanghton; April 21, "Drainage of North Lincolnshire," by Mr. J. Henry Maughan. The annual meeting is fixed for May 5. Mr. G. A. Pryce Cuxson (of the firm of Maughan & Cuxson) has just taken the honorary secretaryship of the Society, which, we may add, has now been established twenty years.

St. Edmund the King and Martyr and St. Nicholas Acons, Lombard-street.—The extensive alterations and improvements that have been in progress in this church for some months past, under the superintendence of Mr. Butterfield, are now being rapidly completed, and the church will be re-opened for divine service on Christmas Eve. In addition to the repairs and decoration of the fabric, the organ is being greatly enlarged, and many modern improvements added to it, under the supervision of Professor Monk, of King's College.—*City Press.*

The Vacant District Surveyorship.—As usual when a vacancy occurs, there is a plethora of candidates for the office of district surveyor of Streatham and Brixton, rendered vacant by the death of Mr. John Mullins, the late surveyor. The number of candidates in the field is between twenty and thirty, including several Associates of the Royal Institute of British Architects. Mr. J. S. Quilter, the late deputy-surveyor, who is also one of the candidates, states in his address that, during the last three years, he has acted in that capacity.

London Fogs.—Mr. W. H. White, of the Institute of Architects, writes:—May I venture to inquire whether those lungs of the metropolis, the parks, may not, in some degree, be responsible for the fogs which periodically obscure parts of London? The fog of Thursday last is known to have prevailed principally in the northern, north-western, and western districts; at the termini of the North-Western and Midland Railways great inconvenience was felt. Now, on the afternoon of that day,—at about half-past four,—I passed through the Regent's Park, and there I observed over a vast space,—the circumference of which, I believe, is three miles,—a dense mass of bluish vapour rising apparently from the grass. In the midst of this vapour, a feeling of damp cold was experienced, with a tendency to cough, while beard and moustache were covered with globules of water. Objects at a few yards' distance could not be distinguished; both in the Euston-road and at Gloucester-gate the enclosure walls of different houses streamed with moisture. At a later hour,—at 11.30 p.m.,—I was in Portland-place, where foot-passengers clung to the area-railings as the only means available for directing their steps. Arrived, however, at Oxford-circus, the fog was less dense; at the eastern end of Oxford-street comparatively little existed. I traversed the slums of Soho, Covent-garden, and the Strand without any difficulty, and the city was free from fog. I would, therefore, humbly beg scientific men who are interested in this matter to visit the Regent's Park any day this winter between 4 and 5 p.m. I have been told that the drainage there is of an obsolete character, and from my experience of this and last year, when London has been visited with fog, the cloud has seemed to me to be thicker in Portland-place than in Oxford-street, or even the Strand.

Adulteration of Food in America.—Through the efforts of *The Sanitary Engineer*, the National Board of Trade, at their annual meeting in Washington last December, were induced to institute a competition for "the best Act or Acts, accompanied by an essay, designed to prevent injurious adulteration, and to regulate the sale of food, without imposing unnecessary burdens upon commerce." One thousand dollars were offered in prizes, which sum had been given to the Board for that purpose by Mr. F. B. Thurber, of New York. The committee of award have just made their report. In addition to awarding the prizes, the committee were required to prepare and submit to the Board of Trade a draft of a suitable National and State Bill designed to secure the results which the competition was instituted to accomplish. The committee have selected as the three most meritorious essays, with the accompanying Acts, numbering them consecutively in the order of merit as follows:—

1. The essay and acts having the motto "Aequo Animo."
2. The essay and acts having the motto "Sic utere tuo ut alienum non laedas."
3. The essay and acts having the motto "Overcome Evil with Good."

Upon opening the sealed envelopes, having corresponding mottoes, it is found that the authors of these essays are as follows, viz.:—

1. Motto "Aequo Animo," G. W. Wigner, F.C.S., London.
2. Motto "Sic utere tuo ut alienum non laedas," Vernon M. Davis, New York City, N.Y.
3. Motto "Overcome Evil with Good," William H. Newell, M.D., Jersey City Heights, New Jersey.

In addition to these essays, we recommend the printing of the essay having the motto "Cardinal Cajetan," whose author is O. W. Wight, M.D., Health Officer, Milwaukee, Wisconsin; and the remarks submitted under the motto "Work and Wait," by Albert B. Prescott, Ann Arbor, Michigan.

New Docks for Silloth.—It is stated to be the intention of the North British Railway Company to build a new dock at Silloth. A few days ago Mr. Thomas Meik, C.E., of Edinburgh, visited Silloth, in company with Mr. Charles Boyd, resident engineer to the company, for the purpose of reporting upon the proposed work. It is added that the new dock is to be about six acres in extent.

Measuring Tapes.—We have received several letters recommending this or that maker's tape; but these are all known to "Inquirer," and are fallible. We have not yet received a letter from any maker promising to try and do better. The want of thoroughly reliable and lasting tapes is admitted.

Light, Heat, and Ventilation.—An exhibition is announced of appliances for heating, lighting, and ventilation. It is to held at the Alexandra Palace, in the great central transept and adjoining halls, and will be opened from December 22nd to January 11th.

TENDERS

For the erection of two villa residences, Woodhouse-road, Mansfield, for Mr. G. Pickard. Mr. Thomas Hartas, architect. Quantities supplied:—

Fisher, Bros., Mansfield	£1,650	0	0
Roe, Alfreton	1,634	9	0
Alsop, Mansfield	1,602	11	6
Parsons, Mansfield	1,595	0	0
Vallance, Mansfield	1,595	0	0
Tinkler, Clay-cross	1,517	0	0
Bradder, Mansfield	1,448	0	0
Bell & Son, Nottingham	1,442	0	0
Maben & Fairington, Manchester	1,400	0	0
Greenwood, Mansfield (accepted)	1,323	0	0

For completing the Alexandra Mansions, Victoria-street, Westminster, for the Midland Land and Investment Corporation, Limited. Messrs. Bateman & Corser, architects:—

Francis	£18,230	0	0
Avias & Co.	17,647	0	0
Lathey Bros.	16,623	0	0
Colls & Sons	15,991	0	0
Martin & Co.	15,528	0	0
Longmire & Burge	15,352	0	0
Adamson & Son	14,400	0	0
Patrick & Son	14,317	0	0

For sanitary works, Cornhill. Mr. T. Mullett Ellis, architect:—

Beattie, Holden-terrace	£155	0	0

For decorative work, No. 3, Warwick-square, Pimlico, for Mr. Francis Mowatt. Mr. T. M. Ellis, architect:—Wilson, Sussex-street (accepted).

For building two houses and shops, Mile End-road, and altering stable premises adjoining. Mr. T. M. Ellis, architect:—

Hart (accepted)	£3,180	0	0

For two houses, Hampstead-heath. Mr. J. Milbourn, architect:—

Linsall	£2,100	0	0
Harper	2,490	0	0
Conder	1,960	0	0
Bishop	1,940	0	0
Cross	1,855	0	0
Ambley	1,815	0	0
Read	1,698	15	0

For alterations and repairs to houses, Stroud-green-road, for Mr. Earl. Mr. W. Smith, architect:—

Shurmur	£840	0	0
Steel Bros.	825	0	0
Harper	725	0	0
Larke	635	0	0
Mattock Bros.	595	0	0
Dunford & Langham	595	0	0
Stevens Bros.	539	0	0

For erecting villa residence, stables and fencing, at Winchmore-hill, for Mr. Sugden. Mr. W. Smith, architect:—

Steel Bros.	£2,093	0	0
Larke	1,990	0	0
Shurmur	1,950	0	0
Harper	1,939	0	0
Dunford & Langham	1,929	0	0
Pocock	1,763	0	0
Mattock Bros.	1,477	0	0
Wheeler	1,420	0	0

For the erection of greenhouse and pits in Venner-road, Sydenham. Mr. C. J. C. Pawley, architect:—

Hollidge & Stuart,* South Norwood	£210	0	0

* Accepted.

For the construction of sewers on the Aldrington Estate, near Brighton. Mr. Arthur Lewis, engineer. Quantities supplied:—

	Concrete.	Combined Brick and Concrete.
Crockett, London (add)	£230	£3,545
Oliver, Preston Park	3,371	3,371
Parsons & Sons, Hove	3,370	3,310
Marshall, Brighton	3,050	3,050
Norris, Hove	2,524	3,208
Hurst, Aldrington	2,950	3,020
Blaker,* Portslade (add)	528	2,978
Harrison,† Brighton	2,880	2,890

* Too late. † Accepted for brick and concrete.

For additions and alterations at 29, Gower-street. Mr. Thomas Newell, architect:—

Bush	£652	0	0
Perkins	650	0	0

For new schools at Glascoed, Monmouthshire, for the Llanbadoc, Monkswood, and Glascoed U. D. School Board. Mr. E. A. Lansdowne, architect, Newport, Monmouthshire:—

White, Abergavenny	£884	0	0
Davis & Jones, Newport	878	0	0
Davis & Thomson, Pontypool	844	0	0
Hatherley, Bristol	798	0	0
Linton, Newport	793	0	0
Thomas, Abergavenny	770	0	0
James & Son, Bridgend	700	0	0
Howard, Cardiff	698	0	0
Jones & Diment, Newport	690	0	0
Richards, Newport, Pontypool	663	0	0
Blackburne, Newport	649	0	0
Orphan, Newport	645	0	0
Davis, Usk	630	0	0
Burgoyne, Blaenavon	630	0	0
Jones & Son, Newport	629	10	0
Martin, Newport	610	0	0
Moulton & Brownscombe, Newport	585	0	0
Giles, Ewens Harold	578	0	0

For the new brewery buildings of ten quarters capacity, for Mr. J. Elworthy, Kettering, from drawings and specifications, Mr. Arthur Kinder, architect:—

Margetts	£940	0	0
Henson	927	0	0
Sharman	915	0	0
Barlow (accepted)	850	0	0

TO CORRESPONDENTS.

J. S. M. (shall have attention).—M. S. A. W. (we have already published the selected design).—M. A. S.—E. I. R.—W. C. T.—G. A. P.—C. G. B.—T. & P.—"Queen Anne."—A. L.—T. O.—W. B.—B. S.—J. & W.—E. & C.—J. M. C.—C. G. D.—E. S. & Co.—J. F.—J. & C. M.—J. H.—F. C. & Sons.—J. P.—E. & C.—C. T.—J. D.—T. M. E.—B. & C.—J. McG.—E. A. L.—G. T. C.—A. H.—T. R. S.—O. P.

Errata.—In the letter headed "Noises" (p. 679), the figure 44° should have been printed thus: −44° (*minus*, or 44 degrees below zero).—In the abstract of Mr. Robins's paper on "Sanitary Science," &c., printed on p. 686, the third principle summarised by Mr. Griffith should read,—"The soil-pipe should be 2xed outside the house," &c.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

SPECIAL NOTICE.

Christmas Week.—*The* BUILDER *for the week ending December 25th will be published on* **Thursday, 23rd** *inst., at the usual hour.*

Advertisements for insertion in that issue must therefore reach the Office before Three o'clock P.M. *on* **Wednesday, 22nd** *inst.*

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Addressed to No. 46, Catherine-street, W.C.

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The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

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"THE BUILDER" is supplied *direct* from the Office to residents in any part of the United Kingdom at the rate of 13s. per annum, *prepaid*. Remittances payable as above.

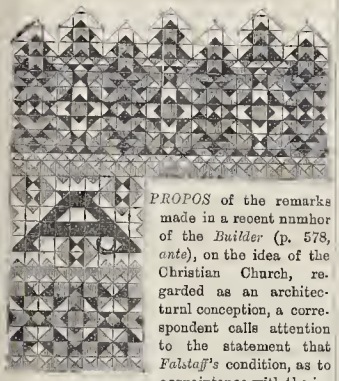
The Builder.

Vol. XXXIX. No. 1976. Saturday, December 18, 1880.

ILLUSTRATIONS.

CONTENTS.

On Coloured Lights, as an Integral Part of Architectural Design.



PROPOS of the remarks made in a recent nnmhor of the *Builder* (p. 578, *ante*), on the idea of the Christian Church, regarded as an architecturnl conception, a correspondent calls attention to the statement that *Falstaff's* condition, as to acquaintance with the inside of a church, is far moro general than people are ready to admit, even in this church-going and church-building age. Nay, more, to the hoary reprohate "the inside of a church" was evidently something once seen, althongh hut dimly remembered. But the position of onr contrihutor is, that most of those whose ecclesiastical pilgrimages are confined within the shores of Great Britain never *have* actually seen the inside of a church, as it was conceived and wronght ont hy the great church-huilders of England, from the time of Edward (King and Confessor), down to the destructive reign of red-handed Harry Tudor.

The suggestion may he put in a humorons form; hut there is a meaning in it which deserves careful thought. Our own pages have not unfrequently contained articles on the snhject of illumination. The importance of that condition while viewing any work of art cannot he over-rated. Has a reader ever paid a visit to the National Gallery, or to any great collection of pictures, when they are half-hidden beneath the veil of a London fog? What becomes of brilliancy of touch, of purity of tone,—even of delicate grace of drawing,—under the disfiguring ahsence of light? In sculpture, the effect of lighting is far more important than in painting, for, in the latter, it is only dimness of effect that is produced hy want of light, while in sculpture positive distortion of the sculptor's idea is produced hy throwing the shadows the wrong way. That a piece of sculpture, whether in relief or in the round, should be entirely executed in ono light, and viewed, when finished, in that same light, is a *sine quâ non* of excellence. It is possible to make some exception to this rule in favour of what may be called chamher sculpture. Thus, the exqnisite proportion of the whole figure (except the head and restored hands) of the Venus dei Medici is so perfect that, like a living heautiful woman, she can hardly he viewed amiss, in any light or in any direction. It would he difficult to say which was the artist's point of view for this particular statne. Nor have its loving custodians heen ahle to solve the difficulty; so they have reflected the matchless curves by a girdle of radiating mirrors. Still, even the Venus, if lighted only hy a lamp plnced at her feet, wonld not maintain her fame. Again, in architecture, the effect hoth of outline and of shadow lines is so varied, owing to the incidence of the sun, and, again, the harmony of the colonr of a building so depends, hoth on its relation to other features of the landscape, and on the incidence of light, that the power of illumination in giving character to architecture is hardly less than in the case of sculpture.

Thus far, then, as to the incidence, and as to the quantity of light. But no less attention should he paid to its colonr. Colour is, as we know, the effect of certain conditions affecting either the transmission or the reflection of light. Our attention, since anything like a revival of art has taken place nmong ns, has been almost wholly devoted, as far as the effects of colour are concerned, to the action of reflection. The colonrs of a picture are reflected colonrs. But the great church-huilders to whom we have referred took the opposite view. They gave, so far as we can now gather from the relics of their finest works, hut little attention to reflected colour. Their chief reflecting surface was gold. But over gold or marhle, canopy and shrine, sculptured saint and carved foliage, a glow of rich harmonious light was thrown hy the glorious stained glass with which they filled their windows.

As to this, of conrse it may he said that the remark is hy no means perfectly novel. No donht that is so. But what we think *is* novel,—or at least has heen pretty generally neglected for three hnndred years and more,—is that the windows of onr churches grew np as integral parts of the structure, glass and all. It was not one man that hnilt, and left the painter and glazier to come after him and improve and ornament at pleasure. On the contrary, the glass-stainer grew in his art as the huilder did in his. The modification in the form, the proportion, and the distribution of the lights, that took place from the time when church windows were simply double splayed holes in the wall, too small to allow the hostile Dane to squeeze through, to that when the whole end of a church or side of a hnilding was one great frame filled with sparkling window jewelry, was accompanied hy modifications in the tints, the leading, and the pattern of the glass, which were accnrately proportioned to the conception of the framework of the window. Grave and solemn in hue, or hright and sparkling in lustre, the window was not an impertinence or an excrescence, hut an integral part of harmonious interior design.

Windows, no donht, when objects of beanty, are things to he looked at. But that was not the original aim or object of the window. One of the few huildings in which the idea of the original architect, in so far as it comprised the effect of the windows (though some restorations have since nnhappily] heen effected), may yet he observed, is the "Dome of the Rock," at Jerusalem. The glorions Saracenic stained glass yet remaining, to a great extent, in the windows of that huilding, forma an integrnl part of the structural effect. You do not go to look at the windows. The absence of figure subjects which here occnrs is in this respect a true architectnral feature. Yon are impressed hy the solemn air of the holy place; and how much of the impression is due to lofty height, or nohle proportion, and how much to the flood of toned light, you do not panse to inqnire.

If our old cathedrals and chnrches are regarded from this point of view, it is impossible to deny that very few of them have ever been seen by any of the present generation as they were intended to he seen hy the huilders. At York we have, perhaps, one of the most striking exceptions; and who that has worshipped there has failed to he struck hy the wonderfnl grandenr of York Minster? The beantiful group of five lancet windows, known as the Five Sisters, in the north transept, filled with glass covered with foliage, and displaying geometric forms, is of tho thirteenth century. In the vestihule of the chapter-house is to be found glass of the twelfth century. The east window of the choir and the west window of the nave date in the first decade of the fifteenth century. In the north choir aisle the glass in the Archhishop's window is not more than twenty-five years later. The sixteenth-century glass in the Jesse window, in the south choir aisle, is of the same date as the Perpendicnlar tracery of the window itself. To a very nnusual degree we can thus see York as it was seen by its huilders and early adorners, and we may refer those who donht the trnth of the remarks we have made to the test of the effect produced on the mind of a man of taste, or of religions sentiment, hy the interior of York.

If we look to snch examples as the oboir of the cathedral of Clermont, or the Sainte Chapelle at Paris (the visitor to the Sonth Kensington Museum may wonder at the sacrilege which has enahled him to form an opinion of the solemn grandeur of this work), we see examples of a very different employment of glass hy the architect from that whioh prevailed at York. At the Minster, if we are correct in our recollection, the windows of Thornton of Coventry, and other great window jewellers, were intended to light the church. In the French sanctnaries thia could hardly he said to be the case. Semi-lnminons pictures, the windows were rather architectural features than points of irradiation; and the worshippers mnst have depended in no small measure for their observance of the ritnal on the silver lamps that hnng from the roof, or on the candles on the altar. "A dim religious light," even at noon-day, is all that was transmitted by windows such as those of the chapel of St. Louis. Can there he a stronger contrast conceivable than that between the effect of glass

lika this, and that of some of the modern transparency painting that disfiguras both the cathedral of the metropolitan, and the cathedral of the metropolis?

Some illustration of the truth of these remarks may he obtained hy any of our readers who have the chance of paying a visit to the Church of St. Nicholas at Guildford. This huilding, the third which has been erected on the same ancient site, is an example of that ready response of the parishioners, and of the personal friends of the lamented founder, the late Rev. Dr. Monsell, to an appeal made by the latter, then rector of the parish, to which he was himself one of the most munificent respondents. St. Nicholas has an especial claim on the attention of the ecclesiastical architect, from the mode in which the More Chapel, the ancient cemetery of the family of which Sir Thomas More was a cadet, has been combined with the south aisle of the church; the small arcade which exposes the chapel to view heing filled with plate glass, so as to separate, from a sanitary point of viaw, the huildings whicb ara architecturally one. There are many points of interest, as well as one or two deserving of pointed criticism, in the architecture of St. Nicholas'; but the point which we hava now in view is the effect which has been produced in the interior by the successive filling up of the greater nnmber of the windows with stained glass. The windows of tha choir, or rather of the semi-octagonal apse which holds the communion-table, were the gift of the Monsell family. They have the disadvantage of being crowded with small figure subjects, poorly treated, and of containing a proportion of clear glass wholly inconsistent with the Early English form of the apertures. When tha church was first opened, the effect was anything hut satisfactory; and the want of harmony between glass and structure was after a time made more painful by the introduction of a reredos in gildcd wood, of which the less that is said the hetter. But after a time, tho west windows of the church were filled with stained g'ass of more appropriate design, as a memorial to Dr. Monsell. Then the south aisle windows were filled in the same way, as a memorial to the successor of Dr. Monsell in the living, the Rev. W. J. Few. And lastly, within the past week or two, the four windows of the north aisle have been filled with figure illustrations of the *Te Deum*, as a gift from a gentleman of the neighbourhood.

The point to which we now wish to call attention is the gradual change in the effect of the interior of the church produced hy these successive additions to its coloured shade. As each new series of windows has heen introduced, those previously inserted have become more admirable. The north aisle, the lowest part of tbe building, lying between a block which covers the very awkward entrance (the worst feature of the church) and the transept-like recess occnpied hy the organ, had a painfully mean look, whicb is removed by the effect of the windows. Nor is the improvement local alone. The harmony of the interior has become far more prononnced. Eaoh additional coloured light seems to have reflected something of its own richness on its neighhours. Even the unacceptable hits of white (or rather of transparent) glass in the choir windows are greatly toned down. And all that now absolutely pains the eye in transmission is the raw and badly-tinted light that comes through the circular window on the south side of the tower, and through the npper row of clearstory windows. These windows at present remain as they were originally filled with glass,—that is to say, in the mannor most detrimental to the general effect of the church, and most unpleasant to the eyes. They consist of transparent glass, a certain proportion of the panes heing of a greenish tint that increases the sickly tone of the brick-work lining of the interior.

The circular window is now about to he filled with stained glass hy subscription. If this prove as great an advance on the *Te Deum* windows as the latter are on the former stained glass, the church will he well worth a pilgrimage to visit. Then, too, if his visit he on Sunday, or on some holy eve, and if the rector occupy the pulpit, the visitor will hear such words as might have fallen from the lips of the greatest preachers of the English Church, when our language was that of Shakspeare, and the minds of men were aglow with the vivid growth of the Reformation. The only source of light remaining to disturb the general harmony, when the rose window is stained, will he the window of the More Chapel, in which the blank shields left by the glazier, fifty-four ont of sixty-six, ought to he filled with armorial bearings, and the before-noted clearstory windows (wa except, of course, the oak panelling and tabernacle work which is required for the lining of the apse). As to these, if they were filled with stained glass, the church would probably be too dark. But tha clear glass, and especially the green glass, should be removed, and its place supplied by dead white glass, as at York, with a small and lustrous quartette of window gems,—ruby, topaz, sapphire, and emerald,—in each light; just enough to show that rich colour was the tone of the illumination, although in this part of the buildiog hut a small quantity of colour was required. The problem of illumination and of effect combined wonld thus be solved.

In the four *Te Deum* windows there is much which reflects high credit on the artists. The two figures of St. Augustine and St. Nicholas, as representatives of "the Holy Church throughout all the world," are really noble. Starting from the west, the first three-light window contains the Apostles Peter and John, with an angel in the centre light,—and a very charming angel it is. With this exception, the celestial personages are less happy in their treatment than any other portion of the work. The second window contains the Prophets, Isaiah and Ezekiel, with Michael the Archangel in the midst. This latter figure leads one to ask,—how is it possible that artists who have evidently given so much thought to the subject should have dreamed of attempting any other representation of the Archangel than a reproduction of the St. Michael of Perugino, in the left hand compartment of that altar-piece in the National Gallery, which is nnmbered 288 in the catalogue? This fignra is nohle and imagioative, and at the same has a sort of Mediæval quaintness in force and general effect, which might be admirably rendered on glass, in which material the maintenance of a certain degree of conventionalism is, in our opinion, indispensable. St. Catherine and St. Stephen, in the third window, represent "the nohlo army of martyrs." Between them is a cherub, which is the same design as the seraph is the fourth window, with the exception that the colour differs, and that the seraph is objectionably besprinkled with human eyes. These, no doubt, are introduced to refer to the eyes mentioned in the vision of Ezekiel as being in the wings,—"their wings were full of eyes about them four." In the vision of St. John, the four living creatures were "full of eyes within"; but this description is materially different from that of the four-faced living creatures of Ezekiel, or the six-winged seraphim of Isaiah. It is a thousand pities, we think, that a symbolism which is not distinctly described, and to which pictorial art refuses to lend itself with any propriety, should here have been adopted. The windows are so good, the colour of the glass is so pure, much of the design is so admirable, and the example of the donor, Mr. Chester, is so mneh to be commended and imitated, that we are reluctant to speak ont ahout those celestial impersonations. But it is due to artists of merit to warn them against an attempt at evolving from their own imaginations representations of these mystio forms. We have pointed ont whence is to he derived an nnexceptionable pattern for the archangel. For the oherub we might point to St. Paul's Cathedral, and to the lovely choir of boy-angels, the work of Grinling Gibbons, that cluster in twos and threes, regarding invisible music-hooks, and nttering a perpetual *Sanctus* that finds an echo in the sculptor's ear. For the seraph some hint might have heen found in the Assyrian sculpture, where, indeed, the very name of cherub has been found associated with winged sphinxes. Or, if the artist had sought to embody the most lofty, because the least detailed, of the records given in Holy Writ of these celestial symbols, he would have found in the *petasus* and the *talaria* of the messenger of the gods an indication of the mode in which the greatest artists of the highest time of art rendered the idea, "with twain he covered his face, and with twain he covered his feet." The effect of the composition of these figures as they have been actually treated, is so disjointed that the idea of unity is almost lost.

We have dwelt at more length than we shonld otherwise have done on this series of windows because the mode in which the Church of St. Nicholas has heen successively adorned hy the piety and the munificence of so many donors, in so short a period of time, may he taken to mark almost a new era in the application of decoration to church architecture. That rich and appropriate decoration should be thus introduced is the desire of all true lovers of art, and, we think, of tha truest friends of the Church. But the more fully this is the case, the greater is the necessity to watch against the introduction, owing to the mistaken taste of any individual, of the grotesque, or even of the abominable. Among the latter may be mentioned certain dragons or other infernal monsters, the depiction of which on the walls of a rather notorious church will he fresh in the memory of many. From the sublime to the ridiculous we know the distance. About tbe same space separates the quaint from the odious. Whether it he desirable, even if possible, exactly to reprodnce ancient portraitures of saint or martyr, angel or cherub, may, perhaps, be questioned. Our own taste points most strongly to the use of such noble floriated or geometric patterns for window jewelry as those of the Dome of the Rock, or as the groundwork of the Brunel, Stephenson, and Locke windows in Westminster Abbey, in preference to figures. If figures must he had, we have, on the one hand, the patterns left of the early workers in glass, and, on the other hand, the limiting lines traced by the great Italian artists. We think that any worker on glass who would wish to leave such a name as, for example, that of Thornton of Coventry, should bear in mind that the imagination of a nineteenth-century artist is not strong enough to hring forth a new conception of an ancient symbol,—snch as that of chernh or seraph. The painter himself wonld here almost certainly fail; and the worker in glass labours under much greater difficulties than the painter. He has to work in honds. So working, a nobility and a grandeur are possible of a very high order. But they ara not to be attained by any attempt to overleap the bounds set by the leads of the casement, and the quality of glass. To paint a transparent picture may be magnificent, hut it is not window jewelry. It is not true architectural decoration. True window jewelry admits only of the colours of natural gems. They are also the colours of the herald, as well as those of astrology. The topaz, the ruby, the sapphire, the amethyst, and the emerald give or, gules, azure, purpure, and vert. Sable is given hy the leads, and the white glass should have the effect of pearl, which, in the hlazonry of gems, denotes argent. If we admit that dark-browns or semi-opaque purples may be introduced into windows,—which, if at all, is only allowable when the illuminated space is of very great area, as in the case of the south window of Westminster Hall,—Saint Augustine and Saint Nicholas, in tbe windows of the church we have named, may be pointed to as examples of what the workers of the present day can do in glass of which any church may be proud. All the more are we desirous that men who can turn out such thorough and noble work should not allow themselves to he seduced, under the plea of giving scope to the imagination, into the mechanical composition of impossible figures, which are neither reproductions of old glass, nor happy attempts at giving embodiment to poetio ideas.

A GRAMMAR OF JAPANESE ORNAMENT.

In the enthusiasm which has sprung up of late years for Japanese art, there has been for the most part little of critical judgment or moderation. It has been a kind of craze, under the influence of which many persons have devotedly imitated or collected everything Japanese they could lay their hands upon, and worshipped the collection with a blind and touching faith. The work put forth by Mr. Cutler * exhibits a different and much more moderate and critical spirit in dealing with the subject of Japanese art. It seems, indeed, to be the first systematic attempt to look for something like principle in the style of design characteristic of Japanese art; to consider in what lies the secret of its charm, and to criticise it in an independent spirit. The author modestly disavows any claim to the possession of literary ability; but his criticisms are expressed in sufficiently clear and readable language, and are in themselves often very sonnd and sensible.

With the short historical sketch we will not concern ourselves especially; the matter is to be found in much more detail elsewhere, and the author does not pretend to announce any new facts. In the following chapters on

* A Grammar of Japanese Ornament and Design. With Introduction, descriptive and analytical Text. By Thoma W. Cutler, F.R.I.B.A. London: B. T. Batsford. 1880.

architecture and sculpture the characteristics of these arts as practised by the Japanese are fairly estimated; in regard to the latter subject, the author raises the question whether it is through accident or want of power that in sculpture the human figure is never correctly rendered, but only in grotesque form; he concludes it could hardly be want of power, as an artist who could draw the feathers and claws of a bird in various attitudes could have learned to draw the human hand correctly. Undoubtedly he could; and our impression has always been that, like other races who have not arrived at the highest style of civilisation, the Japanese do not, or did not, care for the human figure. In character they may be said, compared with Europeans, to be rather like children, and their art has that comparatively child-like character which aims at what is pretty and fanciful and even funny, rather than at intellectual expression. They can use the human figure in satirical caricature with considerable effect, though even here it is sometimes difficult to distinguish between what is intentional caricature or oddity and what is merely defective drawing. But they did not study the human figure as they studied birds, beasts, and fishes. When the highly-interesting collection of Japanese carvings and drawings was exhibited at the Burlington Fine Art Club, we drew attention to the fact that while there were many careful studies of the limbs, plumage, &c., of birds,—and even the actual feathers were gummed to the paper for reference as models,—no one seemed to have had a single study of any part of the human figure, made for the purpose of study, to lend for exhibition. That fact, as we said at the time, was quite sufficient to explain why the same people drew birds well and figures badly. They took pains with the former, but they did not care about the latter.

The recollection of studies from birds with the specimens of plumage appended, which were to be seen in that same collection, leads us, however, to question the entire correctness of the statement in the chapter on painting, that the Japanese rarely, if ever, draw from nature. It was clear, from the Burlington Club Exhibition, that they sometimes study from nature very closely. But, for all that, we believe Mr. Cutler's general view to be correct, that the birds, fish, and plants introduced into or sometimes constituting Japanese decoration are rather the facile repetitions of well-known and long-established types than the result of any attempt to reproduce nature. As he points out, the birds and fish, even, are rarely anatomically correct, or resembling nature in detail; they are thoroughly natural only in the remarkably happy and effective manner in which action is shown in them, and which might result rather from the habit of observation by quick-eyed intelligence than from formal copying from life on the spot. The author's general estimate of the pictorial art of the Japanese, however, we hold to be quite correct, though it would startle the faithful among Japan-worshippers. It is simply that pictorial art, as we mean it, can hardly be said to exist in Japan; "ignorant of chiaroscuro, the play of shadows, and the relief which by their use one can give to objects, scenes, and landscapes, they paint all in flat tones as one paints a vase; it is not a picture which they execute on the sized silk, it is a decoration, and it is as a decorative process that painting in Japan must be considered." They have imposed on themselves a style copied from the Chinese; and "the merit of their art, if we may call it such, lies in their method, which, by repeated copying, gives them such accuracy, such perfect touch, and such mastery over the brush. They are feeble in conception, inimitable in execution; masters in the matter of taste, when the human figure is out of the question."

When we find a writer who has directed special attention and admiration to Japanese art, speaking of it in this judiciously critical tone, we may hope that we are about to see a more intelligent estimate of it succeed to the unreasoning and blind craze against which we have more than once protested; that we shall not always find people ready to demand that some jagged lines for rocks, and some curly lines for water, and some sprigs for trees, without any perspective, linear or aërial, shall be admired as a "landscape-painting," and placed in competition with, or even as superior to, the best European landscape-painting. We have actually heard such a claim made, and have seen some of these grotesque and childish attempts at the representation of landscape landed as evidence of the wonderful versatility of the Japanese, who could draw landscape and animals equally well. It may be hoped that even Japanese collectors are becoming a little more discriminating now, though it must be admitted that collectors as a class are hardly, perhaps, to be judged by the standard of rationality applied to mankind at large.

Mr. Cutler gives some brief chapters on the processes in ceramic ware, lacquer, metal-work, &c., which render the book more complete; and then we come to the æsthetic consideration of the subject. Some remarks in regard to the Japanese artist as a decorator are suggestive, and the brief description of the process of education of a Japanese designer helps to explain some of the peculiarities of their art:—

"A small manual of drawing, in which different designs are mapped out in squares, is placed in the hands of the student, who divides his drawing-paper into the same number of squares, which he is taught to fill up in their fixed order. When he has learned these by heart, designs of gradually-increasing difficulty are placed before him, and thus he learns by degrees to delineate flowers birds, landscapes, figures, and other objects in an artificial manner, without any reference to nature. One student may devote himself to birds and flowers, another may take up the subject of landscape, but in all cases the method pursued is the same, and thus the excellences and faults of the originals are perpetuated. Individual talent in draughtsmanship,—looking to originality of design,—can scarcely exist. The excellences of artists are therefore confined to the combination of conventional forms, and the delicacy or power of execution and colour, in which alone their fancy can have free play. These elegant stems, these feathery petals, are thus executed after a number of models prepared long beforehand, and which every painter possesses."

Admitting this description to be true (and we have no doubt it is) we are in a position to estimate Japanese art very differently from the view we might take of it if we regarded it as an art independently practised by individuals. Like so much of the best decoration in the world, it is, in fact, a kind of artistic school or habit of design, carried to great perfection of finish through the practice and teaching of many generations. In considering it as a style of art for study and emulation by European artists, therefore, we may reduce it to a comparatively few types, and we may then find room to consider whether, if we wish to reproduce for ourselves the effect of ornament of this type, we may not find a better and more living method of doing so, in ourselves adopting our own types and refining and finishing the execution of them to the highest point, and then applying our own details to the production of ornament on the same principle, but with novelty of detail. This would be more interesting and more likely to benefit and advance decorative design in new paths, than merely aiming at a mimicry of Japanese work. In analysing the elements of Japanese design, the author reduces them to certain leading groups. First we have diapers, frets, and medallions, not imitative of nature, and in some respects resembling forms that are found in Greek and Egyptian art. Next we have free-hand curve lines, made with single brush strokes; then a graduated series of studies from the bamboo, one of the most prominent and frequent objects in Japanese decoration. Following these are plates of studies in grasses, flowers, birds, and in clouds and water (so-called). These the author apparently regards as the typical divisions into which the materials of Japanese ornament fall. As to the principle of combination employed, Mr. Cutler defines it as "an avoidance of the appearance of symmetry while producing symmetrical effects, a suggestion rather than expression of proportion, an unobtrusive order, and in repetition of form an irregularity and changefulness, giving to it an unusual charm and freshness. A Japanese artist proceeding to decorate a given space would not mark out the centre and place his ornament there, nor would he divide it into equal parts, but he would most probably throw his design a little out of the centre, and cleverly balance the composition by a butterfly, a leaf, or even a spot of colour." This is perhaps about as much as can be definitely said as to the principle of Japanese design, which to superficial observers is marked apparently by want of principle and method, but which probably has so much of principle as is involved in the intentional avoidance of formality, together with the attempt to comply with the demands of symmetry (as one may say) unsymmetrically, and in a manner such as to produce the effect of a happy accident, a *contrived* accident. We believe that the highest class of decoration, that which has commanded the longest and most extended admiration, is that which is symmetrical and is precisely adapted to the space which it occupies. But we do not always want the highest or most serious class of art, either in decoration or in other forms of art; and when we are tired of the grave symmetry of the Greek, and the less grave symmetry of the Renaissance, ornament, the Japanese comes in like a child and arranges pretty things for our amusement, and seems ready to laugh with us over them. In that light, Japanese art is an exquisite element in the cycle of decorative arts, but it is not to be placed above, or on a level with, the graver, more precise, and more thoughtful ornament of the Greeks.

One other suggestion in the author's analytical chapter we may refer to. After observing that no doubt some of the Japanese work is intentionally conventional, he observes that it may be questioned "whether in their most successful work the artist is not decorative rather by accident than intent,—whether, in fact, he has not striven to produce a faithful and lifelike copy of Nature, and fallen just so far short of reaching a pictorial standard as to produce a decorative effect." This is exactly what we believe to be the case, not only in some of the Japanese work-but in many other schools; in the figure-subjects of Mediæval stained glass, for instance, where we have little doubt that the object was to produce as realistic an effect as was in the artist's power. The limitations which his powers and the exigencies of his material imposed on him led to the formation of a type of design exactly suited to the material and the circumstances, and which in succeeding times came to be regarded as representing the essential conditions of good design. A great deal of the apparently conventionalised art in the world was, we suspect, realistic art to its inventors.

It remains to say a word as to the illustrations to Mr. Cutler's book, which form by far the larger portion of it, but which, being all copies from Japanese originals, do not call for criticism on this occasion, except in regard to selection and execution. In both respects they rank very high. The selections include all the leading characteristics of Japanese ornament, conventional diaper, flower, bird, and fish subjects, designs for lacquer, &c. They are very well executed,—the majority in monochrome, a few in colour,—and do great credit to the publisher, as well as to the author's care and pains in their correct and finished execution. The book will be a useful as well as a very ornamental addition to any collector's, architect's, or decorator's library.

THE GEOLOGICAL EFFECTS OF HUMAN INDUSTRY.

THE unwonted activity which the long-observed depression of part of the surface of Cheshire has shown within the past week has been a source of danger and distress to not a few residents in that industrious county. Beneath the soil of Cheshire lie those treasures of salt on which, for the last 200 years, we have been drawing, as if they were inexhaustible. But it is not as matter of quantity alone that the labour of the salt-worker has been, in the most literal sense of the word, undermining that of the agriculturist. In rock-salt beds, as in coal beds, the miner is compelled, in self-protection, to leave pillars of the mineral that he extracts, or to supply their place by props of wood or of stone, lest the whole area of the roof of his workings should come down upon him. In abandoned workings this fall of roof is not uncommon, and a savage and squalid aspect is imparted to certain regions of "the Black Country," by reason of the descent of the earth from the very surface, to fill up the places left empty by the excavation of the thick coal-seams.

Two millions of tons of salt are now drawn annually from beneath the soil of Cheshire. As the bulk thus abstracted is about equal to twice that of the embankment across the valley of the Colne, near Watford, on the London and North-Western Railway, it is pretty clear that, sooner or later, the surface of the ground must sink. But it is not the miner, with pick and shovel, who is the real cause of the most pressing danger; it is the man who employs the apparently harmless instrumentality of the pump. Drawn up in the form of brine, the salt abstracted leaves space no less mischievous than that effected by the labour of the miner; and it has the further danger of being unknown in its

locality, as well as being unrelieved by any efforts to prop or to shore. A vast amount of solid matter is daily being removed in the form of brine, from which the water is afterwards evaporated to leave a deposit of salt. The water may be replaced from perennial supplies of rain; but the salt, once gone, is irreplaceable.

It is at Dunkirk, near Northwich, the capital of the salt-manufacturing district, that the more recent and most alarming subsidence of the ground has occurred. On the 4th inst. symptoms of unusual subsidence were observed over the site of an old and disused salt-mine, at Wilton, in the channel of a brook. A little later the movement became more active, and the accounts of the phenomena which took place recall the description of the Geysers of Iceland, or of the mud springs or mud volcanoes of volcanic districts. Water rose, as from a boiling cauldron, from the shafts of the old mine; and soft mud was thrown up for 7 ft. or 8 ft. into the air. A gradual settlement of the surface, through the whole day, produced this discharge from the shaft, which acted, not as a safety-valve, but after the fashion of those hydraulic standpipes with which the water companies have made us familiar. By dawn on the 5th of December the depression of the surface had so far advanced as to form the bed of a lake into which the water of Wincham Brook rushed like a torrent, furrowing a channel of 15 ft. in depth. As the water flowed in, the surface of the new lake rose and concealed the mischief below. About four p.m. another discharge took place from the old shaft, which can only be compared to that of an active volcano. Mud and stones were thrown up into the air to the height of 30 ft., and the surface of the earth sank another 5 ft. perpendicularly. With this movement the foundations of the neighbouring salt-works gave way, and the whole building soon after collapsed. A chimney, 90 ft. high, fell with a terrible crash. It soon became known that the Platt's Hill Rock Salt Mines, fifteen acres in extent, were flooded. The subsidence was still going on when this account was despatched. The level of the River Weaver has fallen a foot, and the brooks called the Twincham and the Flasher are still running into the new lake. The only consolation that is afforded to the sufferers is the fact that no lives have been lost. Thirty years ago a somewhat similar convulsion took place, and thirty lives were then sacrificed.

Small comfort as the reflection may afford to the sufferers, there is no doubt that this depression of the soil of Cheshire is a necessary consequence of the continuous abstraction of the salt. It is only a question of time when it may occur. The salt-miners, like the coal-miners, have to balance their accounts between wealth drawn from below and outlay caused on the surface of the soil. Even if permanent lakes are formed, they may have their utility. The great thing is so to watch the indications of movements of the kind as to prevent danger to human life. It is also obvious that none but strongly-framed wooden buildings, or iron buildings, should be erected in districts where the foundations may at any time give way.

There is, however, another consideration of great interest that is suggested by the accounts which we have above reproduced. The column of water thrown up from the old shaft is described as boiling. It is not said whether any observation was made of temperature, or whether the expression merely refers to the mixture of air, or to the violence of the eruption. But the close resemblance of the phenomena to those of a real volcanic eruption will strike all those who have witnessed the latter. If the water was actually warm, the heat may be accounted for on mechanical principles. The descent of such a body of earth must have developed a great degree of heat. The relation between gravity and heat is thus illustrated. We all know that if a mass of any solid matter falls from a great height, or is projected with great velocity (as the bolt of a gun), that the force of impact developes a high temperature. One description of bomb-shell is exploded merely by the heat developed by its concussion. But we have less acquaintance with the subject of the development of heat by pressure. This, however, we must expect sometimes to occur. And the point now before our consideration is,—to what extent may we consider that the heat that is found to increase as we descend below the surface of the earth is due to the pressure of the superincumbent mass?

We have long been accustomed to consider the earth as a body once heated to a molten state, and now gradually cooling. But we are not aware whether any physicist has attempted to investigate how far the terrestrial heat may be due to the active force of gravitation. One series of experiments made of late with reference to the heat of the St. Gothard Tunnel bears strongly on this view of the subject. If we look at the case of a permanent central fire, or source of heat, we should expect to find the terrestrial heat, as measured by the thermometer, proportioned to the distance from the earth's centre of gravity. Thus the surface-heat at the poles should be considerably greater than that at the equator. And thus a boring of 100 ft. or 200 ft. below the top of a lofty mountain should be much cooler than a boring of equal depth below the surface of a plain only slightly elevated above the level of the sea.

But such is not the law of the increase of terrestrial temperature. As far as it is yet known, it is distance, not from the earth's centre of gravity, but from its superficies, that determines the local heat. At 1,000 ft. below the summit of a hill 8,000 or 10,000 ft. high, the temperature is nearly the same as that at an equal depth below a maritime plain. It is to be observed that in sinking in a valley, the temperature increases somewhat faster than in sinking on a hill. But it is also the case that the pressure must be greater in the latter than in the former case. The latest ratio of increase of heat with depth taken from Alpine observations is 1° Fahrenheit for every 88·1 ft. of depth. We recommend the study of the relation between heat and weight to the careful attention of the physicist, and we shall be glad to publish any direct information as to the temperature of the water thrown up by the subsidence of land in Cheshire.

ROMAN REMAINS AT BRADING, ISLE OF WIGHT.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the fourth ordinary general meeting of this Institute for the present session, held on Monday evening last, Mr. John Whichcord, F.S.A., President, in the chair, a report of the Executive Committee (Mr. John E. Price, F.S.A., and Mr. F. G. Hilton Price, F.G.S.) for the Brading excavations was read by Mr. Hilton Price. The report described the position in which the remains have been found as a remarkably fine one, situate partly on the property of Lady Oglander and partly on that of Mrs. Munns. The first part of the remains was discovered by Captain Thorp, of Yarbridge, in April last. The present excavations originated in the finding on Mrs. Munn's property such indications of Roman buildings as offered encouragement for further investigation. While fixing hurdles upon this land, walls, roof-tiles, and traces of pavement were discovered, whereupon Captain Thorp devoted considerable energy and zeal to the more complete examination of the ground. It was subsequently suggested that, in order thoroughly to explore and ascertain the full extent and nature of the buildings, excavations should be commenced on the land belonging to Lady Oglander. With the introduction of their veteran colleague Mr. C. Roach Smith (himself a native of the island), and his relative Mr. F. Roach, of Arreton, Lady Oglander kindly accorded the Committee permission to excavate. The work commenced in August last. In the description of the various chambers (of which a plan was exhibited), the Committee had affixed to each a number by which it might *pro tem.* be known, as in the present state of the excavations they thought it premature to assign any particular name or use to the respective apartments.

Chamber No. 1 measured 18 ft. by 10 ft. 6 in.; the walls on the outside were 27 in. thick, the division walls between rooms No. 2 and No. 4 being 18 in. thick. There were five flue-tiles *in situ* in the chamber, on the east and south walls; the first one was 5 ft. 3 in. from the north-eastern corner; at 5 ft. 3 in. from the first was another; the next was 6 ft. further away; the next 4 ft. and the last 4 ft. 6 in. The flue tiles were 16 in. high and 4 in. broad. In the north-west corner, 2 ft. 6 in. from the wall, were the remains of an arch, composed of flat tiles, and the entrance was 2 ft. in width. There was no pavement in this apartment. In the chamber, fragments of black pottery, of New Forest ware; many broken flue tiles; some well-faced stones, some in the form of arch stones; iron spikes and small nails, roofing slabs made of Bembridge stone, with nails in them, and other articles, were met with.

Chamber No 2 was a square chamber measuring 20 ft., paved with grey marl tesseræ, and the walls were 2 ft. thick.

Chamber No. 3 measured 15 ft. 6 in. by 17 ft. 6 in.; the ornamental centre was 9 ft. by 10 ft. 6 in., and the margins of the pavement were chequered. In this room were found fragments of wall plaster with fresco, pieces of black pottery (Samian), broken flue tiles, and other things. Fully 20 ft. of the wall on the north-east corner were wanting. The pavement presented some novelties as regarded the subjects. It was square; on the western side were two gladiators—one with a trident, the other with a net—in combat. On the north side was a fox under a tree, probably intended for a vine. A building with a cupola completed that side. On the south side, in front of a pair of steps, was a man with the head and legs of a cock; on his right hand were two griffins. In the centre was the head of Bacchus or of a Bacchante, and similar figures occupied two of the angles.

Chamber No. 4, from the entrance to the arch on the south to the pier on the north side, was 11 ft. 8 in. by 10 ft. 6 in. in width. There was no pavement in it, but at the entrance to the arch a mass of plaster material, similar to that in which the tesseræ were laid, was found; when rubbed between the fingers it was quite soft, becoming hard upon exposure to the atmosphere. In the north corner of the room was a pier of masonry 2 ft. square and 2 ft. 6 in. high; upon the top of this the base of a pillar of greensand was found; a number of pieces of black pottery, flue tiles, an iron hinge, and a large number of stone roofing slabs and vitrified stones, were also here found.

Chamber No. 5 was a long narrow room, measuring 7 ft. 6 in. in width by 20 ft. in length, paved with inch grey marl tesseræ. The chamber communicated with No. 6 by means of a passage at the east end, 4 ft. 9 in. wide. The walls were about 18 in. thick. Many fragments of wall plaster with fresco were dug out of this chamber.

Chamber No. 6 appeared to be one long apartment, because the length from the border of the pavement described in room No. 3 to the margin of the representation of Orpheus, corresponded with the length of the other side of this mosaic to the wall of the Medusa room; these dimensions were 21 ft. 10 in. respectively. The representation on the floor of Orphens was 7 ft. 6 in. wide by 8 ft. 6 in. broad, with a well-executed border of the guilloche pattern 1 ft. wide. Orpheus was represented playing on his lyre, and wearing the Phrygian cap and flowing *pallium* or cloak; attracted by his music were animals and birds, suggesting the examples found at Woodchester, Winterton, Lincoln, and at other places. But the peculiarity of the pavement at Brading was the figure of a monkey placed near to the left shoulder of Orpheus; the monkey wore a red cap. The remainder of the chamber was paved in large red and white tesseræ in a chequered pattern. Beneath the pavement was a subway, which was covered with flat slabs of native tertiary limestone. It was 6 ft. 8 in. long, 2 ft. wide, and 3 ft. 2 in. deep; the stones forming it were of various dimensions, but corresponded in thickness, which was 8 in. The subway evidently had something to do with the heating apparatus for chambers Nos. 9 and 12, as both those chambers had suspended floors. The greater part of the wall on the eastern side of the chamber was wanting, and on the western side the wall was composed of rubble and irregularly-sized stones; just above the floor-line was a string-course of stone slabs, instead of bonding tiles. During the excavation of the chamber a considerable quantity of pottery, mostly coarse, of the variety known as Upchurch ware, was collected, but not sufficient to make up any vessel; also some pieces of a fine red ware, a sort of pseudo Samian, ornamented with incised figures of crescents, &c., of precisely the same kind as had been met with in Barge-yard, London, in Uriconium, and at Richborough. In this room and in No. 7 were a number of pieces of a large vessel, made of what resembled Portland cement, nearly ¾ in. in thickness, the inside being marked with the impress of the potter's fingers or thumbs all over. It was probably a mortarium. Some pieces of plaster with fresco upon them were picked up on the south side of the chamber, one piece 11 in. long by 6 in., representing a group of fruit in a circular medallion on straw-coloured

ground; another having a coloured bird of the parrot family, 10½ in. long, with a margin of red and white stripes 4 in. broad.

Chamber No. 7 was intersected by the boundary line dividing Lady Oglander's property from that of Mrs. Munns, and was 20 ft. square. It was paved in squares of red and white inch tesseræ, much injured by fire. The wall separating this chamber from No. 9 was much decayed, the mortar being quite rotten, but the marks of the foundation were plainly visible.

Chamber No. 8 was apparently a square, measuring about 20 ft. by 21 ft., containing no tesseræ nor concrete floor; near the hedge or boundary line was a circular structure, 4 ft. 6 in. in diameter, formed of slabs of Bembridge stone, and coated inside with salmon-coloured mortar. At the bottom were indications of fire, in such quantity as to suggest that the place was used as a furnace or oven. The committee had not been able to explore the whole of this structure, as it ran beneath the bank and hedge. The boundary-wall on the west side was nearly 3 ft. in thickness,—a circumstance which led the committee to think that it might have been an external wall, as its thickness was so much greater than that of other walls of the buildings. There was an opening into Chamber No. 10, 3 ft. 6 in. wide.

Chamber No. 9 was 19 ft. 9 in. square; the bordering was of the usual 1 in. red and white tesseræ; in the centre was a square measuring 5 ft. 10 in., enclosing a diamond-shaped figure, with a central medallion of parti-coloured tesseræ. There was a good deal of plaster or stucco still standing upon the walls to the north and west, displaying scroll patterns of dull colours much faded.

Chamber No. 10 measured 11 ft. 6 in. by 10 ft. 5 in.; the walls were 1 ft. 9 in. in thickness. It had a raised ledge or seat on the west side, 6 in. high by 1 ft. wide, covered over with red plaster, and on the north side was another similar ledge 2 ft. 6 in. wide. Upon the floor were, *in situ*, a considerable number of flat red tiles, 1 ft. 2½ in. by 11¾ in. No tesseræ were found upon this floor.

Chamber No. 11.—This was 15 ft. by 5 ft. The walls were from 1 ft. 6 in. by 1 ft. 9 in. high, and the chamber was paved with rough concrete.

Chamber No. 12 was the largest room yet met with on the site; its dimensions from east to west were 39 ft. 6 in. by 19 ft. in the western portion, and 15 ft. 6 in. in the eastern portion, and 11 ft. between the piers in the centre. The pavements in this chamber were remarkable. At the west end the mosaic pavement was almost square, its dimensions being 13 ft. 6 in. by 13 ft. 10 in., divided into compartments edged with the guilloche border in ¼-in. tesseræ of white, black, and red. The design might be described as in three divisions, with a central circular medallion also bordered by the guilloche, but the subject was destroyed; sufficient, however, remained to show that it contained a similar building to that already referred to as being found depicted in the pavement of Chamber No. 3. Upon either side were oblong panels containing mythological subjects, and at the corners were semicircles enclosed in compartments; these were occupied, with the exception of one which had perished, by busts in illustration of the Four Seasons,—the missing one from the north-west corner being probably Spring. The centre of the pavement was much injured, but sufficient remained to show that the central design was contained in a circular medallion, bordered with the guilloche pattern. Around the medallion were four oblong panels, placed between the angles containing the seasons. These probably represented mythological subjects, because in the one which was tolerably well preserved appeared figures which might be recognised as Persens and Andromeda. The eastern division of the chamber contained the largest and most important of the mosaics yet found. In the centre was a large medallion containing the head of Medusa, such as occurred both at Bignor and Bramdean. Springing from the centre were four compartments, arranged cross-wise; each of these was bordered by the guilloche pattern. At the angles north, south, east, and west were triangular compartments representing figures of bucolics blowing the *buccina*, or neat herd's horn; on their heads was the *petasus* of Mercury, and over their left shoulder was a *pallium*, or cloak. The whole of this apartment was bordered with inch red tesseræ, which contained a fret pattern laid in white, terminating at the head of the chamber in a figure of a *swastika*, or Vedic cross. The presence of this symbol upon Roman monuments had been noted upon remains previously discovered in Britain. A large quantity of plaster off the walls or ceiling was lying face downwards upon the pavement, and some of the colours on it were very bright, but none indicated any special design. There was a fair amount of plaster still adhering to the walls of the room, with fresco painting upon it representing scrolls in dull colours. The explorers also found some plaster roundels for inlaying in the wall.

Chamber No. 13 was a singular structure, consisting of rough stones, and measuring 7 ft. 9 in. long by 3 ft. 10 in. broad, and about 2 ft. deep, paved with large red tiles, similar to those found on the floor of Chamber No. 10. This structure extended on the east or seawards side, where the wall projected fully 18 in. It had been coated inside with salmon-tinted mortar, and on the east side of the compartment a wall had been inserted, which was found to be a continuation of the main wall running northwards. This addition was built of rougher masonry and common, badly-made mortar, indicating a later date. Various usages had been assigned to the chamber, amongst other suggestions being one that it was a bath; but as yet no indication of a pipe had been met with, which would probably have been the case had it been used for that purpose.

Chamber No. 14, which measured 15 ft. 4 in. by 10 ft. 2 in., had a concrete floor; the walls were low, and in certain parts the plaster still remained on the wall, which was of a dull blue colour, splashed with red and black in imitation of marble. The stucco which was dug up from off the floor, lying face downwards, as was the case throughout, was of very bright colours, but none of the fragments denoted any subjects.

Chamber No. 15 was a hypocaust, of great interest. The chamber measured 15 ft. 2 in. north and south, and 10 ft. 7 in. east and west. It contained fifty-four pillars of tiles arranged upon a floor of rough cobble stones; a large tile was placed upon the floor to carry the others, which were 8 in. square and 1 in. thick, with mortar joints 1 in. in thickness. These pillars were 2 ft. 6 in. in height, and consisted of about thirteen tiles each. On the east side of the wall were two flue-tiles *in situ*, 16 in. in length, joined together, thus making a flue of 32 in. leading to the upper portion of the room, and another on the north side. On the west side and in the southern corner was a neatly-turned arch of large flat tiles, with wide mortar joints; at the mouth of this arch a large stone of massive masonry was found placed across it. This arch might have led to the furnace on the outer side of the wall of the chamber.

Chamber No. 16 measured 17 ft. 3 in. long by 10 ft. 7 in. broad. The walls were covered originally with a red stucco, some of which still remained in patches; the floor was of concrete. A large number of flat roof slabs, 18 in. by 12 in., many with nails in them, were found amongst the *débris*, likewise a number of fragments of Durobrivian pottery, and two Samian bowls. Many worked stones were taken out of this chamber. A mortarium made of limestone, 2 in. in height and 6 in. in diameter, was found there; it had only one projection, which formed either a handle or an ornament, though it must originally have had three of them.

Chamber No. 17 was found to be 19 ft. 5 in. long from east to west, by 10 ft. 3 in. wide. The floor was composed of concrete, and the walls, which were now only about 2 ft. high, were covered with stucco, a small quantity of which still remained, the colour being a dull blue splashed with red and black. The chamber communicated with No. 18 by a stone step 1 ft. high and 2 ft. broad, situated about the middle of the wall. In the work of clearing out the fallen *débris*, several large nails or spikes varying in size from 10 in. to 13 in. were thrown out; in several instances these large spikes were removed from the tops of the walls, where they were lying in horizontal positions. The chamber was chiefly remarkable for the large quantity of window-glass it contained. The glass was of various colours, some bluish-green and some a drab colour; upon one side it was smooth and polished, while upon the other it was rough, like ground glass. The thickness of the largest pieces varied from one-eighth to a quarter of an inch. The largest piece of window-glass exhumed was 7¾ in. in length by 4 in. in width, of a brownish-white colour, and one-eighth of an inch in thickness, with a rounded selvage edge; the next largest fragment was a piece of green glass, which was three-sixteenths of an inch in thickness and 6 in. long by 3 in. in width. The explorers also met with bluish-green and yellowish-green glass, and one piece was a quarter of an inch thick near the selvage edge. One fragment had two outer edges rounded, and this might possibly afford a clue as to the manner in which the sheets were cast for fitting into the window-frames.

Chamber No. 18 measured 21 ft. 6 in. from north to south, and 18 ft. 6 in. from east to west; the floor was of concrete, with a red fillet round the margin of the wall. The stucco was still remaining in parts, and exhibited colouring of a dull blue ground, splashed with red and black in imitation of marbling, as was the case with chambers Nos. 17 and 14, and also at the Roman villa discovered at Aldborough, Yorkshire.

Chamber No. 19, which had not yet been excavated, measured 9 ft. by 10 ft. Walls had been traced for at least 100 ft. east of this chamber, disclosing many other apartments, but that area had yet to be systematically excavated. In conclusion, the Committee stated it to be their intention to recommence active operations early in the spring. By the time they were in a position to publish a second report they might be able, with the assistance of architects and antiquaries, to assign uses if not names for the various apartments.

The President, in inviting discussion, said he was sure that the meeting had heard with great satisfaction and interest the report which Mr. Hilton Price had read. He had much pleasure in introducing to the meeting another Mr. Price, a gentleman who, though not related to the reader of the paper, had been associated with him from the first in his researches. It was quite certain that the work could not be in better hands.

Mr. John E. Price, F.S.A., said it would have been apparent to all who had done him and his colleague the honour to listen to the report, that they had purposely abstained from making it other than a report to the Institute. The writers had felt that it was not within their province to go at length either into the topography of the district, or into the Roman occupation of the Isle of Wight. Perhaps the most interesting point of the whole matter was that the district near Brading should be found to abound in Roman remains. So little was known of the Roman occupation of the island, that the discovery of these remains at Brading was of exceptional interest. It was not until the present century that any trace of the Roman occupation of the island was discovered, although the information to be derived from ancient authors as to such occupation was very precise. Vespasian, in the reign of Claudius, was engaged in Germany with the Second Legion, when he was summoned by Claudius to go over and assist in the occupation of Britain; and it was on record that, after subduing Dorsetshire and Hampshire, he occupied the Isle of Wight. The committee hoped, therefore, that as the work proceeded they would succeed in finding some record of the Second Legion. Sir Henry Englefield, in his book, had stated that there was no trace of the Roman occupation to be found in the island; and it was not until 1859 that Mr. George Hillier was able to record the discovery of some Roman work in the grounds of the vicarage at Carisbrooke. With regard to the remains now laid bare at Brading, the executive committee were unable to identify the several chambers with the specific purposes for which they were used. In 1862, during the excavations for the Cowes and Newport Railway, some Roman remains were found; and in 1867 Mr. Roach Smith reported the discovery of further remains. In 1864 the discovery was made of some Roman buildings in Gurnard Bay, which curiously resembled those found at Brading. Among the things found in Gurnard Bay were merchants' marks made of lead and stamped with Roman devices, some coins of Vespasian, and others of the age of the Antonines. At Bonchurch, Shanklin, and Freshwater, Roman coins and other remains had been found. At high water Brading Haven had all the appearance of a lake. Many attempts had been made to reclaim that valuable tract of low-lying shore, but without avail. Captain Thorp was under the impression that he had discovered an ancient ford across it, and if so it would probably be found to have some con-

nexion with Centurion's Copse,—a name suggestive of military occupation. The remains at Brading were found in two fields, respectively known as the ten-acre field and the seven-acre field, both constituting such a slope of cultivated ground as would at once have commended itself to the attention of the Roman architects, whose text books contained important counsels as to the selection of sites. The walls found at Brading averaged from 3 ft. to 4 ft. high; there were none higher than 4 ft. The pavements found were constructed of tesseræ, made of native stones found on the spot,—taken from the sea-shore; and every kind of stone used for that purpose at Brading by the Romans could now be picked up in Sandown Bay or off Bembridge Ledge. With regard to the design of the pavements, too much stress was sometimes laid on the fancied motives of the *tesselarii* or makers of Roman tesselated pavements, and it was never safe to be too positive in assigning the subject of or in asserting a particular scene to be depicted on such pavements, because the men employed in the work seemed in many cases to have worked very much at random. But, nevertheless, the pavements found at Brading bore a significance that could not be mistaken, —the mythological character of their design could not be gainsaid. In conclusion, Mr. Price said the committee owed great thanks to Lady Oglander for the kind manner in which she had given permission to excavate on her land.

Major Leeds, the chairman of the committee, said that, as representing the persons locally interested in the remains, he was able to state that they were most anxious to render every possible help to architects and antiquaries who might desire to scientifically survey and explore the remains which had been found. Unfortunately there were difficulties involved in the fact that the remains had been found existing on two properties, but he hoped that arrangements would be made whereby the whole area of the buildings,—for he thought they must not merely consider the remains as simply those of a villa,—could be opened out at once. Lady Oglander was willing, and, indeed, desirous, to help in every possible way. Those locally interested felt that they owed great thanks to the Messrs. Price and to the learned societies who had assisted them, and they were very grateful to the Royal Institute of British Architects for placing their rooms at the disposal of the committee.

Mr. E. W. Brabrook, F.S.A., said that so much had been said with regard to the remains from an antiquarian point of view that he should be glad to hear what the members of the Royal Institute of British Architects had to say, and to reserve his remarks for a future occasion; for he trusted that it was not too late to hope that the matter would be fully discussed from an antiquarian point of view in another place. Messrs. Price were deserving of thanks for the manner in which they had conducted the excavations, one important lesson to be learnt from which was as to the necessity of pursuing them to the end. It appeared to him that there was a great deal more to be discovered at Brading, and it was to be hoped that the Messrs. Price would be assisted and encouraged in pursuing their explorations until they had ascertained the whole extent of the undiscovered remains which lay between what had been excavated and the seashore.

Dr. Lewis asked at what depth below the surface the Brading remains had been discovered, and as to the nature of the superincumbent soil. He and others who had had more or less experience in investigating Roman remains in this country knew that they were generally found a considerable number of feet below the surface,—from 16 ft. to 18 ft.

Mr. F. C. Penrose said that he had not pursued the subject of the domestic architecture of the Romans, and so could not enter into a detailed discussion of the paper. He would, therefore, confine his remarks to the marvellous specimens of glass which were exhibited as having been found at Brading. In Italy, as far as he remembered,—at Pompeii and elsewhere, window glass had not been found in connexion with Roman remains, doubtless because it was not needed in that climate. It had, in consequence, been tacitly assumed that the introduction of glass for windows was a mediæval or Gothic invention, and that the Roman occupants of Britain, and even the Normans, were unacquainted with glass in windows. In the pieces found at Brading, however, evidence was afforded of the use of glass in sheets of really respectable dimensions by the Romans in Britain. He should be glad to know from those who had followed up the subject of Roman antiquities in Britain whether glass had been found in other places. Some of the glass exhibited was very pellucid and of very fine colour. The remarkable preservation of the iron spikes and nails exhibited was very noteworthy.

Mr. G. H. Birch said it struck him that there was a great similarity between the remains found at Brading and those of the Roman villa at Lyme Regis.

Mr. T. Chatfeild Clarke and Mr. E. C. Robins having made a few remarks,

Mr. J. G. Waller, F.S.A., referred to the singular emblem known as the Swastika, mentioned in the report as having been found in the decorations of the Roman buildings at Brading. He said he believed he was the first person who gave it that name,—now forty years ago, getting his information about it from the papers of the Asiatic Society. The late Mr. Albert Way and himself had happened to light upon the English word for it in the same week. It occurred in one of the Harleian MSS. in the course of a few rough notes made by a gentleman for the execution of a window as a memorial of himself and his wife. The Swastika was a religious emblem amongst the Buddhists,—indeed, he believed it was the earliest religious symbol of which we had any evidence. Dr. Schliemann had found it in his excavations at Hissarlik, and had said a great deal about it, on the authority of a writer who was not to be too implicitly trusted. After all, very little was known about it, except that it was one of the most ancient, if not *the* most ancient, religious symbol of which there existed any sort of record.

Mr. Alma Tadema, R.A., said that Mr. Penrose would be interested in learning of the existence, in a museum in Rome, of two bronze frames, measuring about 2 ft. by 2 ft. 6 in., in one of which pieces of window-glass still remained. He was unable to enter more fully into the discussion, but he wished the excavators much luck.

Colonel Prendergast asked whether Mr. Price had come to any conclusion with regard to the cause of the destruction of the buildings at Brading? One curious fact was mentioned in the paper, viz., that all the plaster covered with fresco painting was found with its face downwards.

Mr. C. F. Hayward, F.S.A., with regard to the depth at which Roman remains were generally found, said that at Colchester Roman coins and other vestiges of the Roman occupation, such as ornerary urns, and even stone monuments, had been found very near the surface. Within the last few years there had been discovered there a figure of a centurion, in very high relief. The Roman walls found at Colchester were, it was to be observed, composed of a concrete made with septaria, dredged up at Harwich and in its vicinity. There was no stone whatever in the neighbourhood.

Mr. Nicholl asked whether the plaster or fine concrete floor mentioned as having been found at Brading was decorated with colour.

Mr. Hilton Price, in replying on the discussion, said that the remains at Brading were found at an average depth of 3 ft. or 4 ft.,—in some places at a rather less depth. The tops of the walls were about 18 in. beneath the surface of the ground. The pavements were about 3 ft. deep in parts,—in some places a little more. Mr. Penrose had asked whether window-glass had been found in connexion with Roman remains elsewhere in England. Yes: there were records of its having been found at Uriconium, and at one or two other places. Some of the fragments of window-glass found at Uriconium had mortar adhering to the outer edges, leading to the supposition that the glass was fixed into the window openings by means of mortar. Mr. Roach Smith, he should add, in a letter just written, stated that he had found window-glass in Roman remains at a great many places in England. As to the cause of the destruction of the buildings, there was, he thought, no doubt that they were pillaged after the Roman legion left the island, and were then destroyed by fire; for traces of fire were evident throughout, and many of the objects recovered were very much charred. The floors which were not covered with mosaic pavements were covered with a kind of fine concrete or plaster, but he could not say whether they had been decorated in colour. The plaster fillets round the walls were certainly coloured red, and splashed with black and other colours to resemble marble. One very curious point with regard to the glass, which had been analysed, was worth noting,—namely, that lead was wholly absent from it. The total dimensions of the buildings now uncovered were 200 ft. from north to south, and about the same distance from east to west.

The Chairman, in closing the discussion, said it might be expected, after receiving so interesting a communication as that which had been read, and especially as the meeting had the honour to be graced by the presence of so many ladies, that he should from that chair sum up the discussion. He should not attempt to do so, however, simply because any remarks emanating from him would be taken to represent the views of the body of the members. They as architects felt very great interest in discoveries of the kind described in the report, and they would endeavour, when the full facts were discovered,—as they could not be until the excavations were completed,—to pronounce upon the character of the buildings of which the remains had been described, and which buildings appeared to be only a fragment of a whole. It would be premature, with the comparatively limited discoveries which had been made, to attempt to pronounce definitely as to the uses and purposes of all the different apartments of which the remains had been found. It was better to take due time and care in arriving at conclusions. Many years ago now, when the first discoveries were made in Pompeii, there was issued one of the most charming books that had ever passed from the press. He alluded to Sir William Gell's work on Pompeii. Sir William was so fortunate as to be associated with a number of very eminent local antiquaries, and he was able, in the time he devoted to the preparation of his work, and by the care which he exercised in analysing the various discoveries from day to day, to propound theories and to indicate the uses to which the different apartments and buildings had been put. He believed that up to the present day the accuracy of the descriptions of Sir William Gell had never been challenged. Without attempting to compare the remains found at Brading with the imperial treasures found at Pompeii, he was bound to say that the character of the former seemed to be exceptionally important, regard being had to the size of the apartments and the character of the pavements and other objects disinterred. It was very probable, he thought, that further excavations would lead to infinitely greater results. It appeared to him that the work could not be in more diligent and careful hands than in those of the Messrs. Price, whom he assured that the Institute would receive with very great satisfaction any further facts that they might bring to light; and he hoped that when the matter was again discussed in that room, the members of the architectural profession would be in possession of sufficient data to enable them to speak authoritatively as to the plan and uses of the buildings. He concluded by formally moving a vote of thanks to Messrs. Price for their interesting communication.

This was carried by acclamation, and Mr. John E. Price having briefly responded, the proceedings terminated with the announcement that the next meeting would be held on Monday, January 3rd, 1881.

SPECIALISM IN THE BUILDING TRADE.

The tendency towards the acquisition of an exact knowledge of things, which is one of the prevailing characteristics of the present day, has already had the effect of altering the status and traditions not only of professions, but of trades as well. In the majority of employments, whether they embrace mental labour or handicraft, the ever-increasing call for division of labour has rendered specialism not only a prevailing feature of competition, but an almost necessary condition of success.

Whether or not this tendency is on the whole of advantage to the individual, as regards his power to grasp the general features of a problem connected with his particular profession, is a matter open to great doubt. Every now and then cases occur in which capitalists would be glad to have the advice and assistance of an "all-round man." Even in Medicine, where specialism may be looked upon as having to some extent found its level, and in which the divisions of labour are defined with considerable accuracy, there is often a difficulty on the part of a suffering layman as to whom he should

apply. The bodily organs are so interdependent upon each other that a specialist in derangements of one kind may possibly be found to treat his patient at the sacrifice of what the specialist in another department might consider to be essential to the recovery of health. It is not unfrequently one hears the remark,—"Ah! poor fellow, he went to the wrong man; if he had gone to so-and-so, he would, no doubt, have pulled him through." And this difficulty of whom to apply to is by no means confined to the profession of Medicine. We have already referred to the capitalist as being sometimes in a similar dilemma. Frequently the successful employment of money depends upon the solution of problems in which the judgment of a specialist is of little value. Cases occur in which investments that promised well at the outset are in imminent danger of missing the mark, on account of the unexpected appearance of difficulties that did not suggest themselves at the beginning. Hence, as in the case of men suffering from obscure ailments, it becomes necessary to inquire what kind of specialist should be employed, and often there is no answer to be obtained. Then it is that the "all-round man," who has been so nearly improved out of existence, is wanted, and cannot be discovered.

An engineer, like Smeaton, who could build a lighthouse or construct a windmill, would be a tolerably safe adviser in matters of engineering generally, but if he lived to-day he would have little chance of making a competence out of a reputation that embraced so wide a range of capacity. The occasions on which his advice would be paid for would be few and far between, unless he confined himself to some limited department of his profession, and his ability to advise his clients generally in matters requiring a strong grasp of the salient features of a difficulty would nowadays be scarcely a marketable commodity. Even if such another genius as George Stephenson were to arise amongst us, it would not be enough that he should confine himself to being a railway-engineer. We do not think we are far wrong in saying that if he were to choose the path that would bring him nowadays to the greatest amount of wealth, and even of reputation, it would be one that was narrowed to limits which were never even contemplated at the time he lived.

The consequence of an absence of any demand for the class of men of which Smeaton and George Stephenson were types, unless they consent to become specialists, has led very materially to a falling off in the supply. We know of cases in which the directors of great commercial enterprises have had to fall back upon the services of retired veterans who were trained under the broader system which is now practically extinct when they required the sort of advice which a specialist, by his very training, is frequently unable to give.

In the midst of all this general tendency towards specialism, which it is unnecessary to say is going on even more among trades than in professions, it is interesting to consider the case of one large industry which, in London at any rate, remains practically unaffected by it. We need hardly say that we refer to the building trade. As a short inquiry into the causes and conditions of this industrial anachronism cannot fail to be of interest to many of our readers, we make no apology for speaking of the matter at some little length.

Of course, we do not refer, in the remarks we are about to make, to those great contractors connected with the building trade who are in the habit of taking large contracts, and letting them out among specialists; nor to work in the hands of architects who insist upon its being subdivided among experts, as is invariably done in Scotland. It is the typical London builder of whom we wish to speak,—the man who calls himself a builder in the same way that a tailor or a bootmaker puts up his sign and looks for business, and yet who, unlike those tradesmen who stick to the specialty of cloth and leather, combines half a dozen trades in one by professing to overtake all the handicrafts that appertain to the construction of a dwelling-place. Viewed in this light, the builders we speak of may be looked upon as almost isolated examples of tradesmen who remain unaffected by the conditions which seem almost essential to success in every other industry we can think of. The men who build houses for the living are scarcely less affected by the prevailing system of division of labour, at least in London, than those who build houses for the dead. Masonry, bricklaying, plastering, painting, plumbing,—all are embraced under the superscription of a single signboard, and the advertisements in the newspapers from workmen in search of employment show how much the example of the masters has been followed by the men, and how important it is for a skilled tradesman to be what is known as a "handy man."

It is probably to this element of handiness that we owe the existence and continuance of the system. It is handy not only for the architect, but for the householder as well. As a rule, persons in London who wish to build a house fall in with the prevailing traditions of the building trade, and do not trouble themselves to consider the complexity of the appliances that are necessary in order to make it wholesome and comfortable. They do not think that it is necessary for them to have some guarantee that the different classes of work should be done by different classes of men. They do not notice that the system is directly opposed to the principles of specialism which have led to the perfecting and developing of other industries. The convenience of the prevailing method seems to cover its defects. It avoids trouble, and simplifies the business character of a building transaction. It concentrates the responsibilities of breach of contract or insufficiency of workmanship. It avoids the mutual recriminations of different tradesmen, and above all, it is the tradition of a highly conservative community.

In other parts of the country, notably in Scotland, division of labour has long been the rule, and not the exception. Nothing can strike the eye of a North British builder as a greater contrast between the system he has been accustomed to and the one prevalent in England than the simple record of one man's name in connexion with the construction of buildings in England. In Scotland one name would appear in connexion with the masonry, another with the plaster work, another with the painting, another with the plumber work, and so on. It is not, therefore, an unnatural question to ask, will the Scotch system, so consonant with the prevailing tendencies of the present day, spread to England, or will the present English system take root in Scotland?

As matters stand, there is much to be said on both sides. On the whole we believe it is generally admitted that the building in Scotland is superior to that in England. The system of land tenure, under which a man there builds for his remotest posterity without the fear of disturbance on the part of the superior, encourages the habit of constructing substantial houses. Saving in repairs is generally looked upon as more than a set-off against the additional outlay required for extra good workmanship and materials at the beginning. Moreover, there is a natural advantage over the great majority of building areas in England in the excellent quality and abundance of sandstone. Still, this does not by any means justify the supposition that there are not as good buildings in England as in Scotland, or that for one who is willing to give a good price, as thoroughly first-rate buildings cannot be had in London as elsewhere. We are rather inclined to go further, and say that the best workmanship in the world may be found in London. But having said this, we are by no means sure that we are justified in attributing the absence of specialism in the business of building contracts as the cause of the excellence referred to. We are inclined to think that in the majority of cases in which the credit of our national workmanship has been prominently maintained, the element of special contracts has prevailed; and we know very well how enormous is the amount of bad work done under the present mode.

Without going into the merits of the rival systems, it must be a subject of interest to many to inquire as to whether the plan at present in vogue in London is likely to last. Have the little Smeatons and George Stephensons of the building trade to continue, or are they to be swept away among the things of the past? Are people to continue to act with regard to their houses as their fathers were accustomed to do in matters affecting their health? Will they go on consulting the local builder about everything relating to their houses, from the drains to the gas-pipes, as the old-fashioned physician was consulted about everything connected with the ailments of his patients? or will specialism step in and change the aspect of the trade? Of the "handiness" of the present system there can be no manner of doubt. Even architects, whose business it is to know intimately the best method of doing every kind of work, are fain to confess to the great convenience of the prevailing system. The strange incongruities of a builder's yard have failed as yet to strike them as a great anachronism. Doubts have already been cast for some time on the advisability of being tempted to take the sign of a few pieces of wall-paper hung as a background to familiar sanitary appliances in the windows of the front shop as an indication that the general run of builders can be trusted in the matter of artistic decoration.

In this department a decided change has already taken place. The contract between the work of specialists in the province of house decoration and the notions of men whose attention is divided among half a dozen trades at once is already too great to admit of comparison. But we do not quote this case in disparagement of the typical builder, but only as an indication of how matters are likely to go with him. The convenience to architects and to the average householder of the present state of the trade is evident enough. The training of a really good builder in London is not unlike that of an old-fashioned journeyman engineer, who could turn his hand to everything, and whose rapid disappearance is generally deplored; but it seems to us impossible that he can long retain his present position. On the one hand the art of the decorator has gone into the hands of specialists, and, on the other, some architects seem already inclined (unfortunately for architects) to divide their work with the sanitary engineer, who, on his side, is beginning to demand the services of workmen who have been specially trained. Already, then, a process of disintegration is setting in, and in spite of much that is to be said for the present system and for the abilities of the men who are connected with it, there is every prospect of its being replaced by another that is more consonant with modern tendencies. For a long time the change may not appear on the surface. Builders will probably continue to carry out the entire contract of house-building, even after they have been forced into subdividing the work among subcontractors who are specialists. These specialists will no doubt sooner or later assert themselves, and just as we have come to have men celebrated in decoration, so, before long, we shall find other niches occupied by experts in the different branches of house-building, until perhaps before very long something approaching to the system in North Britain, and which formerly prevailed in England, has become almost universally prevalent.

THE PANAMA CANAL.

THE gigantic enterprise of M. de Lesseps, which seemed at one time a project impossible of realisation, is now actually taking form and position. Against every kind of moral and material difficulty, and through adverse opinion, M. de Lesseps has fought his way till the scheme of the Panama Canal is in train to become a *fait accompli*.

Before we come to the project itself, a few words about Panama from one who paid a short visit there may not be without interest, and serve to bring before the mind's eye a spot that will soon be the scene of one of the greatest engineering enterprises of any age or time.

"Twenty-four hours are more than enough," says this somewhat *blasé* traveller, "to know Panama. It is an indolent-looking spot, bathed by the waves of the Pacific, and yet seems by its geographical position destined to become the *entrepôt* of the commerce of the two hemispheres. Breezes are rare, so rare that the legend runs, Pizarro tacked about for sixty-six days before gaining the open sea. However, that may have been partly the fault of the ships in those days. The little islands one can see from Panama have a pretty appearance. One of them, Taboga, produces pineapples of the finest sort; further off you see the Archipelago of Pearls, but, notwithstanding the name, at the present time, not more than two or three pearls of any value are found in a year.

Panama is an old Spanish town, but it has become so cosmopolitan that the ramparts and churches alone reveal its origin. Almost every one there can speak Spanish, English, and French. Many of the churches are falling in ruins, but they are picturesque, and the crumbling ramparts serve as a promenade, where, at the end of the day, one tries to get a

hreath of fresh hreezy air after the intense heat is over. Panama has neither park nor theatre, nor any particular gaieties going on in the town, as it is merely a passage; and the passengers hardly leave the grand hotel during the three or four days they spend there, though English travellers always meet with great hospitality from one of the chief families of the place, the Messrs. Hurtado, whose father was for many years Minister Plenipotentiary at the Court of St. James's."

The railway which unites Panama to Colon traverses a forest principally of hrushwood. At some points the rails are literally on shifting and muddy ground, and travellers crossing these damp marshes often suffer from fever. The labour in laying down the rails was so excessive that, one morning, seven Chinamen, with that calm peculiar to the organisation of the children of the Celestial Empire, hanged themselves in company, on the same tree, sooner than continue their portion of the work. The railway-fare is very high, and the transit of merchandise ruinous. If once the canal is made through the isthmus, all this will change.

Colon (Aspinwall, Naos, Naoz, or Limon, for it owns all these names) is built on marshes. Every house seems to possess a little swamp before it, just as we would have a garden. However, the American quarter, built near the sea-shore, is more salubrious, as it receives the breezes from the north. The railway-station is adorned with a good statue of Christopher Columbus, the only monument one can cite; for if Panama is only a large hotel, Colon is only a railway-station.

One can understand from this description how, when French and English travellers desirous of attaining the coast of the Pacific have reached Panama, they have anathematised that tongue of earth, not twenty leagues in width, which has forced them to go hy Sonth America; thns adding 3,500 leagnes to their journey, and making it last three months longer, with all its added chances of disasters hoth to seamen and shipowners.

It was France who bestowed the first serious attentiou on this snhject, in 1843, when Mr. Garella, chief enginer of mines, was sent to Panama. He proposed to open a canal from the port of Panama to the Gulf of Limon, capahle of allowing a passage to the largest vessels. The difficulties the scheme of the Isthmus of Suez met with will make it nnderstood that this idea mst with but little support outside the engineering world; but the astouishing success of the communication between the Red Sea and the Mediterranean hrought the subject once more prominently hefore the public.

M. de Lesseps asked for an international congress, nnder the auspices of the French Geographical Society. Five great committees considered the question under every aspect, and the statistical committee decided that a tonnage of 5,000,000 wonld clear the canal.

On the report of these committees ths congress decided nnanimously that an inter-oceanic canal ought to be made at Panama, hetween the Bay of Colon and the Gulf of Panama. That this canal, of which the length is to he ahont forty-six miles (the Snez Canal is more than twice as long) is to be constructed without locks, and exclnsively fed hy the sea. It is to he without any sensible rapidity, and at the constant level of the sea in the hay, where it is not affected hy the influence of the tides. It is to he 72 ft. wide at the hottom, with ahont 27 ft. of water.

The canal wonld reduce the route from Havre to San Francisco to 3,300 leagnes, whereas at the present moment it is actually 6,500 leagues.

From New York to Valparaiso the diminution in distance wonld be 2,700 leagues. It is actnally 4,700 leagues hetween the United States and San Francisco. Six millions of tonnage, with a toll of 15 francs,—a figure which hardly equals the rate of the insurance paid hy the ships that go rnnd Cape Horn, whilst spending three months on a ronte that could he accomplished in two days,—would give an actnal revenne of 90 millions of francs.

The duration of the works is fixed at eight years, and this term could be abridged if, instead of 9,000, there were to he 12,000 workmen employed,—an angmentation to be taken into consideration, as it might he in the interest of constructors and shareholders. The enterprise is to he confided to Messrs. Couvrent & Hersent, who accept it at the terms of 512 millions of francs (say 20½ millions sterling), though the total estimate seems to make the cost appear some 50 millions of francs more. Messrs. Couvrent & Hersent were the contractors for the Suez Canal, and they have heen making fresh examinations, and have once more sounded, explored, and calculated. They affirm that 512 millions (francs) will suffice to dig ont on a line of 73 kilomètres the 75 million cnhic mètres of earth and rock from the hed of the canal, equalise the declivities and utilise the rubhish in the constrnction of a reservoir of a capacionsness of one milliard of cnhic mètres, and which is destined to retain the waters of the Chagres, that rise considerably in the rainy season.

To be more precise still, let us add that a dam will he constructed between two neighbouring peaks, and hold captive the waters of the river which flow throngh a cironit of mountains admirably disposed to form the hasin of a gigantic reservoir. The dam will be made at the foot of the hed of the Culæhra, so that the stone taken from the horing of the mountain will serve to constrnct the dam, which will he ahont 147 ft. in height.

There is much, also, to facilitate the ultimate success of the scheme in the fact that whereas at Suez there was the desert to conquer, at Panama there is water, a railway all along the line of the canal, ports, and steamhoats, which touch in large numhers at the port of Colon. The head-quarters of the Canal will be on the Atlantic, and three lines of French steamhoats will ply to Colon.

Such is the *ensemble* of the material elements. The financial may have some interest.

According to M. Levasseur, Memher of the Institnte and President of the Statistical Commission, the interoceanic transit wonld consist, almost immediately after the opening of the canal, of more than 7,000,000 of tons. Let us put it at what the company do, 6,000,000 tons. Lastly, it is hoped that the Panama Canal will he opened in 1886.

The capital (shares and honds) is not to exceed the sum of 600,000,000 francs. A good dividend is guarantsed while the works are going on.

The Suez Canal shares, issued at 20*l.*, are now worth 52*l.* However, it is as a great engineering work, not as a financial scheme, that we again draw attention to it.

A LINK TO JAMES BARRY.

The cleansing of Barry's remarkable works in the great room of the Society of Arts, the observations npon them in our own pages, and a recent eloquent lecture, have hronght him forcibly into notice. Turning over one of our early volumes just now (the fifth), we lighted npon a paragraph which reminded us of more than one conversation we had had, in our early days, with one who had known him well, and dwelt fondly on his memory, and this was Elizabeth Cockings, a servant in the house when Barry was painting his pictnres, and subsequently the Society's housekeeper, a post she retained up to the time of her death. According to her story, which we then recorded,* Barry often lived on bread alone; all his friends, with the exception of Edmnnd Burke, had given him up, hut in the eyes of Elizabeth he was ever a hero. There was James Barry—the stern, solitary, eccentric, and the then childish, playful girl of eighteen, who, as we gathered from her own statements to us, gazed complacently at these remarkable images, as they grew out of the mute canvas; and Barry may have painted some of his capricious female figures to astonish his yonng friend. She had many anecdotes showing the hent of his mind. A certain lord had lent him some costly work for reference, and as the artist had kept it some time, the owner wrote him a friendly letter, presenting him with the hook. This (poor, nndiplomatic) Barry repulsed as a downright insult! What was to he done with a man with such feelings in a commercial and higgling age? Then he wonld shnt himself np in his cheerless cold room, brooding over his own reflections, and then again darting forth and creating images which are becoming nnderstood. When, hy such behaviour, he baffled all his friends, none could approach him, save Elizabeth. Then she would take him his meals, deliver messages, and make his room as comfortable as his strict (and religionsly observed) orders would permit it to he. And then she had to hear his death, and the neglect of his memory which followed. Years rolled on. There were the paintings, though few looked at them. Bat time is a great justifier And then came Canova, and gazed long and intensely on the Apotheosis of man's history. This consoled Elizabeth's heart, who remained single all her life, living on the memory of a baseless dream.

* See vol. v., p. 59.

NEW RUSSIAN CHURCH, DRESDEN.

The new Russian church, erected at the end of the Reichsstrasse at Dresden, is from designs of the architect Harald Jalins von Bosse, of St. Petershurg, who has given to Dresden an addition to the series of remarkable buildngs within her walls. The comparatively large number of Russians of the Greek faith residing in the pleasant capital of the kingdom of Saxony have long felt the want of a church of their own, and when, a few years ago, a movement was set on foot for erecting a Russian chnrch or chapel, the project met at once with such liberal support that its realisation was not long delayed. The new temple has been raised entirely hy private subscriptions. A wealthy Russian-German, Alexander Wollner, at once presented a site; other Russian residents contributed handsome sums, the subscription list heing headed hy the Russian councillor, Simeon von Wikerlin, residing in Dresden, who gave 21,750*l.* of the 24,750*l.* required for the erection. The plan of the church follows closely that of Russian churches of the most flonrishing period of the Russo-Greek ecclesiastical style of architecture, as expressed in the finest churches of Moscow and Kieff. The church is not large, for it holds, in accordance with the limited requirements of its small congregation, only ahout 300 persons. It creates, placed among snrroundings of entirely different styles, a novel impression, with its towers and turrets, its bulbiform domelets, its shield-like gable-ends. The inner embellishment of the church by statnary, paintings, and general ornamentation has heen effected by Karl Weisshach, James Marshall, Becher, and other artists.

DECORATIVE SUGGESTIONS FROM NATURAL FORMS.—No. 8.

The suggestion for a pavement given in our present nnmber speaks for itself, and needs no comment.

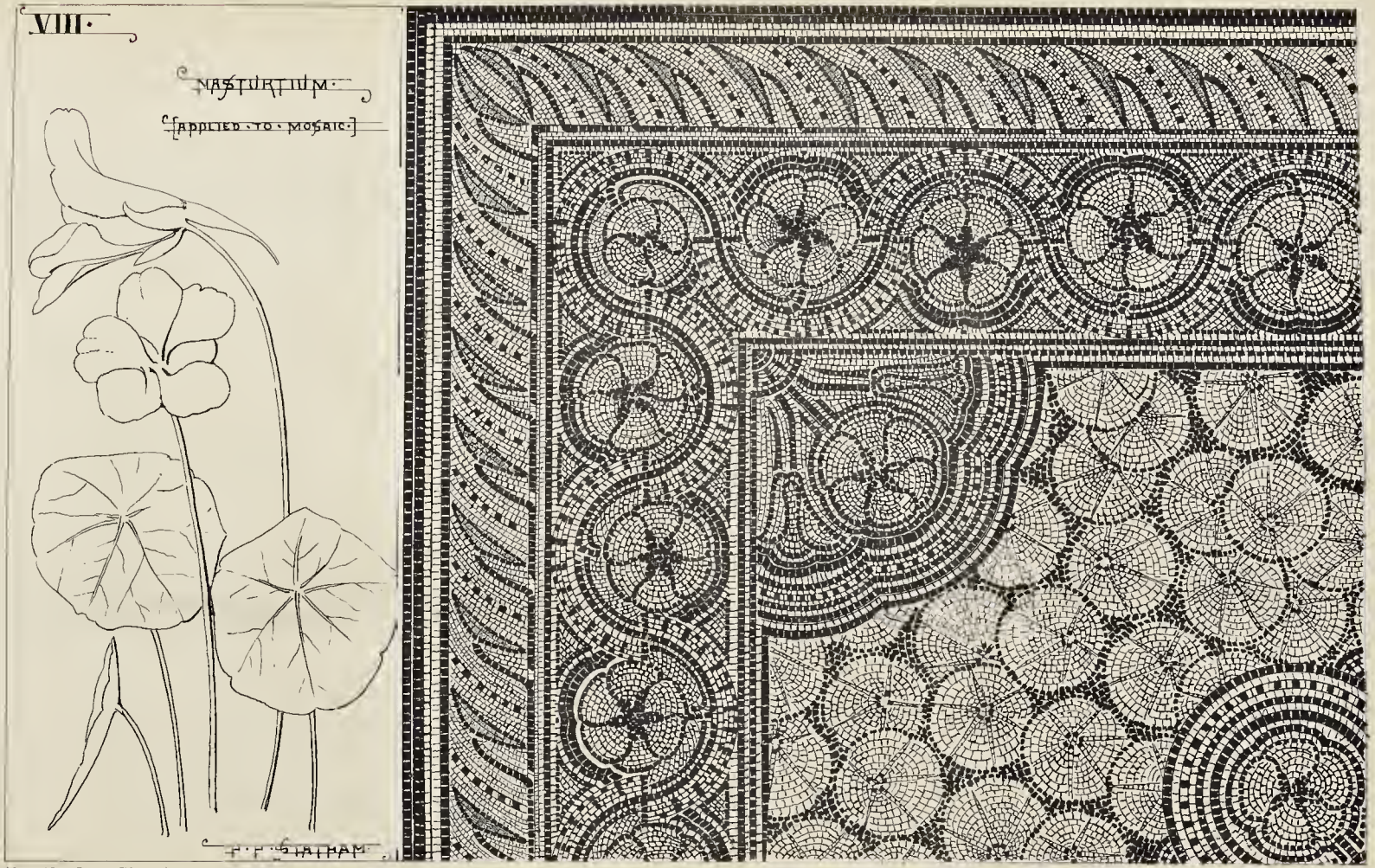
COMPETITION: NEW SCHOOL OF ART, LIVERPOOL.

The Board of Directors have awarded the first premium of 100 guineas to the design marked "Fides," hy Mr. Thomas Cook, of Liverpool, and the second premium of 25*l.* to the design marked "Let there be Light," hy Mr. C. O. Ellison, of Liverpool. The directors have decided not to exhibit the designs submitted to them. In Mr. Cook's design, the entrance vestibule, 11 ft. wide, is placed in the centre of the front to Mount-street. On the ground-floor the accommodation comprises two elementary rooms, architectural, modelling, store, and attendants' rooms, also male and female lavatories and cloak-room; and on first-floor, two antique rooms, painting, life-class, and head-master's rooms. The building is designed in the Queen Anne style, and is proposed to he faced with Hollington stone, the estimated cost heing 10,600*l.**

Alleged Building Society Frauds.—Warrants were issued hy the stipendiary magistrate at Swansea, on the 10th, for the apprehension of the late treasurer and the secretary of the Second Swansea Equitable Benefit Building Society. Information was sworn hy the chairman, accountant, and directors, to the effect that the society was formed in 1872, and was conducted almost entirely hy the acoused, who acted also for the First Equitable Society. The hookkeeping was a sham, hut there was evidence of fraud in money and deeds, and the deficiency in hoth societies was about 12,000*l.* William Henry Jones, the secretary, is chief accountant in the borough treasurer's office, and also deacon of a Calvinistic Methodist chapel. He was apprehended, and subsequently admitted to hail in 400*l.* Herhert Jones, the treasurer, who was a hooksaller in the town, has been nnable to find hail.

* "Competitor" writes as to "rumours" of improper proceedings in this competition. There should be something more precise than rumours hefore charges are made.

THE NEW RUSSIAN CHURCH AT DRESDEN.—HARALD JULIUS VON BOSSE, ST. PETERSBURG, ARCHITECT.



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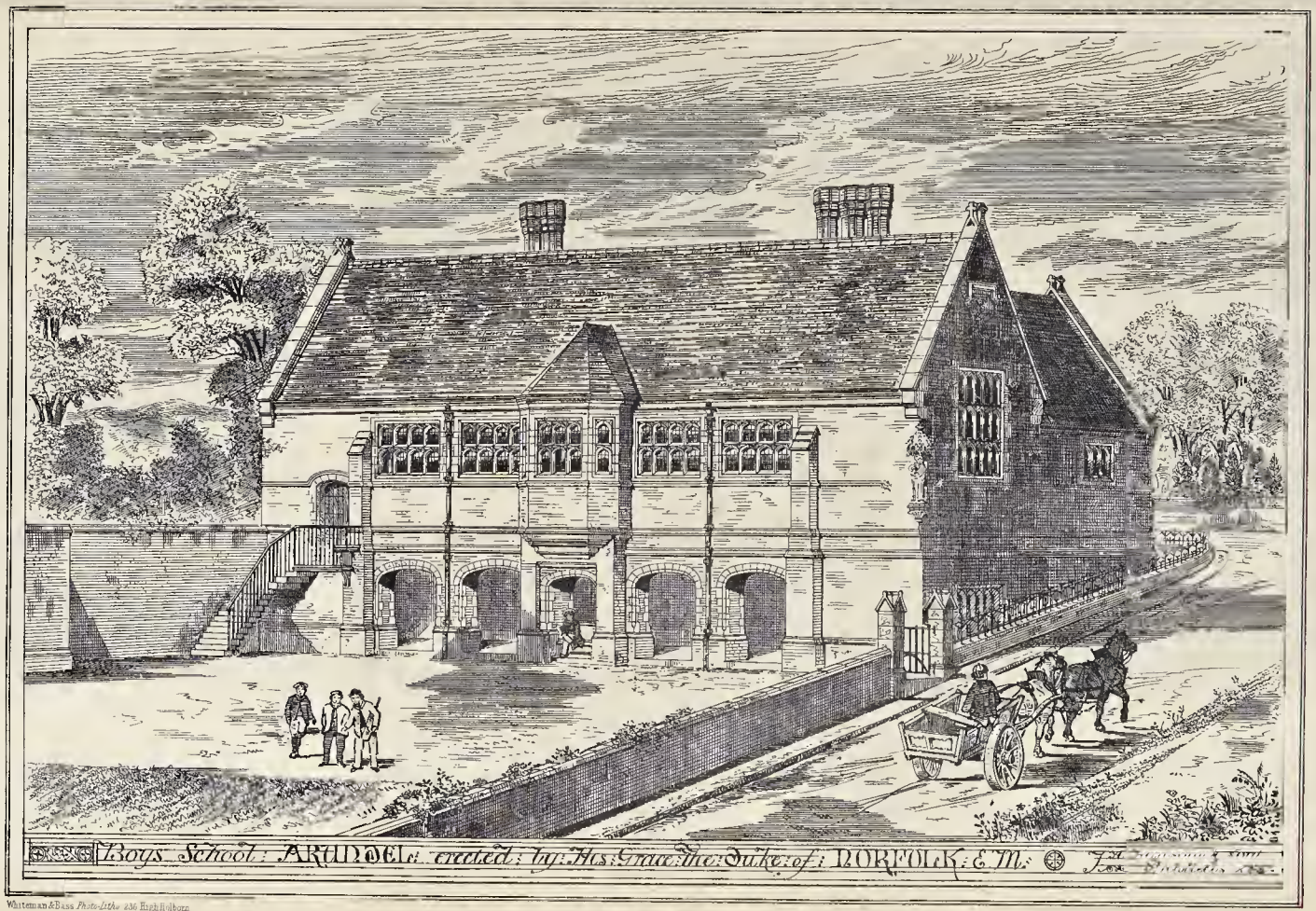
DECORATIVE SUGGESTIONS FROM NATURAL FORMS. — No. 8.



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VIEW OF THE LIBRARY IN SION HOUSE, SEAT OF THE

OF NORTHUMBERLAND.—Robert & James Adam, Architects.

DECORATIVE WORK OF THE BROTHERS ADAM.

Mr. Batsford knows which way the wind blows, and prepares for a *sale* accordingly; he sees that some of his customers are on the eve of going back to Adam, so calls in the aid of photography to supply them cheaply with materials for their journey. In plainer words, he has issued, under the title, "The Architecture, Decoration, and Furniture of Robert and James Adam, Architects," * a selection of twenty-six folio plates taken from their well-known but now scarce book, "Works in Architecture," published between 1778 and 1822. The new book includes a number of ceilings, chimneypieces, fittings, and pieces of furniture, besides views of two of the drawing-rooms in Earl Derby's house, Grosvenor-square; the library at Kenwood, residence of Lord Mansfield; the library in Sion House, the seat of the Duke of Northumberland; and other apartments. We are enabled to reproduce the view of the library in Sion House, which will serve as a specimen of the work and show how well it is done. It was a lucky thought, considering the temper of the times, and we have no doubt the publisher's enterprise will find a reward. We add a few brief notes as to the authors.

Robert Adam, who was the leading spirit of the firm, was born either in Kirkcaldy or Edinburgh, in 1728, and his father, if not an architect, designed two or three large buildings in Scotland. Robert went abroad to study; and, while his contemporaries, Jas. Stuart and Nicholas Revett, were measuring remains in Athens, Adam was measuring and drawing the now well-known and much-abused Palace of Diocletian at Spalatro, in Dalmatia, where he found the seeds of the style he afterwards produced. When settled in London, and in partnership with his brother, he executed a large number of buildings, public and private, some of which we have already named. Portland-place, Stratford-place, Hamilton-place, two sides of Fitzroy-square, and the buildings of the Adelphi, are also among their works, some of which, especially the last-named, were executed by them as speculative builders, and were not financially successful. We have no great admiration for their designs, but they were at any rate artists, had a distinctive style of their own, and certainly improved on the street architecture of their day. Robert Adam was at one time architect to the king, but gave up the appointment after a few years in order to go into Parliament, where he sat for the county of Kinross. He died in 1792 and left behind him the sweet savour of a kindly heart and high moral character. The brother died two years afterwards.

The selection made by Mr. Batsford is a very good one, and the original engravings are marvellously well reproduced.

NEW BOYS' SCHOOL, ARUNDEL.

We give this week an illustration of the above building, showing the back elevation and the covered playground underneath the school. In February last we gave an account of this building, and subsequently a view taken from the front in the London-road; it will, therefore, be unnecessary to recapitulate these particulars. The school was opened last Whitsuntide. The entire cost was defrayed by the Duke of Norfolk, Mr. Claridge, of Banbury, being the contractor; Mr. Heveningham, of Arundel, the clerk of works; and Messrs. J. A. Hansom & Son, of South Kensington, the architects.

The New Seed-Crushing Mills and Oil Refinery on the Boat Quay, King's Lynn, belonging to Messrs. Walker & Son, have just been opened, in addition to their Albert Oil Mills, by the side of the Dock. The buildings cover an area of nearly 4,000 square yards, and are fitted up with the newest and best-known machinery extant. The quantity of cake produced at Messrs. Walker's two mills amounts to 800 tons per week, with 200 tons of refined oil. The oil-mill machinery has been supplied by Witham & Sons, of Leeds (and is upon what is known as the Anglo-American system), and the engines are by Simpson & Co., of London. The buildings have been erected by Mr. W. H. Brown, of Lynn, from plans and under the superintendence of Messrs. Adams & Son, architects, of King's Lynn and Wisbech.

* London: B. T. Batsford, 52, High Holborn.

DWELLING-HOUSES: THEIR SITUATION AND CONSTRUCTION.*

THE PARKES MUSEUM OF HYGIENE.

In addressing you to-day upon the opening of a course of practical lectures on house building and situation, it is both my duty and pleasure to remind you of the provocative cause,—of the collection of interesting objects that form this museum.

The Parkes Museum of Hygiene is the result of a strong desire on the part of both the professional and personal friends of the late Dr. Parkes to found a memorial of such a character as to aid scientific investigation and practical study in the subject to which Dr. Parkes's life and work had been specially devoted. In determining what the museum should contain, the committee state in their first report that "They tried to limit their endeavours mainly to an attempt to illustrate, *visually*, the various subjects which are treated of in Dr. Parkes's comparative book on practical hygiene."

The articles exhibited are arranged in six groups, under the following headings, viz.:—

1. Engineering and local hygiene; 2. Architecture; 3. Furnishing; 4. Clothing; 5. Food; 6. Preservation and Relief; and, lastly, a library containing the most recent works on sanitary science.

You are all aware of the circumstances which have led the committee to inaugurate the course of lectures to members of building societies which I have the honour and pleasure to commence, with some remarks on the choice of a site for a house, and on the materials and general construction which should be employed to render any house not only commodious, but healthful.

The space in which the present museum is accommodated is, however, very limited, and I propose, therefore, in the first instance, to make some general remarks before I lead you to the objects themselves, so far as this institution supplies examples.

Dr. Corfield, who will address you on a future occasion, has already published a most useful and interesting little book, entitled "Dwelling Houses: their Sanitary Construction and Arrangement," and I should recommend any one desirous of possessing a better acquaintance with the subject than he is likely to carry away in his memory from anything I may say, to purchase that little book, which comprises a series of lectures commonly termed the "Cantor" Lectures, which were delivered by him before the Society of Arts, and which lectures were largely illustrated by specimens borrowed from this museum.

And now as to our subject.

SITUATION.

By "situation" I mean to imply that it is quite possible to have an excellent house, and yet to have an unhealthy dwelling, if care has not been taken in the choice of its site. And in choosing a site I take it for granted that your choice is comparatively limited, and that I am addressing those who do not contemplate living in the midst of a beautiful park, but whose business necessitates their living within a city, or in its near neighbourhood, or within easy access thereto.

1. *Aspect.*—The value of land in the suburbs of any great city limits the choice of aspect. The streets are usually arranged in such a manner that the most may be made of the ground, and in the selection of your site, or of your house if it is already built, be careful to see that the road runs pretty nearly north and south, so that your house may have its principal windows and doors facing east and west, and the street in front of you and the garden at the back of you will always partake of whatever southern sun our ungracious climate vouchsafes. If you select a corner site, you will have three sides of your house exposed to the wind and weather; take care to choose the southern corner, and you will save much fuel in the preservation of sufficient warmth within. The thin walls of small houses allow the wind to pass clean through them at the rate of several cubic feet per hour. In large detached houses it is usual to arrange the living-rooms on the south, east, and west sides, and the kitchen offices towards the north, with a shrubbery beyond and around to screen the offices; the larder and dairy always to face north, and the wine-cellar to be an internal chamber, to preserve an equable temperature throughout the year.

2. *Soil.*—The nature of the subsoil, or the stratification of the earth upon which the building stands, is the next important inquiry, but not second in importance. A damp site makes a damp house, not only by the surface dampness of the surrounding ground, but by the ground air which forces the moisture under and into the house, drawn forward by the means adopted for warming the interior, which, by lightening the weight of the internal air, makes a free passage for the damp ground air in the direction of the least resistance. There are two general divisions in classifying soils, the permeable and the impermeable; and in proportion as the site is free from moisture, in the same proportion is it fitter for residential occupation. But it does not follow that impermeable soils are the driest; on the contrary, it is usually the permeable.

Pervious soils are those like gravel, sand, and soft limestone, which allow of the free passage of water through them, and if there is nothing to obstruct its free passage, and the level of the water in the ground is sufficiently deep, the upper surface upon which the house is built is always dry and healthy. If, however, the gravel has no deep outlet for water which passes into it, owing to its being situated in a basin of impervious soil, so that the level of the water in the soil is brought very near the surface, then it is necessary to find an outlet for the accumulated water by artificial means, called land drainage.

Impervious Soils are those chiefly composed of the various clays, which do not allow the water to sink into their depths, but only suffer it to flow over their surface, and consequently the garden soil gets super-saturated; and if the land is level, the water is long in getting away, and the evaporation of the moisture in and upon the soil produces a humid damp atmosphere, very injurious to health, and requiring very careful surface-drainage to overcome.

The public roads, forecourts, and areas of houses in a town are usually so well drained that no evil comes from this source, as a rule, in front of the houses; but the back gardens are commonly neglected, and the basements suffer in proportion. It is obviously important to you as investors in house property, for income or for residential purposes, to look to the surface and subsoil drainage of the site of the house you buy or build, as the case may be. But this is not all. Suburban villas are not always built on natural soils. The brickmaker has sometimes preceded the builder on impervious soils, and the gravel and sand merchant has sometimes sunk great gravel-pits for the sale of gravel and sand, on pervious soils. And to bring the land to its uniform level, the well-known notice-board has been put up, inscribed "Rubbish may be shot here," which is only another phrase for "The Seeds of Disease sown here." Avoid such sites altogether. I could point you to many, but common sense is shocked at the folly,—shall I say the wickedness?—of raising human dwellings over such abominable deposits. Happily the Public Health Acts all over the country are gradually influencing the age; and the action of the Nuisances Removal Acts, Local Management and Building Acts, are all aiding the public in the acquisition of sounder and healthier dwellings. Instead of grudging the fees paid to district surveyors and local officers, it would be wiser to secure their influence and direction, and to support their authority.

CONSTRUCTION.

Having secured a fairly healthful site, let us next consider how to make the best use of it.

1. *Foundations.*—You will not often have the opportunity of building your house upon a rock, but let us see that it is not built on the sand, or, what is equivalent to it, upon soft loamy soil. Hard gravel or chalk is an excellent foundation, but usually the soil is treacherous, and if there is any doubt about it, do not spare a few yards of good concrete formed of one of ground-stone lime and six of good clean ballast, or hard-burnt clay broken up to pass through a ring 2 in. diameter. If there is water in the soil, use Portland cement instead of lime, in either case to be thrown into the trench from a height of, say, 6 ft. The concrete to be of sufficient thickness, not less than 12 in. thick for any wall, and usually 2 ft. thick; but it is rarely necessary to exceed 3 ft. in thickness; and always make the trenches 12 in. wider than the lowermost footings of the wall. Do not raise your

* By Mr. Edward C. Robins. The first of a course of lectures to members of building societies, delivered on Saturday, the 11th inst.

concrete above the level of the top of the trench, but fill in your trench with concrete, and form a layer of concrete from 4 in. to 6 in. thick over the whole surface of the basement, to keep back the ground-air and the moisture it brings with it. And a similar layer of concrete to be put under all paving external to the walls of the house. Bed the soil-drains in concrete to a fall of not less than 3 in. in 10 ft., and as much more as possible. The footings of all walls should be in single courses, and each should project 2½ in.; the lowermost footing should be twice the width of the wall resting upon the footings. The bricks used for the foundations should be sound, hard-burnt, grey stock bricks, or others equally hard, or harder, and the joints should be filled up solid with the mortar or cement used.

Damp Course.—Just above the level of the lowest floor of the house two courses of brickwork should be built in cement, and between them should be laid a double course of slates in cement, or a layer of asphalte not less than ¾ in. in thickness, as a damp course to prevent damp rising by capillary attraction in the walls themselves.

We will look at some of the contrivances in the museum for making damp courses of stoneware, and of utilising them as air-bricks for passing air from without to the spaces sometimes left under basement floors, and always required under joisted floors so as to give free access for the air to permeate every part of the space, which should never be less than 12 in. from the surface of the ground or concrete layer, to the underside of the joists of the floor over. Dry-rot will never appear where there is a free circulation of air; where it has appeared, it may be arrested by the introduction of a sufficient quantity of moving fresh air.

2. *Walls.*—The enclosing walls, of solid brickwork, of a building to be lived in, ought never to be less than 14 in., or a brick and a half, thick, though the Building Act allows them to be 9 in., or one brick thick for certain heights and lengths, and certain stories defined in the schedules appended to it. But a much drier wall would result from walls of the same thickness, but built hollow, and united by galvanised iron ties, one in every square yard. Walls built of cement concrete are both strong and dry. The materials used in the construction of walls are various, and thickness is not the only thing required.

Mr. Lascelles has constructed cottages with walls 1½ in. thick, and quite impervious to moisture, but then they are formed of hydraulic cement concrete slabs as hard as nether millstones, and not so porous. But bricks will always be most in requisition for house building in this country, except in the stone districts, where more or less porous freestone will be used for those parts that require to be worked with a tool, and the hard flinty rubble stones will depend chiefly on the imperviousness of the cementitious matter in which they are bedded for their soundness and resistance to the weather. The porousness of soft building stones may be overcome by various chemical solutions. The Indestructible Paint Company have provided one, two coats of which applied by a brush when the stone is dry will stop the pores and cause water to pass off it as water from a duck's back. I never use Bath stone externally without applying this solution.

With reference to bricks, it is all-important that they should be well burnt; the half-burnt bricks are not only very porous, but crumble away the first winter; they are called place bricks. Rubbers, or bricks required to be soft enough to cut to mouldings, or for ganged arches over openings, are necessarily pervious.

White gault bricks, wire-cut or pressed, make good face bricks, and the "pinks," as they are termed, are best to back them with, because they are of equal size. It is bad to face with a thick brick, and to back it with a thin brick, as it is obvious that the mortar joints in the one case must be thicker than the other, and cause unequal settlement. A quarter of an inch is as wide a joint as is desirable.

Red bricks are usually more porous than others; but there are good hard red bricks to be had.

Glazed bricks are very costly; but Candy's granite bricks from Chudleigh, in Devonshire, are like flint, and to be put into trucks for 37s. 6d.

The blue Staffordshire are like iron, and are commonly used for copings and curbs to railway platforms and kindred purposes.

All brick copings should be set in cement, with a double tile creasing projecting to throw the water off the wall.

It is an important axiom in building to put "voids over voids": it is the best construction, because it involves putting solids over solids, and so produces equality of settlement. It is economical, too; for if a solid wall comes over a bay-window, the chances are that the bressumer will be overweighted if no architect has been employed, and if it is not, the cost of the bressumer will be increased by the additional strength required to carry a wall where a window should have been; yet how common it is to see two windows on the upper floors situated wide apart, and a bay-window on the ground-floor, just under the pier between the upper windows.

The superincumbent brickwork over every opening should be sustained by discharging arches which should pitch on the brickwork, and not on the wooden lintel beneath it, which is placed there to fix the door and window frames, and to carry the filling-in between the arch and the lintel. *Rough lintels* of artificial stone, for use in place of timber for door and window openings, introduced by the late Matthew Allen, now made by Lascelles, are much in use by architects.

When openings are wide it is usual to distribute the weight of the piers upon the foundations between by means of invert arches. But what most disfigures buildings is the bad construction of the arches over the openings, more especially where they are covered with cement architraves and cornices; being out of sight, they are not formed as arches at all, but hold together by the tenacity of the cement only. It is better to employ half-brick rings, one over another as required, than to make false flat arches, and put false joints to make believe.

Mortar.—In the matter of mortar, it is needful to add a word of caution. Much of it is not mortar at all,—that is, lime and sand in the proportion of one of lime to two of river sand. The lime is of inferior quality, and in small quantity, and it is often mixed with loam, or street sweepings, or the *detritus* from sludge brought up from the main sewers, and sold at 6d. a yard to Jerry builders. Houses compacted together with materials so mixed,—full of impurities, such as decomposed or decomposing animal or vegetable matters,—cannot be healthy, and the smell that often comes from plaster with which interior walls are lined may be traced to this source. I have used at the Choir Schools of St. Andrew's, Wells-street, and elsewhere, selenitic mortar for the brickwork and for the plastering. It is a valuable substitute for the ordinary mortar and plaster, at nearly the same cost, and it sets hard like cement. Care must be taken in the mixing, or it blows in the setting, or sets with a curious array of pinholes.

Chimneys.—In the construction of chimney-breasts, it is often the case that the breasts are not built up solid, but have large cavities left, and the flues are built on no principle, with wide and open jaws below and a small pot above. It is desirable that the flues should be as straight as possible, for the sake of preserving a good draught upward; but it is often important to prevent down-draught by sloping a portion of its length, with a seat for the air to beat against to break its descending force. All flues should be quickly gathered over the mouth of the fireplace, and should be lined with plaster, or be formed with terra cotta, though the use of the latter, by giving too little hold for the soot, occasions its unexpected fall at inconvenient seasons. All hearths in upper floors should be supported on half-brick trimmer arches in cement, but sometimes these are omitted, and the centreing for the arch is latbed for plastering, and the stone hearths rest on the timbers of the floor. The arch, though butting against the trimmer, should have a deep skewback in the wall, so that if the trimmer were removed, the arch would stand alone when set. All trimmer joists should be at least ½ in. thicker than other joists. But besides solid or hollow walls of brick and stone, and cement-concrete walls of various kinds and thicknesses, there are other forms of enclosure which are to be commended as combining picturesque effect with weather-proof construction, and with a minimum thickness and weight of material. I allude to what is called half-timbered work. Of old, the upper stories of buildings were rarely built of such solid materials as the ground story; but stout angle-posts, filled in between with more or less substantial intermediate posts, called quarters, let into a plate below, and head and sill above, with intermediate braces, were all well knit together with oak or iron pins; and these timbers were, and still are, usually filled in with half brickwork, and rendered in lime and hair both inside and out: the inside was finished with fine plaster face for colour, paint, or paper, while the outside was either finished in rough cast plaster with pebble face, or was filleted with battens, and covered with vertical tiling of plain or ornamental design, well secured to the battens with two galvanised rails. The tile battens may be put on either before or after the plaster rendering. For sound-proof flooring and partitioning, and for a frost-proof covering to cisterns and pipes, nothing is better than slag felt.

The tiles used should be well burnt; pale red coloured tiles, like pale bricks, are but half-burnt, and are porous; but rich warm colours, with a bloom, are well burnt, and of indestructible durability. Such tiles used for covering roofs are at once the warmest of coverings in winter and the coolest in summer. Speaking of tiling and tile-work generally, great improvements have been made in ridging tiles. Cooper of Maidenhead, and others, produce very perfect work, and there is no better ridging than saddle-back tiles well set in lime and hair, carefully pointed in cement. The cresting, if any, should not be a separate part of the ridge fitted into a groove; it is better that the tile should be complete in one piece, with handsome hip-knots and finials finishing, also moulded in one piece. The simplest outlines are best. No pavement is better than the best Staffordshire red, black, and buff paving-tiles, and none are cheaper except Portland cement mixed (half and half). They should always be laid in concrete, worked to a smooth face to receive the tiles, bedded in mortar and pointed in cement, and if they are laid anglewise to set patterns the commonest floor is made interesting. The more beautiful colours and quality, delicate texture, and beauty of design, which distinguish Minton's, and Maw & Co.'s tiles, must be paid for if desired.

Floors.—But tiles, like stone and asphalte, both of which are valuable in their place for paving, are oftentimes too cold for the feet, for internal use, and wooden floors are preferred. To get a wooden floor, and yet one as solid as either of the rest, it is necessary to substitute 1½ in. to 2 in. thick wood blocks, about 6 in. long and 3 in. broad. These blocks, set to a herring-bone or other pattern, should be Barnettised to prevent dry-rot, and may be bedded in gauged lime-and-hair mortar, and the interstices filled in with Portland cement powder; then sweep the surface clean, and wash it down with water, which, setting the cement in the joints, makes a permanent floor, which may be polished. They are sometimes laid in asphalte, and are of various sizes. I exhibit a specimen of this kind of solid wood-block floor, sent by the manufacturer, Mr. Gregory, of Station Works, Clapham Junction. Mr. William White, an architect, was the inventor of this, which I believe to be the best kind of flooring for basements. You will observe that these blocks are dipped in pitch before laying, which is a further improvement. As the surveyor of the Berners Estate, Oxford-street, where I have some 600 houses under my care, I have had very great opportunities of observing the relative durability of houses, and my experience has taught me that the exclusion of moisture is the secret of perpetuity, as it is also the most important element in healthfulness.

Damp soils, damp walls, damp roofs,—these are the causes of premature decay. The area pavings allowed to be laid on the ground instead of on concrete, or bedded in mortar, perhaps, but not pointed in cement, the wet gets through and saturates the foundations, which may be built of absorbent bricks, and have (as the walls of old houses often have not) no footings, and, what is more common still, no concrete, but baulks of timber laid under them, which, rotting by the alternate wet and dry state to which they are subjected, their decay is revealed by the settlements which appear in the walls, which walls, having no damp course, have become by the attraction of the warmer air in the house, and what is called capillary attraction, saturated with damp several feet above the floor, which, if of wood, will in all probability have no space under the joists and no air-bricks in the outer walls to ventilate the same. The walls may be lined inside and out with plaster or cement badly made at the first, and receiving the moisture like a sponge, which is absorbed by

the bricks as it is forced through the walls by the winds or differences in the temperature of the air. But the walls may not be cemented or stuccoed on the outside, the bricks may be exposed, and the badly-burnt ones will scale off in flakes as the frost affects them; and even if the facing-bricks are good, the joints are defective, and the original pointing has fallen out, and where renewed, has been done without first well raking out the old decayed mortar, and so there was no hold for the new pointing, and it may be picked ont with the finger, and is ready to fall at any time, the result of which is that the wall has admitted the damp to such an extent that the walls have bulged and twisted and become detached from the cross or party walls and finally fallen into the street,—as the fronts of three houses in Newman-street, Oxford-street, did about ten years ago.

Then there is the roof: the parapets and chimney-stacks are crumbling to pieces and out of the perpendicular, and the owner would probably as soon think of pointing the joints of walls that could not be seen from the street as to wash his own body because it was hidden by his clothes. The continued neglect of such things brings its own punishment in the bill for dilapidations which comes with the termination of the lease, if not before.

But to return to the roof. It may once have been well tiled, or slated, or covered with lead, but it has been improperly repaired; and zinc has been substituted for lead internal gutters and iron external or eaves gutters, and cement filletings for lead flashings to walls and chimney-stacks. The zinc has decayed, never having been laid with proper fall or with proper rolls or 2 in. drips to shorten the length of the sheets used; but the sheets have been soldered to one another and the changes of temperature have twisted, and buckled, and torn the gutters and flats, which, if made of zinc at all, should have had free scope to shrink or swell, being put together by a system of overlapping joints, no solder or other immovable fastening being used at all: then the zinc is so thin, No. 12 instead of No. 15 being used as a rule. Use galvanised or Barfied iron in preference to plain cast or wrought iron, which will prevent corrosion, whether painted or not. Then the timbers of the roof have been much too slight and not properly braced together; the rafters have neither collar to cross-tie them, nor purlins to shorten their bearing, or these are too slight, or too far apart, and the roof sags, and the cement filleting, if it has not rotted, has become detached from the wall or the slates or both, and the damp trickles down inside, and the walls and ceilings attest the defective state of the roof, and its consequences.

Now, good construction in building houses is not to be understood without taking the pains to understand it, and the majority of Jerry builders, as they are called, make it a chief part of their business to learn how *not* to do it. And thus you see that the province of the architect is not to be despised. He it is who stands between the owner and the builder and arbitrates between them. He it is who not only designs the pretty façade archæologically correct in whatever style of architecture the fancy of his employer may desire, but he it is who writes the specification, describing every part of the building, determining every kind of material or sanitary appliance to be used, specifying everything of the strength required for its purpose and no more. He it is who brings his scientific as well as his technical knowledge to bear upon the attainment of the largest result for the least money compatible with sound construction and good sanitation. And not only is he all this, but he also takes upon himself the responsibility of seeing that his instructions are carried out by the builder employed, whether that builder is the lowest in a large competition of builders, or a person whom both employer and architect know to be a trustworthy tradesman, who knows his business and is willing to do it at reasonable prices. Such men are raror than they ought to be, but honesty is the best policy, and an architect who has reason to know his man and to trust him fully can make the fortune of any such person, and prevent the necessity of his stretching his conscience to do things which his poverty and not his will consents to.

There are lots of young educated architects anxious to make their way in the world to whom the smallest opportunity of distinguishing themselves is a pleasure. Such men are ready and willing to give their services with the earnestness of men of their class for the poor pittance of 5 per cent. on the cost of the building. Why deprive yourselves of the assistance of such men to save a penny and to spend a pound you know not how? Why not have the help of intelligent men, whose interest it is to get the work done in the best possible manner, as the best means of gaining the reputation which will ensure their future success as architects?

The mass of the buildings in London are not built by architects at all, and yet we often hear them blamed as if they were responsible for the miles of miserable dwellings with which this great city abounds.

I have spoken chiefly of what concerns the exterior fabric of a building, because keeping the weather out is easier than contrivances for overcoming the consequences of its having already got in. And in this connexion I ought to have mentioned the advantages derivable from the use of terra-cotta, instead of stone or cement, or even brick, dressings and cornices, &c. Good terra-cotta is comparatively indestructible, and if a pattern is given which is repeatable, it is cheaper than any other materials. If moulded bricks are used, let them be moulded and not rubbed if you wish them to last and keep the weather out. I need scarcely say that brick drains are now entirely exploded, and stoneware socket drains are everywhere substituted for house-drains. No soil-drain should be more than 6 in. in diameter or less than 4 in; 5 in. would be better than either. They should be set in puddled clay, and pointed in Portland cement, and laid in concrete. So far as they may have to pass under any part of the house, they should be perfectly straight, with openings at the back and front of the house for examination and cleansing. Every soil-drain should be ventilated before it is connected with the sewer, on the house side of the sewer. This cannot be too often repeated.

And now a very few words on the interior. Good joiner's work is the test of a good builder, some say; certainly, bad joiner's work is abominable. Good yellow deal or pitch-pine, free from sap or shakes, and obtained from Christiania, is as important a material for use in joiners' work, as is Baltic timber from Memel or Riga for carpenter's work. You may always know where timber comes from; there are trade-marks put at the end of every plank, and in "Spon's Builders' Pocket Memorandum Book" the corresponding letters are all given, along with all the rules which are necessary to be known in order to secure good building, and to know how to measure and value it when done. Do not be led away by pretty casements. Stick to the old rising sashes. Nothing is better for keeping out weather or for ventilating purposes. In my lecture on ventilation I shall have something more to say on this subject; in fact, I fear I must defer mention of many internal contrivances till I can consider them in connexion with their bearing on ventilation and hygienic considerations generally.

Do not strain after empty grandeur; do not covet heavy plaster cornices and central rose-flowers; do not insist on big architraves and other mouldings,—a bead or a splay is often quite as effective, and does not harbour so much dust and dirt; do not try to save by pinching the price given for ironmongery: a few shillings make all the difference between misery and comfort in the use of good locks and furniture and fastenings generally.

Do not put iron pulleys to sashes to get rusty, instead of brass, that will not rust; but do not despise lacquered ironwork,—it is stronger than brass, and does not tarnish by damp, and costs nothing to keep clean.

Have good sound flooring, 1¼ in. thick, for ground-floor rooms, and let them be tongued, and stain and varnish them for 1 ft. 6 in. or 2 ft. all round, and you will be able to carpet your house at half the cost, and have the pleasure of removing the carpets for cleaning as often as you please without trouble or injury to either floor or carpet. Exercise your common sense in building your house or in choosing your house, and before doing so buy Mr. Teale's book, illustrating the evils of bad plumbing, about which you will hear enough before these lectures are over. And inspect in this museum the disastrous consequence of neglecting this most important part of house sanitation.*

* At the close of the lecture Mr. Robins explained many of the articles exhibited in the museum. Mr. Rutherfurd, director of a building society, proposed a vote of thanks to Mr. Robins and the executive committee, and expressed a hope that, before long, the museum would be sufficiently well supported to enable the committee to arrange for the delivery of such lectures with better accommodation, so that a larger number might benefit from them. Mr. H. Rutt seconded, and the resolution was carried unanimously.

SANITARY ASSURANCE ASSOCIATION.

A MEETING of the members and subscribers of this Association,—convened to receive the report of the provisional committee appointed to consider the means of organising the society and of carrying on its work,—was held on Tuesday evening at the Langham Hotel, Sir Joseph Fayrer, M.D., in the chair.

Mr. Mark H. Judge, the surveyor *pro tem.*, read the report of the provisional committee, who stated their conviction that it was desirable, firstly, "to promote the establishment and maintenance of sanitary arrangements among all classes of the community, and in every household, so that the public health might be guarded and improved;" secondly, "to leave the execution of works recommended by their officers to such persons as the members or subscribers might themselves elect." The committee further reported that, having ascertained the views of persons prominently connected with sanitary questions, and others desirous of assisting the movement, they had come to the conclusion that the best means of organising the Association (the members not proposing to provide a capital divided into shares or otherwise) was by incorporation under the Act of 1867, 30 & 31 Vict. c. 131. By that statute, in order that an association, formed for any useful object which did not involve the division of profit, might be granted the privileges of the Act, the licence of the Board of Trade must be obtained, for which purpose a draft of the proposed Memorandum and Articles of Association must be previously submitted to the Board, and, if they were approved, a licence would be granted. Accordingly the committee now submitted the Memorandum and Articles of Association for the approval of the members and subscribers.

The Chairman then moved, "That the report of the provisional committee be received and adopted, and that the first executive council be now elected, with power to have the Association incorporated in accordance with the recommendations of the provisional committee, with such alterations and additions as they may consider necessary." In the course of his remarks, Sir Joseph Fayrer insisted on the necessity of such an association being formed, especially on account of the enormous and crowded population of London, where the death-rate, considering all the circumstances, was, he thought, marvellously low, although it could, no doubt, be materially reduced by due regard being paid to the sanitary condition of the houses of the people.

Professor Corfield seconded the motion, saying that he thought a workable scheme had been put forward by the provisional committee.

The motion was carried unanimously.

Mr. J. G. Romanes, F.R.S., moved the next resolution, to the effect that Sir Joseph Fayrer; Mr. George Aitchison, F.R.I.B.A.; Professor Corfield; Professor De Chaumont; Mr. Mark H. Judge; Professor T. Hayter Lewis; Mr. H. Rutherfurd, barrister-at-law; and Mr. T. Roger Smith, F.R.I.B.A., be the first executive council of the Association.

Dr. Poore seconded the motion, and observed that the Association had a vast field of work before it. Every medical man was aware of the prevalence of disease caused by unhealthy dwellings, and he hoped the time would come when what had been called "adulterated" houses would not pay for building,—and that time *would* come if people would refuse to live in houses which could not be certified as healthy. Not only the poor, but the rich, were deeply concerned in the matter, for many of the mansions of the rich were mere decorated and gilded pest-houses.

The resolution was adopted.

Professor Tyndall, in moving a vote of thanks to Sir Joseph Fayrer for presiding, said the Association was one which, if supported as it should be, was capable of conferring great benefit on the community.

The motion having been seconded by Mr. Rutherfurd, was adopted, and the proceedings terminated.

Mr. Inderwick on Tithes. — Mr. F. A. Inderwick, Q.C., M.P., addressed a meeting on Saturday last at Hastings, in connexion with the newly-formed East Sussex Branch of the Farmers' Alliance. The mayor (Mr. Alderman Gausden) presided, and about 100 farmers were in attendance. Mr. Inderwick explained the law relating to tithes, and stated he was preparing a Bill to be laid before the next session of Parliament on the subject. Tithes were the property of the nation, and not of the subject. Parliament, he said, had never hesitated to deal with tithes when it thought proper in the interest of the public. He proposed to make extraordinary tithes redeemable at a certain charge, and suggested a nine years' purchase. After much consideration he had come to the conclusion that a nine years' purchase was the proper amount. He had spoken to several members of Parliament on both sides of the House on the matter, and they had promised their hearty support to the principle of the Bill, though not fully concurring in some of its details.

THE ORIGIN OF THE ARCHITECTURAL ASSOCIATION.

Sir,—In the account of the origin of the Architectural Association, recently given by my friend Mr. Phené Spiers, what little I did in the matter is referred to so very kindly that I am prompted to add a little in the way of gossip to complete the picture of the birth of my favourite society.

The real origin of the movement is traceable to a letter which was published in the *Builder* about Christmas time, 1846, written by Mr. Charles Gray, who, if my memory serves me well, became afterwards the first honorary secretary of the Association, and whose name ought to be held in especial honour. Mr. Gray was then a pupil in an architect's office, and he complained boldly of the want of a proper system of professional education, proposing that if masters would not, or could not, teach their pupils, the pupils should attempt to obtain instruction elsewhere. This letter brought about a little consultation amongst a few young men, when it was discovered that a Society of Architects' Assistants existed, although in a condition of what I will call repose. Their number was small; but they were of the class of exceedingly respectable middle-aged married men, and therefore perhaps a trifle slow. Mr. James Wylson (long at the head of the office of Mr. Sydney Smirke) was their president, and Mr. Jayne their secretary; the other members were the two Messrs. Colling, Messrs. Drayton Wyatt, William Young, Sayer, and three or four more. Mr. Wylson had gone to Glasgow a year or two previously, but Mr. Jayne (whom I was glad to see evergreen the other day) received us with the utmost friendliness. We thought it might be advantageous to found our proposed society in some way upon the basis of this little club. The address on "Architectural Education" was, by permission, read at their place of meeting, Mr. Jayne's rooms, in Southampton-street. They themselves attended, and we mustered as many younger friends as we could. The result was a resolution to get up a society, not like theirs, a fraternity of the permanent assistant class, but an instruction-guild for architectural youth of an aspiring turn. Accordingly, *they joined us; we did not join them.* Having existed for only four years, and with such indifferent vitality, they had no traditions to surrender, and gave place loyally to our broader purpose. The Association of Architectural Draughtsmen confessed failure, and passed away; while the Architectural Association, full of hope, came into being. Lyons' Inn Hall (where the Globe Theatre now stands) was adventurously taken for the weekly meetings, and we resolved to make our appearance before the world with a special gathering. Two gentlemen of influence now appeared in the character of practical helpers, namely, Professor Donaldson and Mr. George Godwin. They came down to Lyon's Inn, listened to our speeches, gave us speeches in return, and from that day to this have never ceased to back up the Architectural Association. Pray, therefore, let not their agency be forgotten; nor that of Mr. Gray; nor that of the *Builder* journal. I may add that Professor Cockerell and Mr. Beresford Hope deserve the credit of having helped us also. They came down one night and condescended to hear a paper read; and, as it happened, we had a lively meeting in consequence of the great Amateur too flatly contradicting the great Academician. The amazement of the Professor was splendid. "Sir," he exclaimed, "I knew the gentleman's father! And he held different opinions."

Of the original "Draughtsmen," several became respected presidents of the Association,—Mr. James Colling, Mr. Drayton Wyatt, and I think, Mr. Young; but I need not say that adolescent architecture proper had no difficulty in producing presidents out of its own fertile resources.

The great distinction between the Draughtsmen and the Association was that the one was a small and unsuccessful benefit-club, and the other an important educational institution, calculated to accomplish any amount of usefulness the times may require. Robert Kerr.

Sir,—As my name has been mentioned by Mr. R. Phené Spiers, in connexion with the origin of the Architectural Association, I consider that it is only justly due to the memory of the late Mr. James Wyleon, whom we all liked and respected, to say that he was the sole originator of the "Association of Architectural Draughtsmen." I and others assisted him, but the idea originated with him. He drew up the first rules, and called together the first meeting, which was held at the coffee-house in Castle-street, Holborn. James K. Colling.

THE PUTNEY VESTRY AND THE PROPOSED NEW TRAMWAYS AND RAILWAYS IN THE PARISH.

The Putney local authorities have decided to oppose the proposed introduction of tramways into the parish, and have also concluded to resist the project of the Metropolitan District Railway to construct a new line across Putney Common. At a meeting of the Vestry which has just been held, the members unanimously expressed themselves as strongly opposed to tramways being brought into the parish, and the Putney members of the Wandsworth District Board of Works were instructed to oppose the tramway scheme at the Board. The memorial against the undertaking being permitted was agreed upon. The proposal of the Metropolitan District Railway to extend their line to Wimbledon by crossing Putney Common was also opposed at the meeting, and a resolution adopted to the effect that the Conservators be requested to oppose any encroachment on the Common. The proposed new bridge likewise formed a subject of discussion at the meeting, in the course of which it was incidentally stated that the new structure would be wider than Waterloo Bridge. A sketch showing how the High-street would be affected by the approach to the proposed bridge was ordered to be placed on the churchyard wall for the information of the parishioners.

BUILDING LAND AT WILLESDEN AND SNARESBROOK.

Several plots of building land in the neighbourhood of Willesden were sold last week by Mr. Belton. They included, amongst others, a number of plots on the Neasden Station estate, described as eligible for the erection of shops and the better class of houses. Some of the plots, having frontages to Neasden-lane, of 18 ft., were sold for 90*l.* each, whilst a number of others realised 110*l.* each. A plot, with a frontage to Vicarage-road of 17 ft. 6 in., was sold for 65*l.* It forms a portion of the property known as the Willesden Church Estate. Numerous plots in Willesden-lane and on the Willesden-green Estate were likewise offered. Various plots, having frontages to a new thoroughfare called Cobbold-road, of 15 ft., were sold at 35*l.* and 36*l.* each, and 40 other lots, having frontages of 16 ft., were sold for from 40*l.* to 45*l.* each. Five plots on the Willesden-green Estate, having frontages of 20 ft. to Willesden-lane, were sold for 90*l.* each.

Mr. F. M. Whittingham offered, at the Eagle Inn, Snaresbrook, twenty-eight lots, on an estate close to the Snaresbrook Railway station and to the Wanstead main road, and in the immediate neighbourhood of Epping Forest, several of the plots being described as eligible for the erection of first-class villas. It was stated that the property was offered free from all rights of the Conservators of Epping Forest, the rights having been purchased under an award made by the arbitrators under the Epping Forest Arbitration Act. A considerable number of the lots, which have frontages of 20 ft., and an average depth of 100 ft., were sold at the rate of 5*l.* 10*s.* per foot frontage, or about 110*l.* per plot.

WORK IN MOSAIC.

The apse of St. Peter's, Bayswater, has been decorated with an important work in Venetian mosaic. The subject is Leonardo da Vinci's "Last Supper," and the work has been executed by Messrs. Burke & Salviati. The treatment differs from the original in the arrangement of the background. Instead of showing the side of a square room in which the Last Supper took place, it has been arranged to suit the semi-circular surface of the apse, and its features are made to harmonise with the leading lines of the architecture in this part of the church. The copy for the mosaicists was made by Mr. A. Booker from the copy of Leonardo's work by his pupil Oggione, which is possessed by the Royal Academy. Oggione's copy is of the same size as the original, and was probably painted under the supervision of Da Vinci himself, and may therefore be relied on as expressing faithfully the spirit and the drawing of the original. The whole has been executed under the direction of Mr. Chas. Barry, from whose design the arrangement of the background was made. The cost, which is very considerable, will be borne by the widow and family of a late churchwarden, who took interest in the fabric of the church.

COMPENSATION CASES.

ARTISANS' DWELLINGS ACT.

At the meeting of the Metropolitan Board of Works held on the 10th inst., the solicitor read the following report:—

Artisans' and Labourers' Dwellings Improvement Act, 1875,—Goulston-street Scheme.—I have to report an important inquiry which took place at the Sheriffs' Court last Wednesday, on the appeal of the Board against the award of Mr. Hunter Rodwell. The subject matters of the claim were thirteen houses held on long lease in Castle-alley, High-street, Whitechapel; also a long leasehold interest in 8, 9, and 10, Inkhorn-court; and a copyhold of inheritance in six houses, 1 to 6, Inkhorn-court. It is impossible to speak too strongly of the disgraceful character of these premises, the approaches from High-street, Whitechapel, being some 3 ft. wide, and the courts being of wholly insufficient width for sanitary requirements, the houses also being in a wretched state of disrepair and dirt. The claimant is of the Jewish persuasion, who, no doubt, made his living by collecting the weekly rents of these houses and of other property of a similar kind in the neighbourhood. I ascertained that numerous notices under the Nuisances Removal Act had been served upon the claimant, and this was duly proved at the inquiry. Three claims were delivered amounting to 6,675*l.*, and the gross income derived from the property was, as put in evidence by the claimant, 617*l.* per annum. Mr. Rodwell's provisional award amounted to 3,100*l.*, but upon hearing the claimant's adviser before making the final award, he increased his award to 4,874*l.*, the valuation of the Board being 2,771*l.* The committee directed an appeal to be lodged against the final award. At the inquiry at the Sheriff's Court last Wednesday, Mr. Meadows White, Q.C., and Mr. Freeman appeared for the Board, and Mr. Willis, Q.C., and Mr. Muggeston for the claimant. I, of course, arranged that the jury should take a careful view of the premises, and it was clear throughout the inquiry that they took the strongest view against the claimant, and but for the summing-up of the Under-Sheriff, who called their attention to the fact that the Board itself had valued the property at 2,770*l.*, I have no doubt that the jury would have given a verdict for less than the Board's figures. They did, however, return a verdict for the exact amount given in evidence by the Board,—that is, 2,770*l.*, or 2,100*l.* less than Mr. Rodwell's final award. In addition to this, the claimant will pay his own costs, less 30*l.* certified by the Under-Sheriff as payable by the Board. This is another illustration of the extreme uncertainty of the verdicts of juries, as the committee may recollect about three weeks since property of the same character, almost adjoining this, and belonging to Mr. Thurgood, was the subject matter of an appeal against Mr. Rodwell's final award. The jury in that case, after a view, did not express any opinion as to the character of the property, and gave a verdict for 1,950*l.*, or 200*l.* only under Mr. Rodwell's award, and 700*l.* more than the Board's figures.

On Wednesday last Mr. Under-Sheriff Burchell presided over a special jury at the Middlesex Sheriff's Court in the appeal "Churchwardens of St. Luke's *v.* The Metropolitan Board of Works." Sir H. Hunt, the arbitrator, had made an award, and the churchwardens demanded a jury to assess the value of the property, consisting of a house on lease for eighteen years, and the reversionary interest. The contention was as to the reversion. The house was in Golden-lane, St. Luke's, and was required for artisans' dwellings. Evidence on both sides was given as to the reversionary interest, and the difference in the estimates of the surveyors was somewhat large. The jury, which consisted of only eight, no tales having been prayed, inspected the property, and the result was a verdict for 900*l.* As the amount exceeded the award the appellants had their costs allowed.

WOLVERHAMPTON STREET IMPROVEMENTS.

Mr. M. F. Blakiston, the acting under-sheriff of the county of Stafford, sat in the Sessions Court of the town-hall, Wolverhampton, two days last week, to hear an appeal of the trustees of the late John Savage Davenhill against the award of the arbitrator under the Improvement scheme in respect of property situated at the Queen-square end of Lichfield-street, which is required by the Corporation under the scheme for the purpose of the projected main street to replace Lichfield-street.

The property is a half-timbered house occupied by a relation of the late Mr. Davenhill.

Mr. Underhill (town clerk, appearing for the Corporation) said that as the property was not in the unhealthy area under the scheme, its purchase would come under the Lands Clauses Act, the provisions of which allowed that besides the actual value of property purchased, the owners should receive compensation to the extent of 10 per cent. on the intrinsic value for compulsory sale. The area of the

property was 132 square yards, which, at the very high figure of 10*l.* a square yard, would give 1,320*l.*, as the price of the land; or, putting it at the (for Wolverhampton) fabulous figure of 2*l.* a yard, would amount to 2,640*l.* I the place had to be rebuilt as it stood, it would not cost more than 1,200*l.*

The evidence of valuers was, as usual, very contradictory, those for the Corporation putting the total to be paid at between 4,000*l.* and 5,000*l.*, and those for the appellants at between 9,000*l.* and 10,000*l.*

The jury awarded 6,766*l.*

ARCHITECTS' ACTIONS.

HANCOCK *v.* BAKER AND SONS.

THIS was an action in the High Court of Justice, Common Pleas Division, before Mr. Justice Lopes, brought by Mr. W. St. John H. Hancock, an architect, of Furnival's Inn, to recover from Messrs. Baker & Sons, auctioneers, a sum of 66*l.* 10*s.* for professional services.

It appeared that defendants had originally been in communication with another gentleman respecting laying out an estate for selling in plots, and making roads thereon, who, before any work had been done, was obliged to retire from business, owing to illness. Mr. Hancock was asked to take up the work, and it appeared in evidence that he stated to Messrs. Baker & Sons that he would do so on his own account, to which, according to plaintiff's evidence, the defendants assented.

The work in question was done in 1877-8, covering nearly six months. Some months after the work had been done and the estate put up for sale, defendants, being asked for payment, denied their liability to pay plaintiff, stating that they had never employed him.

A great deal of correspondence was put in, and several witnesses examined, the hearing of the case occupying part of three days.

The jury had to decide as to whether the plaintiff (who did the work) was to receive pay, or the estate of the former surveyor (who was a bankrupt)? Was the statement of the plaintiff or that of the defendants to be relied upon?

On these questions the jury gave a verdict for plaintiff for the full amount claimed.

Mr. Bigham and Mr. Frank Safford, instructed by Mr. S. J. Debenham, of Lincoln's-inn-fields, were for the plaintiff, and Mr. Telfourd Salter, Q.C., and another learned gentlemen, instructed by Messrs. Blewitt & Tyler, were for the defendants.

WHAT PART OF A SHOP-FRONT BELONGS TO A SHOP?

HAYES *v.* CORDINGLEY.

THIS somewhat curious action was tried in the Exchequer Chamber about a week ago. The plaintiff, Mr. F. B. Hayes, an auctioneer and estate agent, has a lease of a shop on the ground story of No. 14, King-street West, Hammersmith; the shop being part of a larger shop, and described in the parcels as "all that portion of the shop now in the occupation of the said lessee containing the dimensions and abuttals more particularly delineated and set forth in the plan drawn in the margin hereof, and being a portion of the ground-floor of the premises aforesaid." The interior of the shop was tinted pink on the plan, but not anything beyond the exact internal area; the pink tint was not referred to in the body of the lease.

The defendant (the lessor) occupied the rest of the premises, including the upper floors, and the parties being recently on bad terms, he damaged the painting of the cornice and of the brattishing above it, as also of the centre pilaster, between the shop-fronts, and cut a door in a very rough way in the wooden stallboard under the shop-window, and used it for access to the basement story. The plaintiff brought his action for peaceable possession, and claimed some moderate damages. There was apparently no attempt to dispute the fact that there was an intention to annoy the plaintiff, and to damage the effect of his premises, for which a high rent was paid, the only question being, were the parts in question demised to the plaintiff or not? It was proved that, previously to the lease being granted, in November, 1876, the lessee had painted all the parts over which he now claimed control.

Mr. S. Flint Clarkson, architect and surveyor, gave evidence in support of the plaintiff, and was followed by Mr. Vickery. The jury returned a verdict for the plaintiff, damages 30*l.*

The evidence, and the summing up (of Mr. Justice Watkin Williams) go to establish,—(1), that a tint on any portion of a plan may be taken to have no signification whatever, unless it is specially referred to, and its meaning expressed in the body of the deed; (2), in the absence of stipulations to the contrary, the whole of a shop-front, including the entablature, will be demised with a shop. The cornice and cresting must be considered as connected with the rest, as the upper parts of a frame would be with the lower parts. In this case the ceiling of the ground-story reached only to the top of the fascia, but the whole of the upper part of the entablature is to be reckoned as part of the ground-story; (3), "occupation" may extend to the external surface of a structure. In this case, for instance, the lessee, having painted the woodwork under the stall-board (although it contained a glazed panel giving light into the basement) previously, without being interfered with, it was held that this surface was "in the occupation of the said lessee" at the granting of the lease.

THE MYSTERIES OF FIGURES.

THE following is a mathematical demonstration of the fact alluded to by your correspondent "J. H." We will first show that if the sum of the digits of any whole number greater than nine be subtracted from that number, the remainder will be divisible by nine.

Let N denote any whole number, and let p_1, p_2, p_3...p_n, represent the digits, beginning with that in the units place, and represent the base of the common scale of notation by $r=10$.

Then $N=p_1+p_2r+p_3r^2+\ldots\ldots p_nr^n$

Subtracting $(p_1+p_2+p_3+\ldots\ldots p_n)$ from both sides of the equation we have $N-(p_1+p_2+p_3+\ldots\ldots p_n)$

$$=p_2(r-1)+p_3(r^2-1)+\ldots\ldots p_n(r^n-1)$$
$$=p_2 9+p_3 99+p_4 999+\ldots\ldots \text{to } n \text{ terms.}$$

This equation is therefore divisible by 9, since every term on the right-hand side is divisible by 9. The above is therefore established.

We will now show that the sum of the digits of any whole number divided by 9 will leave the same remainder as the whole number divided by 9.

Adopting the same notation we have as before

$$N=p_1+p_2r+p_3r^2+\ldots\ldots p_nr^n$$
$$=p_1+p_2+p_3+\ldots\ldots p_n$$
$$+p_2(r-1)+p_3(r^2-1)+\ldots\ldots p_n(r^n-1)$$

therefore $\dfrac{N}{r-1}=\dfrac{p_1+p_2+p_3+\ldots\ldots p_n}{r-1}$

$$+p_2+p_3(r+1)+\ldots\ldots p_n\frac{r^n-1}{r-1}$$

But $\dfrac{r^n-1}{r-1}$ is an integer, whatever positive integer n may be; therefore $\dfrac{N}{r-1}=$ some integer $+\dfrac{p_1+p_2+p_3+\ldots\ldots p_n}{r-1}$

The second case is therefore established, since $r-1=9$.

Now, by the first case it was demonstrated that if the sum of the digits of any whole number greater than 9 be subtracted from that number, the remainder will be divisible by 9. Therefore by the last case the sum of the digits in the remainder will be divisible by 9. Should "J. H." be unable to follow the demonstration, then perhaps the last few lines will satisfy him. A reply to his letter, however, hardly seems complete without a rigid demonstration.

J. G. VINE.

SIR,—In reply to your correspondent, "J. H.", although I do not undertake to explain the *whys* and *wherefores* of the peculiar property of the figure 9 to which he draws attention, I beg to subjoin the following algebraical symbol for the "trick," which will make the peculiarity of the "9" element more apparent.

Suppose a, b, c, d, e, f, g, h, represent eight figures, the problem will become:—

$$10000000a+1000000b+100000c+10000d+1000e+100f+10g+h-(a+b+c+d+e+f+g+h)$$
$$=9999999a+999999b+99999c+9999d+999e+99f+9g-$$

where 9 is the common factor. H. L.

RADIATION AND CONDUCTION.

SIR,—At the Royal Institute of Architects' discussion, on the 29th of November, more than one speaker drew a distinction between radiated and conducted heat, expressing a decided preference for the former. Mr. Robins said that radiated heat passed through the air without heating it, warming the first obstacle to its passage. Captain D. Galton says, in his "Healthy Dwellings," that air cannot be heated by the radiant heat of an open fire. Now, our thermometers indicate the temperature of the air. The heat we require, say 60°, is got by contact of the air with the walls, furniture, &c.; therefore it seems to me that our desired air temperature is got by conduction when a fire is the means of warming. Are there, therefore, any solid grounds for the distinction which is drawn? Suppose a room to be warmed up to 60° by a supply of air, warmed by passing through a chamber kept to a temperature of 70° or 80°, why should it not be as satisfactory as the warmth got from an open fire? I admit that ordinarily a room warmed by hot air is not so agreeable as one warmed by an open fire, even when the ventilation is as good, which it rarely is; but this I attribute to the fact that hot air for warming rooms is almost always passed over highly heated surfaces, very generally moving slowly over parts of those surfaces, whereby particles of organic matter floating in the air get charred.

F. LLOYD.

SANITARY SCIENCE IN ITS RELATION TO CIVIL ARCHITECTURE.

SIR,—The letter from "A.R.I.B.A.," at page 709 of last week's *Builder*, shows that there is ample room for at least some of the members of the "R.I.B.A." getting better acquainted than they are with the science of practical plumbing, and especially in its relation to the proper position and fitting-up of the sanitary appliances of houses. All soil-pipes should be put up outside of the house, and if any soil-pipe in that position freezes up, that is the pnnishment for some sin, viz.,—the waste of water. I do not think that, as "A.R.I.B.A." supposes, films of ice forming in the interior of the soil-pipe when it is used are the cause of the freezing up, but, as I said, some water crane or valve leaking continually into the soil-pipe, and so wasting the water. I have put outside a number of soil-pipes that were formerly inside, and heard no complaint during the late severe frost of anything freezing up; nor did I last year either. And as to the ventilating traps at the foot of the soil-pipes, &c., and upon the drains, I do not remember of hearing of a single one freezing up, although about seven thousand are now in use.

I was rather astonished to read the statement of "A.R.I.B.A." that the waste-pipe from his sink is only 1 in. in diameter. In Scotland we generally use 2½ in. waste-pipes from sinks. The smell he speaks of may likely be owing to want of ventilation. He should consult either Mr. S. S. Hellyer's book, "The Plumber and Sanitary Houses," or my own work on "Plumbing and House Drainage," and he would then gain a better knowledge of the subject than his letter leads me to suppose he at present possesses.

In reference to Mr. Norman Shaw's published plan of fitting up soil-pipes, I beg to observe that it was very crude, and open to improvement in various respects; and unless he has lately issued an improved plan correcting himself, his first plan is not one to be copied, more especially as other more practical and better plans were and are in existence.

W. P. BUCHAN.

MEASURING TAPES.

SIR,—I should think that a good stout linen tape, passed through a solution of rubber, in order to render it waterproof, would answer. I do not, however, know of any firm making such, but would gladly purchase one so made. Linen hose so prepared will last for years.

J. C. M.

LINCRUSTA-WALTON.

WHEN this material was first introduced to the public, under the title "Muralis," or "The Sunbury Wall Decoration," we were able, without any hesitation, to point it out to our readers as a particularly good and available material, and we have no cause for changing our opinion in speaking of it under its new name, Lincrusta-Walton. Trade reasons have probably led to this change, but it is not wise for all that. Still it will come right in time. When a hard-working and long-popular member of the Lower House, let us say Mr. "Bob Lowe," consents to accept a peerage, he commits temporary suicide, and disappears from the outer world under a new name as entirely as if he no longer existed. In time, however, his personality asserts itself, and the same qualities bring Lord Sherbrooke equally to the front. As the Honble. Bardwell Slote, in the "Mighty Dollar," used to say, in reply to Mrs. Gen'l. Gilflory's preference for *pommie de terre* over potato,—"Fortunately, ma'am, the vegetable tastes the same in both languages," so we have no doubt Mr. Walton's material will be equally valued, whether called Linorusta or Muralis, because

it is a really good thing. It is in (low) relief, like wood-carving; it is waterproof and impermeable to moisture; can be washed with soap and water; and will not absorb infection. It has a comfortable appearance, can be adapted by architects to any style of building, and is applicable for dados, panels, cornices, friezes, borders, and folding screens. The company by whom it is supplied have just now issued a very pretty Pattern Book (7, Poultry), wherein, by means of the autotype process, as we suppose it to be, the patterns in stock are shown with marvellous fidelity and effect, the patterns themselves exhibiting so much good taste and skill in design and drawing as to make it obvious that intending users may safely place themselves in the hands of the company. Care is required in cutting and fixing the material. The latter is done with glue and paste, made (in the proportion of one-third of the former to two-thirds of the latter) as thick as it is possible to use it, and laid on lightly with a stiff brush. "Then take a piece of lincrusta and attach it to the wall under the cornice by means of gimp pins, and gradually press it to the wall, making the joint good until it reaches the bottom. In doing this, care should be taken to work from the centre outwards, so as to avoid the air getting under the piece and preventing adhesion." Very rich effects, we will add in conclusion, may be obtained by decorating the Lincrusta in colours.

CAN A BUILDER CHARGE FOR AN ESTIMATE?

Sir,—I should be glad if some of your correspondents would enlighten me as to the following, viz.:—

"An architect invites two or three builders of equal merit to tender for works in alterations and additions (700*l.*) where quantities are not supplied. On opening the tenders the difference is so trifling that the architect's client accepts one above the lowest, although the usual clause, 'the lowest or any tender not necessarily accepted,' is omitted to be mentioned."

In a case like the foregoing I certainly think a builder can send in a claim to the client of, say, two per cent. for the taking out of quantities and preparing of estimate.

If, in your next issue, some of your correspondents will give their opinion, and kindly state if such a case has been decided in a court of law, they will confer a favour on many builders. W. B.

VARIORUM.

A fifth edition of "The Proportions of the Human Figure," by the late Joseph Bonomi, just now published by Charles Robertson (Long Acre) contains a photograph and short memoir of the much-regretted author. It also includes a list of authorities on the subject. The scope of the work we have before now stated and commented on.——*Nature* of December 9th has an interesting article showing what has been done by science towards the prevention of the vine disease in France due to the *Phylloxera*. Two maps show the extent to which its ravages have spread.——With No. 3 of "Decoration" (Sampson Low) a decorative picture, "Karlavagh," designed by Mr. Moyr Smith, is presented.——Part 1 has been published of a new issue of Cassell's "Cookery," a very useful book of its kind. It will be completed in thirteen sixpenny parts.——The same firm have also commenced a new issue of the "Popular Educator."——The *Garden Oracle* for 1881, edited by Shirley Hibberd, maintains the reputation for usefulness acquired by previous issues. We give a quotation that may be useful as to an aquarium and fern-case combined:—"The whole of the rock-work should be built on a wooden floor, and when thoroughly set should be put into water and remain immersed for at least a month, to season it thoroughly; for new cement is poisonous to fishes, and therefore undue haste in this work tends of necessity to a break down. In stocking the tank you need not introduce any vegetation at all, but a clean bed of well-washed pebbles and a few fishes only. But if you wish to have a little vegetation at once plant a few tufts of Vallisneria only; if you introduce a variety of water-plants you will come to grief speedily. The whole affair ought to be in full working order a month or so before any fishes are put in, and during that time of probation the water should be changed twice a week at least. We now come to the subject of the fishes. These should be few and small, and of the most peaceable disposition. The lovely gold carp is the most suitable of all, but any other kinds of carp may be adopted. Minnows and bleak are suitable, but scarcely desirable, as they soon suffer if the water should be insufficiently oxygenated. Such interesting but delicate fishes as the eel, the stone loach, and the miller's thumb are really quite unfit for the purpose. The principal object is not to secure a zoological collection, but a beautiful object. The ferns will, of necessity, comprise such as thrive when constantly bathed with moisture, and the filmy ferns, such as *Trichomanes radicans* and *Hymenophyllum tunbridgense*, are the best. The small species of *Todea* will answer, as will also our pretty Britishers, the wallrue, *Asplenium ruta-muraria*, and the sea spleenwort, *A. marinum*.——The eighteenth annual issue of the *City Diary*, published at the office of the *City Press*, 154, Aldersgate-street, has just made its appearance. In it will be found, as before, a great deal of information respecting official life in the City, together with the customary matter of an almanack.——"The Golden Mark," the Christmas number of the *Quiver*, contains a large amount of good reading and illustrations for 6*d.*——The December number of Harper's *Monthly Magazine* for both quantity and quality is noticeable. It is now published by Sampson Low & Co.——"The Belgravia Annual" and "The Gentleman's Annual" (both published by Chatto & Windus) include many good stories of their kind.——According to the *British and Colonial Printer and Stationer*, "Cherry Ripe" the supplement to the Christmas number of the *Graphic*, was produced in fourteen printings at a speed slightly exceeding 800 sheets per hour, two on a sheet, and that no fewer than 400,000 copies have already been produced and sold.—The second volume of the *Antiquary*, edited by Mr. Edward Walford, M.A., which consists of the parts published between July and December, affords much interesting reading to those who find pleasure in the study of the past. The *Antiquary* supplies a want.

Miscellanea.

Wilmslow Sewerage.—The Wilmslow Local Board of Health have for several years past been trying to obtain a satisfactory scheme for the complete sewerage of their district, which includes the village of Wilmslow and the surrounding residential and agricultural district of 6,907 acres, with a present population of about 7,000. About eighteen months since the Board offered premiums of 100*l.*, 50*l.*, and 25*l.* for the best schemes for sewering and disposing of the sewage of the district. A large number of plans were sent in by engineers, and Mr. J. G. Lynde, C.E., formerly city surveyor, of Manchester, was called in to advise the Board as to the merits of the several schemes; and the Board subsequently awarded the first premium to Messrs. E. Corbett & Sons, of Manchester; the second premium to Messrs. Brierley & Holt, of Blackburn; and the third premium to Mr. Vawser, of Manchester. Messrs. E. Corbett & Sons' scheme is on the "separate system" for collecting only sewage in the new sewers, leaving the rainfall to be conveyed by existing drains, streams, &c. The scheme provides for a northern and a southern outfall of 15-in. glazed earthenware pipes, jointed watertight in cement, with branch sewers of 12-in. and 9-in. pipes. A sewage-farm of about 57 acres is proposed on or near Lindow Common (where deep sand is overlaid by peat of varying thickness). The sewage is to be raised from the two outfalls, a height of about 45 ft., to the farm, by means of Shone's patent sewage-ejectors, worked by compressed air from an engine at the farm. The estimated cost of the whole scheme is as follows:—19,095 yards of pipe-sewers and 170 manholes, 6,500*l.*; air-compressing engines, boilers, ejectors, rising-mains, air-pipes, and buildings, 4,250*l.*; sewage farm, farm buildings, drainage, &c., 4,800*l.* Total, 15,550*l.*

Silver Work.—Mr. J. W. Benson has had the honour of exhibiting for her Majesty's inspection a silver model made in imitation of the Albert Memorial for the late Siamese Embassy. It has now been shipped for Siam. It is a remarkable work, more than 7 ft. in height.

Window Cases for Queen Anne Houses.—"Can any be obtained?" says a correspondent. Yes, certainly! Messrs. Dick Radclyffe & Co., of High Holborn, have prepared some purposely, as our advertisement columns show.

Bells, Lincoln Cathedral.—On Saturday last the new clock and set of quarter bells provided for Lincoln Cathedral were formally opened by the Dean, in the presence of the members of the chapter, priest, and vicars, and other officials of the cathedral, as well as Messrs. N. Clayton and A. Shuttleworth, members of the celebrated firm of agricultural implement makers, the donors, in conjunction with Mrs. Seely, the wife of Mr. Charles Seely, M.P. for Lincoln, of the quarter bells. The new clock, which has been provided at the expense of the Dean and Chapter, takes the place of one by Thwaites, dated 1775, subsequently altered by Vulliamy. It has been constructed by Messrs. Potts & Sons, Leeds, under the superintendence of Sir Edmund Beckett. The bells, which are arranged for the well-known "Cambridge quarters," are from the foundry of Messrs. Taylor, Loughborough, the founders of the new peals of St. Paul's and Worcester cathedrals. They weigh respectively 27 cwt. 2 qr. 7 lb., 13 cwt. 0 qr. 14 lb., 12 cwt. 3 qr. 24 lb., and 11 cwt. 0 qr. 10 lb. The crowning-stone was laid of the newel of the spiral staircase of the south-western tower, thus formally signifying the completion of the work in which the Chapter has been for some years engaged, under the direction of Mr. J. L. Pearson, R.A., in tying together the magnificent western façade (which was bulging outwards to an alarming extent), rebuilding the lower part of the south-west tower (which had become so rent and shattered as to threaten imminent ruin), and strengthening the whole.

The Society of Engineers.—The twenty-sixth annual general meeting of the members of this Society was held on Monday evening last, the 13th inst. The retiring president (Mr. Joseph Bernays) occupied the chair. The following gentlemen were balloted for and duly elected as the council and officers for the ensuing year, viz.:—As president, Mr. Charles Horsley; as vice-presidents, Mr. J. Church, Mr. F. E. Duckham, and Mr. Arthur Rigg; as ordinary members of council, Mr. S. Cutler, Mr. C. Gandon, Mr. Perry F. Nursey, Mr. Thos. Porter, Mr. W. Schönheyder, Mr. R. Berridge, Mr. C. J. Light, and Mr. Henry Robinson, the three last-named gentlemen being new members of the council; as honorary secretary and treasurer, Mr. Alfred Williams; and as auditor, Mr. W. H. Bennett. The president announced that premiums of books had been awarded by the council to Mr. G. M. Ward for his paper on "The Utilisation of Coal Slack in the Manufacture of Coke for Smelting," and to Mr. W. Worby Beaumont for his paper on "Steel as a Structural Material." The annual dinner of the Society was held on Wednesday evening.

Proposed Tramway between Warwick and Leamington.—The Leamington and Warwick tramway extends along a route of about 5,377 lineal yards, and consists of about 4,859¾ lineal yards of single line, and 517 lineal yards of double line in crossings, passing-places, &c. The undertaking is now assuming a very practical and complete form; plans, sections, details of rails, crossings, specifications, and bills of quantities having been prepared by Mr. E. Pritchard, C.E., of Birmingham and London. In answer to an advertisement which appeared in the *Builder* and other newspapers, some time ago, about a dozen contractors have since inspected plans at Mr. Pritchard's offices, and the directors have since received tenders for the works. The new tramway will consist of a continuous iron sleeper, 90 lb. to the lineal yard, laid upon a bed of concrete, having a rolled steel rail 34 lb. to the yard let into the sleepers, and secured at intervals of 18 in. with wrought-iron pins, in the form of a wedge. No timber whatever will be used in the system.

Church Warming.—Mr. R. S. Dunbar, of the Thames Bank Iron Company, has warmed the Catholic Apostolic Church and the Cloisters, Gordon-square, by a system of hot-water boiler and pipes placed above the floor. This very large church has for a long time past been without any heating apparatus, but recently the committee called in the assistance of Mr. Dunbar, and the result, at the cost of 337*l.* 10*s.*, is said to be satisfactory.

The Abbey Church of Romsey, Hants, has just received the addition of a stained-glass window, representing Christ leading the Blind Man. It is in memory of Caroline Maria Noel, youngest daughter of the Hon. and Rev. Gerard T. Noel, and cousin of the present Earl of Gainsborough, and has been well executed by Messrs. Mayer & Co., of Munich and London.

The Re-valuation of the Metropolis.—The results of the re-valnation of the metropolis, a work which has oconpied the various districts during the year, have been reported to Mr. Jebb, the chief clerk of the Metropolitan Asylums Board, whioh is the authority nnder the Act (the Metropolis Valuation Act, 1869) to issne the return. This is the second quinquennial valnation. The metropolis shows a vastly increased value, owing, not only to the increase in the number of buildings, but to the rateable valne of houses having been raised by the local authorities. When, in 1871, the list was first issued, the gross value of the metropolis was 24,176,338*l.*, and the rateable value 19,900,072*l.* The returns now given in show a gross valne of 25,785,556*l.*, and a rateable value of 23,697,405*l.* These totals, however, do not include the City of London, whose rating authorities have not yet sent in their returns; nor Poplar, nor the Middle Temple. The gross value of the City of London is estimated at 3,953,707*l.*, and the rateable valne at 3,313,522*l.* The rateable value of Poplar is estimated at 311,895*l.*, on the gross of 423,796*l.* The Middle Temple is estimated as likely to give in its returns 10,929*l.* of rateable value on a gross of 13,144*l.*,—a total increase of 50,000*l.* on the three places. Hence the returns will be,—gross value, 33,176,203*l.*, and a rateable value of 27,833,751*l.*; an increase in the second quinquennial period of 5,079,391*l.* gross, and 4,679,112*l.* rateable; and a total increase in the ten years of 8,999,865*l.*, and 7,933,679*l.* The largest assessments of gross valne, next to the City, are Kensington, 1,969,501*l.*; St. Pancras, 1,828,828*l.*; Islington, 1,757,589*l.*; Marylebone, 1,659,874*l.*; St. George's (Hanover-square) Union, 2,728,318*l.*; and Lambeth, 1,577,631*l.*

A Verdict of a Penny a Month.—In the Warwick County Court, on Tuesday last, a case was heard before Sir Richard Harington, bart., judge, in which Messrs. Denston & Co., glass and lead merchants, Birmingham, were the plaintiffs, and William Roberts, builder, Leamington, the defendant. The action was brought to recover 14*l.* 13*s.* 3*d.* for goods sold and delivered. It appeared that the debtor some months ago filed a petition in the Warwick County Court, for the liquidation of his affairs by arrangement. The creditors agreed to accept a composition of 3*s.* in the pound, payable in a month, on the joint security of the debtor and of Mr. George Grove, ironmonger, Leamington. Mr. Grove in due time gave his own cheques for the amount to each creditor, and one for 2*l.* 4*s.* was accordingly forwarded to the plaintiff, who declined to accept it, as the offer was not strictly in accordance with the terms of the resolution. The judge made some comments on the proceedings, and gave a verdict for the plaintiff without costs, and one penny per month.

Parliament Street.—The site occupied by the two old houses with projecting shops situate 53A, to 54, Parliament-street, abutting in the rear on Cannon-row, and on the site of the Grand National Opera-house, has now again been disposed of by Mr. Robins, of Waterloo-place, Pall Mall. In 1874 the property was sold by auction to Mr. Mapleson for the purpose of forming a direct approach to the new Opera-house from Parliament-street, but the purchase was not completed. Its re-sale points to an immediate movement in connexion with the site of the Opera-house on the Embankment, while the demolition of these old houses, whose incongruity with their more modern surroundings is very remarkable, will considerably improve the appearance of this part of Parliament-street. We understand the price now paid is equivalent to 7*l.* per foot super.

District Surveyorships, Streatham.—At the meeting of the Metropolitan Board of Works on the 10th inst., it was agreed, on the recommendation of the Building Act Committee, that the district of Streatham and Brixton (part of Lambeth), vacant by the decease of Mr. John Mullins, be divided into two districts, to be designated East Streatham and Brixton (part of Lambeth), and West Streatham, respectively; and that the centre line of Brixton-hill, Streatham-hill, and Upper and Lower Streatham, do form the line of boundary between such districts. It was further agreed to proceed to the elections at the meeting of the Board this Friday, the 17th inst.

Patent Pendulum Pump.—The Bronze Medal of the Mining Institute of Cornwall has been awarded for the above pump to Mr. J. Stannah, engineer.

Ventilation of the School Board House.—At the weekly meeting of the School Board, on the 9th inst., Dr. Richardson was permitted, as a matter of emergency, to make a statement as to the ventilation of the Board-room, and the corridors and rooms adjoining. He said that he and the architect to the Board had, during the past three weeks, been looking into the arrangements for ventilation existing in connexion with the building in which the Board were in the habit of meeting. He had come to the conclusion that the ventilation of the Board-room was a matter of great emergency. The room in which the Board sat should be one they could occupy without dangerous results. Without desiring to cause any unnecessary alarm, he felt bound to say that the members incurred danger by sitting in this room. The architect was of opinion that the necessary alterstion in the ventilating arrangements might be made in a month or six weeks. That would involve the Board meeting in another room for some time, and it would also involve expense. In the opinion of the architect the expense would be about 300*l.* He (Dr. Richardson) imagined it would be more, but 300*l.* might be taken as about the cost. He, therefore, moved that it be referred to the Works Committee, to consider and draw up a proposal as to the warming and the ventilation of the Board-room, the landings adjoining, and the ladies' room. Mr. E. Buxton (vice-chairman of the Board) seconded the proposition. After some opposition from Mr. Bonnewell, who suggested that the lighting of the room should be also inquired into, the motion was carried unanimously.

South London Water Supply.—Notice is given of a Bill to be introduced into Parliament next session for the incorporation of a company to supply the southern districts of London with water to be obtained chiefly from springs in the neighbourhood of the Basingstoke Canal and other places on the borders of Hampshire and Surrey. Power is sought to transfer the undertaking to any trust that may be formed to control the water-supply of the metropolis. It is stated that from the sources specified in the notice about 13,000,000 million gallons daily could be obtained.

Street and Road Tramways.—A Parliamentary paper shows that there are in the United Kingdom 3,680 miles of street and road tramways open, from which (for passengers, parcels, mails, animals, goods, minerals, &c.) 1,312,933*l.* have been received, and upon which 1,113,094*l.* have been expended. This leaves a balance of receipts of 229,830*l.* The total number of passengers who have travelled on the tramways is given at 173,067,103; the mileage run at 23,842,000; the number of horses at 12,392, of locomotive engines at 17, and of cars at 1,619.

"Fogs and Mahogany."—Mr. W. J. Prim, Resident Engineer at the Houses of Parliament, writes to say that he never made the statement attributed to him by a speaker at a recent meeting (mentioned in our columns) "that the fog in the Houses of Parliament, which was occasionally found when no fog existed outside, was due to the quantity of mahogany wood employed in the building," for, as a matter of fact, oak is almost exclusively employed for the furniture and fittings in those buildings.

Female School of Art.—Her Majesty the Queen has again signified her approbation of the work of the Female School of Art, 43, Queen-square, Bloomsbury, by purchasing a life-study in water-colour. We understand that there will be some specimens of wood-carving by female students on view at the annual exhibition on the 22nd and 23rd inst.

Folklore of Old Japan.—At a meeting of the Birmingham Philosophical Institute, last week, Mr. Pfonndes read a paper on "The Cosmogony Legends, Witchcraft, Spirit Rapping, and other Superstitions of Japan." Native illustrations and photographs were exhibited by the lecturer.

Bribes.—More than one architect complains to us of a circular sent out by some "Sanitary Engineers" in the Blackfriars-road, offering to allow them 10 per cent. commission on all the said engineers' goods the architect may specify. Manufacturers ought to know by this time that such offers simply do them mischief.

The Strike at the Welsh granite quarries, South Carnarvonshire, terminated on the 13th inst., the men going in on the employers' terms. The cause of the dispute was the appointment of an English foreman, whose dismissal the men wanted.

Dryclough.—A new (R.C.) school-church, dedicated to SS. Aidan and Oswald, was opened on the 28th ult. at Dryclough, near Royton. The main room measures 66 ft. by 30 ft., and is approached by a porch containing the stairs of the gallery. A separate chancel, 18 ft. 6 in. by 15 ft., opens from the main room by means of large doors, 19 ft. by 6 ft. 9 in. each; and an infants' room, 30 ft. by 22 ft., having gallery accommodation for sixty children, is attached to the main building. The sacristy and class-room measures 18 ft. by 18 ft., and the boys' vestry 11 ft. by 11 ft. The accommodation for school-work is for 350 children, infants included, and for Divine service for about 500 worshippers. The rooms are all lofty, and have stained and varnished open-timbered roofing throughout; and, to enhance the comfort of the rooms, the roofs are boarded and covered with felting under the slates. The style is described as a free treatment of English Gothic. The windows are glazed with quarry lead lights. The altar is in carved oak, from a design supplied by the architect, and has been executed and fixed by a Dutch firm, Messrs. J. A. Orr, of Roermond. The building works were entrusted to the following local firms, viz.:—Brickwork, Mr. Thos. Whittaker; masonry, Messrs. J. Hirst & Sons and Mr. P. Walsh; joinery, Messrs. R. Hilton & Sons; plumbing, painting, and plastering, Mr. M. J. Hearne; slating, Mr. J. Bamford; and benching, Messrs. S. Ashton & Sons. The whole has been carried out from the designs and under the superintendence of Mr. Thomas Mitchell, architect, of Oldham. The cost will amount to about 2,200*l.*

Burnham Westgate.—St. Mary's Church, Burnham Westgate, Norfolk, has been reopened, after restoration. The chancel has been nearly rebuilt and provided with a new roof, Minton tile pavement, new window, carved oak seats, and other fittings. In the church the old chapel of St. John has been restored with new lead roof, well lighted, opened to the north aisle by a new archway, and fitted with open seats. The nave and aisles throughout are repaved with Minton tiles, and supplied with open seats of pitch-pine, a carved oak pulpit and reading-desk, and additional windows, with a thorough repair of all the stonework. The cost of the works has been about 750*l.*; some work still remaining to be done to the tower and porch is estimated to cost 120*l.* The restoration was under the direction of Mr. Phipson, architect, Norwich, and executed by Messrs. Daw, the builders; Mr. Alfred Beavor, stonemason; and Mr. W. Witton, plumber and glazier, all of Burnham.

The Builders' Ball.—The annual ball in aid of the funds of the Builders' Benevolent Institution is announced to take place on Thursday, January 27th. We trust that it may be as successful as the recent anniversary dinner proved to be. Those of our readers who are willing to do their part in attaining the desired end should communicate with Mr. F. W. Keeble, the honorary secretary for the Builders' Ball, 4, Vernon-place, Bloomsbury-square.

Royal Asylum of St. Anne's Society.—An Old Boys' Club in connexion with this noble charity is now organised. All Old Boys desirous of joining or aiding the movement are requested to communicate with Mr. John G. Adams, at 69, Cook's-road, Kennington Park, an ex-scholar, who has undertaken to receive all names.

TENDERS

For the erection of a new brewery (exclusive of offices and brewery plant) at Walham Green, for Messrs. Stansfeld & Co. Mr. William Bradford, architect and engineer. Messrs. J. & A. E. Bull, surveyors:—

Smith & Co.	£21,760 0 0
Lucas Bros.	21,528 0 0
Holland & Co.	21,374 0 0
Trollope & Son	21,048 0 0
Higgs & Hill	20,898 0 0
Bywaters*	20,210 0 0

* Accepted, subject to modification.

For the erection of warehouses and printing-offices, Shelton-street, Drury-lane, for Messrs. Henry Hansard & Son. Mr. Octavius Hansard, architect:—
Mitchell & Co. (accepted).

For the re-erection of premises, and dilapidations, No. 11, Berwick-street, Oxford-street, for Mr. Francis Pinn. Mr. John H. Swann, architect:—
Mitchell & Co. (accepted).

For a mission-house, Brunswick Park, East Barnet, for Mr. J. L. Wood. Mr. S. C. Capes, architect. Quantities not supplied:—
Garratt (accepted) £360 0 0

For shops, Peckham-road:—
Taylor & Parfitt (accepted) £2,835 0 0

For five houses and shops, Brixton-road, for Mr. Earle Bird. Messrs. Fowler & Hill, architects. Messrs. Fowler & Hugman, quantity surveyors:—

Hook & Oldrey	£3,841	0	0
Freight	8,600	0	0
Forrest	8,487	0	0
Lang & Son	8,165	0	0
Maxwell Bros.	8,130	0	0
Taylor	7,987	0	0
Kirk & Randall	7,865	0	0
Colls & Sons	7,573	0	0
Conder	7,398	0	0
Nicholls	7,331	0	0
Higgs	7,328	0	0
Pack Bros.	7,195	0	0

For the sewerage of Beeston, Notts. Mr. John Jackson, engineer. Quantities by Messrs. Hovenden, Heath, & Berridge:—

Roberts & Watson	£13,430	0	0
Meats Bros.	12,670	0	0
Knight	11,358	16	0
Cordon	11,264	0	0
Kellett & Bentley	11,224	0	0
Botterill	10,733	0	0
Rayner	10,497	0	0
Cook & Bennett	10,473	0	0
Bell	10,395	0	0
Smart	10,222	10	5
Ridal & Arnison	10,079	15	9
Johnson	9,897	0	0
Dawson	9,715	0	0
Young & Nicholson	9,619	0	0
J. & G. Tomlinson	9,395	0	0
Bromage	8,970	0	0

For the erection of a new brewery at Portslade, near Brighton, for Messrs. J. Dudney & Sons. Messrs. Scamell & Colyer, architects. Quantities by Messrs. Curtis & Sons:—

Contract No. 1.—*Building.*

Grimwood & Sons, London	£3,698	0	0
Morter, London	9,200	0	0
Colls & Sons, London	9,190	0	0
Patching, Brighton	9,039	0	0
Chappell, London	8,930	0	0
Brown, London	8,820	0	0
Parsons, Brighton	8,800	0	0
Smith & Sons, Islington (accepted)	8,145	0	0

Contract No. 2.—*Ironwork.*

Westwood, Bailey, & Co., Poplar	£2,532	11	3
Handyside & Co., London	2,329	19	4
Cochrane & Co., London	2,178	10	0
Morelund & Sons, London	2,150	7	0
Thornewill & Wareham, Burton-on-Trent (accepted)	1,930	0	0

For the erection of the new church for the parish of St. Lawrence, in the city of York, exclusive of the tower and carving. Mr. John Green Hall, architect:—

Bredford	£9,500	0	0!
Bowers	9,300	0	0
W. & J. Crow	8,337	0	0
Osbourne	8,187	17	2
Weatherley	8,063	0	0
Williams	7,930	0	0
Hebden	7,823	0	0
Morton	7,745	0	0
Roberts & Watson	7,200	0	0
Bellerby	7,135	0	0
Whittaker Bros.	7,000	0	0
Padbury & Sons	6,987	0	0
Barry	6,893	0	0
Lyons	6,584	0	0
Barton	6,530	0	0
Creaser	6,495	0	0
Simpson	6,336	0	0
Dennison	6,250	0	0
Bowman	6,220	0	0
Bingham	6,177	0	0
Clark	6,173	0	0
Kilvington	6,070	0	0
Keswick & Sons (accepted)	6,015	0	0
Boulton	5,950	0	0!

For new shop-front, for Mr. J. Collier, at Chepstow-road, Newport, Monmouthshire. Mr. H. A. Goodman, architect:—

Jones & Son	£173	9	0
Morgan	170	0	0
Moulton & Brownscombe (accepted)	163	10	0

For the erection of new shop on forecourt, with rooms over, and additions at rear, Nos. 186 and 188, Southwark Park-road, Bermondsey, for Mr. E. T. Swales. Mr. E. Crosse, architect:—

White (accepted)	£350	0	0

For sundry works required to be done in fitting up Dungannon Hall, Knightsbridge, for the United Service Provision Market Company (Limited). Mr. Edward Witts, architect. Quantities not supplied:—

Knight & Richardson	£1,146	0	0!
French	710	0	0
Sawyer	683	0	0
Spencer & Co.	633	0	0
Bradley	628	0	0
Evans	599	0	0
Cass & Belldon	565	0	0
Augood	530	0	0!

TO CORRESPONDENTS.

"Mysteries of Figures" (a pile of letters received on this subject).—"Bricks" (the terms are too open to constitute a contract).—E. F. A. (if communication be sent, it shall have attention).—W. P. (next week).—W. P. G. (next week).—G. G. (next week).—B. A. (received).—H. P.—C. S. B.—J. & T. T.—W. H.—M & C.—J. S. C.—C. B.—S. J. D.—B. & S.—P. & P.—C. S. B.—J. S.—"Wood Brick."—J. R.—W. A. S.—M. Y.—T. B.—T. E. P.—J. W. W.—C. O & Co.—B. T. B.—P. H.—Prof. V.—J. C. M.—H. H.—H. L.—J. & A. B.—C. R. B.—J. D.—E. G.—"Handbuch der Architektur."—J. T. C.—W. B.—J. G. H.—A. S. J.—S. & Co.—H. L. V.—W. G.—H. J. I.—J. W.—S. & C.—S. Bros. & Co.—A Competitor.—C. F. H.—C. O.—H. W.—W. B.—J. C.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

SPECIAL NOTICE.

Christmas Week.—*The* Builder *for the week ending December 25th will be published on* **Thursday, 23rd** *inst., at the usual hour.*

Advertisements for insertion in that issue must therefore reach the Office before Three o'clock P.M. *on* **Wednesday, 22nd** *inst.*

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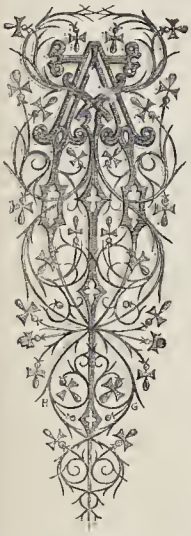
The Builder.

VOL. XXXIX. No. 1977. SATURDAY, DECEMBER 25, 1880.

ILLUSTRATIONS.

CONTENTS.

Roman Building in England and in Italy.



AN interesting description of the masonry of the portion of Roman wall lately discovered in the excavation for the Fenchurch-street Railway Station has been sent to the daily papers by the engineer of the Great Eastern Railway. The top of the portion discovered was about 9 ft. below the surface, and the bottom 9 ft. lower, giving a total of 18 ft., which very fairly corresponds to what we have before had occasion to mention as a rough scale for the accumulation of *débris* on town-sites, of about 1 ft. per hundred years. There are, however, several particulars of an unusually suggestive nature with regard to this wall. We need only slightly refer to its ponderous strength,—9 ft. in thickness at its foundations,—a strength which, before the invention of gunpowder, was enough to guarantee a long resistance to even a pertinacious attack.

But it was not on mass alone that the Roman builder depended for security. When we consider the details of the present portion of his structure, we shall see how much thought has been given to the production of stable and durable work. Of the character of the cement used we shall have a word or two to say, only now remarking that after a lapse of more than 1500 years the solidity of the work is such as to render its demolition,—even when attempted course by course,—a very serious affair. The courses of wall are, in the main, 6 in. courses of random rubble, in limestone and mortar. But the thickening of the wall, not being effected by batter, but by steps, involved the introduction of a material that would afford a more level surface than rubble for the offsets,—if we rightly understand Mr. Langley's expression, "projecting three inches." This material is afforded by what the account calls tiles, but which are really the Roman bricks, frequently found in ancient work in this country, and made and used to this day in Italy. These bricks are 17 in. long, 12 in. broad, and 1½ in. thick.

There can be no doubt that the Roman bricks were introduced in order to form plinths or level offsets, as three offsets on each side of the wall are thus finished. The value of the long flat form for bond is also to be remarked. The two upper layers, of three courses each, extended through the wall. The lowest layer, 18 in. above the foundation, was probably not far from the level of the soil. This course only extended 18 in. into the wall; the rubble being built on two layers of blocks of stone, each 9 in. deep, and about 2 ft. square. It will be very interesting to ascertain from what quarries the Romans brought the limestone to build the wall of London; and Mr. Langley will do good service to archæology, as well as to the kindred professions of the architect and of the engineer, if he will obtain an accurate analysis of the stone found, and aid in determining whence it was brought.

Under the stonework of the wall was a bed, composed of six layers of flint and clay, 2 ft. 6 in. deep. Whatever was the level of the soil, this, no doubt, must have been a sunk and buried foundation. There occurs a very remarkable parallel to the mode of preparing the foundation of the second city built on the site of Novum Ilium (*ante*, p. 663), in which cakes of clay were used as a sort of packing for the foundations. Between each course of flint in the London wall was a bed of clay about 1½ in. thick. This structure was carried down 3 ft. into a solid bed of gravel. It would seem as if the ancient builder was of opinion that, when protected from atmospheric effect, clay was reliable as a building material, and the existence of the wall confirms the truth of this opinion.

The Roman bricks are bright red, well burnt, and retain their form and sharp arrises. About the year 1844, during the construction of the railway from Gravesend to Rochester, specimens of Roman pottery were discovered, in which the bright red colour, and smooth, sharp surface, were like those of Samian ware. But the simplicity in form of some of the articles was such as to render it highly improbable that they had been imported. Like the bricks, they must, we should conceive, have been British-made. One of the Gravesend vessels, more like the saucer of a garden-pot than anything else, but smooth and bright, had the word GRACISCE on it in raised characters from an indented stamp. The Society of Antiquaries have not as yet explained this word. It seems to indicate the existence of some Roman earthenware manufactory in the valley of the Thames; and the red bricks in London wall seem to us to tell the same tale.

We now come to the question of the mortar. And here we would ask our readers to compare the perfect petrifaction of the lime used in the old Roman work in this country with the crumbling condition of the mortar in many of the ruins of 300 or 400 years later date. Who has not been struck with this in examining such a ruin as Kenilworth, or in making his way up the turret staircase of some long-deserted keep? If we compare the Roman mortar of the third or fourth century with the London mortar of to-day, what is the result? The architect shakes his head, but is unable to repress a smile at the question. "Yes," he says, "but look at the age of the one." Is that a satisfactory reply? We at once admit that a certain time is assignable during which well-prepared mortar gradually becomes more and more solid, more and more, to repeat the word purposely before used, petrified; but we do not think that, when a certain time has gone by, the process continues. Between a house of six weeks old and one of six years every one can perceive the difference. Go back to sixty years and you may, perhaps, say the same. From sixty to 600 we are not prepared to say what takes place. But as between, let us say 1,200 and 1,600 years, we do not think that at all events any solidifying process goes on. Things being alike,—that is to say, the mortar being as well made by the castle-builders of the twelfth or fourteenth century as by the wallers of the third or fourth century, we think that any difference in solidity could not be expected to be in favour of the latter.

We conclude, then, that the builders of the Roman wall of London made use of British materials, to which they applied the patient forethought and thorough integrity of execution that characterise Roman work. They dug the clay of the valley of the Thames, and instead of moulding it into thick blocks hard to bake, and next to impossible to bake thoroughly through, they moulded it into flat 1½ in. plates, on which the vitrifying process could have full effect, and which are almost, if not quite, as durable as firebrick. As to brick, then, there is no doubt. But how about the mortar? As to that, also, we have ourselves no difficulty. The Romans used British lime, whether burnt from the chalk from Gravesend or from some other and harder stone it is for the chemist to tell us; but they made it into mortar in the Roman method. What is that? a reader may ask. We have, we think, before now, mentioned in these columns what it was; but, if so, it may well bear to be repeated. It was the diametric opposite of the present English method. There are many builders and persons conversant with public works who can remember the immense care which Mr. Brunel bestowed upon his specifications, and the elaborate system of inspection by which he effected the practical application of his rules. No one, as far as our experience goes, in modern times, so laboured to secure the greatest excellence of work. It fact, it is well known that what Mr. Brunel called rubble would be called ashlar by some of his contemporaries, and that the rigidity with which his orders were carried out made it by 10 per cent. or 20 per cent. more costly to execute his designs than those of some of his brethren. Mortar, of course, exercised much of his care, and the mortar that he used was mixed hot from slaking the lime. If any remained to the next day, it was to be thrown away. Such was the specification; and although that was an extreme case, we apprehend that nine

builders out of ten would say, if it erred at all, it erred on the right side.

In Italy an opposite view is taken, and an opposite method is adopted. The first practical preparation for building in that country is to dig a large oblong square pit, into which the lime is thrown when burnt, and covered with water. It is thought desirable to throw in at once all the lime that will be required for the building, and the longer it is before it is used the better it is considered to be. It forms a dense paste, which is taken out with a spade and mixed with sand or pozzuolana as required. It is usual to keep it moist, but we have never heard of or seen any thrown aside for any cause at all. The magnificent character of the work done with this mortar is well known. The Italians of many districts are born masons. Where we should call in the carpenter, and rig up a shore, a centre, or a set of props, the Italian builder runs up a temporary wall. He saves the cost of wood, for he can use the stone over again; and his temporary work, if required, will last almost as long as his permanent work. In the cases, which are far from uncommon, of damage to building from earthquake, the wonderful celerity with which they are repaired is quite a phenomenon. Again, many of the Italian roofs are made of a species of mortar, a mixture of lime and clay, beaten for a week or ten days incessantly with clubs or mallets. The surface is quite water-tight, a condition by no means to be obtained by English mortar. Again, for plasters of all kinds, down to the smooth surface which lends itself to the rapid brush of the fresco-painter, the excellence of the Italian lime, notwithstanding the wide geological range from which the limestone is taken, is something that is unattainable in England. It is all very well to say that the genius of the English school does not tend to work in fresco; there is something more than that. The English artist has not the opportunity of exercising himself by that most artistic use of his implements.

We recently saw a very remarkable illustration of the difference effected in the same material, and that, too, a cement, by the mode of treatment. We know an artist of rare patience and skill in the restoration of broken china. We know of a dragon vase, once fractured into twenty-five pieces, and of a china plate, shivered into nearly forty bits, that are now on their owner's shelves, without any visible mark of a crack. The cement that was used is that known as the "Mend-all cement"; but, of course, the skill goes for much more than the choice of material.

The artist in question, however, has long been careful to procure the smallest possible bottles of the cement; and that for the following reason:—The material is prepared for use by dipping the bottle containing it in hot water. It then becomes fluid, and is easily applied to the edges to be joined, the fragments being themselves kept in hot water, and taken out and wiped before being cemented and put into place. If a large number of mends are made, and the whole affair gets out of shape,—which it is very difficult in that case to avoid,—the mended article is again put in very hot water, when it comes to pieces at once. Each piece has to be carefully wiped and re-cemented.

The objection to large bottles of cement is this,—hitherto a perfectly empirical one:—After the cement has been liquified and cooled a certain number of times, it becomes refractory. It no longer liquifies easily, if at all. It makes bad mends, or is altogether useless.

To this long-observed fact, a second observation has been added, within the last few days, which is highly significant. The bell of a "Queen's" reading-lamp, which had a large piece broken out of it some years ago, was mended by the artist in question, and has been in nightly use ever since. After the fashion of mended things, this glass shade has outlived its more robust brothers. But the line of junction was visible, and the repairer thought that it would be an improvement to wash the bell, remove the old cement, and re-cement it. The bell, however, thought otherwise. To the surprise of the operator it laughed at the hottest water, and absolutely refused to allow the crack to re-open, or the cement in any way to soften or dissolve.

This phenomenon is worthy of reflection. It is impossible to disconnect it from the behaviour of the cement in the bottle. The shade of a queen's lamp does not get so hot as to burn one's fingers, but it gets warm. The mended individual has thus been warmed and allowed to cool at least a thousand times. At what stage in the process the chemical change was complete it is impossible to tell. Very likely in twenty or thirty days. But slowly and gradually the cement has so parted with some element of solution as to vitrify, or, at all events, to unite itself with the glass in a union indissoluble by the agency of hot water, the original solvent of the preparation.

We cannot bake walls, unless it be by selecting very hot weather for their construction. On the other hand, we can avoid that soaking of the bricks, if rain happen to come on during the process of building, of which no notice is now usually taken. We know of one costly building, of which the colour is permanently and entirely ruined by this neglect. Our object is to induce the Royal Institute of British Architects, the Institution of Civil Engineers, or others whom it may concern, to investigate this important fact of the behaviour of lime or other cement. What is the effect of time on their cohesive force? Should time be allowed to elapse before the use, as is the case in Italy? Should it be combined with repeated rise and fall of temperature, as in the case of the Mond-all cement and of the lamp-glass that we have cited? Will an exposure of a certain duration to a steady heat have the same effect? And, if so, what heat, and for how long applied? These are questions of primary interest to the architect. Their solution may place a new material within his grasp. He may be enabled to rear those egg-shell domes which the imagination of Bulwer fashioned for the homes of the "Coming Race." We can never tell how far a new idea may carry us. We strongly suspect that the builders of the earliest bridge over the Tiber, or of the walls of Rome,—certainly that the builders of the Roman wall of London,—had a much clearer insight into the relation between the time spent in preparation and the permanent durability of work, than has any writer or lecturer on structures at the present day. We are not now speaking of those "Jerry builders" of whom a contemporary justly observed, *apropos* of this very discovery of a Roman relic, that the Romans would have thrown them from the Tarpeian rock. We are speaking of thoughtful and experienced men. We are quite sure that Isambard Kingdom Brunel, were he now alive, would respond to our words by an elaborate series of experiments; and that if the result confirmed the practice of the Italian builder, he would then and there have re-drawn his specifications. We know not on whom now to place confidence for an equally earnest and practical desire to reply to such a question, but we trust that each and all of our friends who have the opportunity will do their best to aid in the formulation of the answer.

THE ARCHITECTURAL PROFESSION IN ENGLAND AND GERMANY.

In the Prussian Parliament, about a year ago, Dr. Reichensperger made an attack on the system of education and State connexions of the architectural profession in Germany. There arose in consequence in the German press a controversy, to which we referred at length in the columns of the *Builder* at the time. Up to the present day the dispute has by no means been settled. On the contrary, it has broken out again with renewed vigour. The *Cologne Gazette* is again taking a leading part in the paper war, and has just published a general review of the present state of the question. While Dr. Reichensperger condemns the German practice, and holds up England as a model for Germany in regard to the education of architects and builders and their relations to the State, the *Cologne Gazette* contends that Germany has little or nothing to learn in the matter from this country. "In our articles on the subject," says the paper in question, "we adduced evidence based on the judgments of Englishmen that the system prevailing in their country in regard to the education of the building 'professions has for many years been found defective and unsatisfactory. The most competent authorities in the professional societies and journals of England have declared in favour of a change in imitation of foreign models. A continuance of the present state of things, it is considered, seriously threatens the reputation of the profession in England, and endangers the industrial interests of the country. We concluded that Dr. Reichensperger had spoken in the House of Deputies about things of which he was ignorant."

In a pamphlet he has just published under the title of "Parliamentary Utterances on Art and Art Industry, together with Comments thereupon," by Dr. A. Reichensperger, the author takes up his old position and defends it against the *Cologne Gazette*. In this publication he reproduces his speech of December 6th last year (filling five pages) and accompanies it with "glosses" or comments (filling twenty-six pages) in which he settles accounts with his opponents. His remarks are mainly devoted to former criticisms of the *Gazette* upon his theories. Dr. Reichensperger predicted that the Rhenish paper would ignore his latest utterances, but, so far from doing so, the *Gazette* enters into an examination of them at great length. The Prussian Deputy is accused of great ignorance of the subject on which he presumes to lay down the law. He is charged with dragging everything into the discussion,—the system of the technical high schools, the connexions of architects and builders with the State, their various official titles, the procedure in contracts and tenders, the preparation of estimates of cost, the practical erection of buildings, the correction and improvement of the navigation of rivers, the construction of bridges,—in fact, everything, "and something further besides." The way in which he deals with these matters is, according to his critic, calculated only to show his want of thorough acquaintance with his subject.

While Herr Reichensperger charges his Cologne critic with heaping on him "contemptible suspicions and coarse insults," the latter replies that the Doctor is angry at having his ignorance exposed, and the latter is charged with having, in his pamphlet, entirely failed to meet the arguments brought against him. The essence of the charge against the Deputy is, that he urges the Prussian Parliament to adopt certain English practices which are anything but worthy of recommendation. He professes to have thoroughly studied the position of architecture, architects, and builders in England, and states that the extensive apparatus of professional officials, such as exists in Prussia, is scarcely to be found in Britain. There the system of studying privately under the masters of the profession is in vogue, and this he recommends in preference to the system of state instruction followed in Germany. There are no State examinations as in the latter country. There is no great architectural institution similar to the "Bauakademie" in Berlin. And yet, urges Dr. Reichensperger, Germans are beaten by Englishmen in all departments of the field of architecture. It would, therefore, he contended, be worth while that the Prussian Government should cause a thorough inquiry to be made into the English system. He thought the result would be to convince Germans that they might shut up their state-endowed institutions, like the "Bauakademie," and throw the keys into the Spree.

With reference to these opinions of Dr. Reichensperger, the Cologne critic writes:—"Such a laudation of a system which in England itself has for years been generally acknowledged to be defective,—acknowledged, indeed, to be a *misère*,—a system which the most eminent authorities are most energetically endeavouring to improve, bears witness to a want of knowledge of the subject that is almost inexcusable, especially when the place where those opinions are delivered is taken into consideration. They are the less to be excused, as they will serve as a foil to other attacks on our own [Prussian] system, and our own architects, and their achievements."

The writer refers to a former article in the *Cologne Gazette* for an unbiassed description of the real state of things in England, and adds that his earlier remarks have been discussed by the English professional organs in a manner which deserves his most grateful acknowledgment. The most widely-circulated English technical journals had given their readers a *resumé* of his criticism; as, for instance, the *Builder* (March 13), &c., and afterwards some American organs. The English papers had understood how to go to the kernel of the matter, as the titles they had prefixed to their articles showed ("Technical Education of Architects in England and Germany," &c.). These articles, the German writer says, did not charge him with making any mistake, nor did they dispute his assertions respecting the English system. On the contrary, they so far agree with him that the system here required a thoroughgoing improvement. From the perception of the deficiencies of the

present system, the English will proceed to an attempt to remedy them. This, in the writer's opinion, is guaranteed by that most laudable absence of prejudice with which they have accepted the comments of foreign critics.

An interesting contribution to this question, continues the writer, is presented in the recent speech of the president of the largest English architectural association, the Royal Institute of British Architects. We have formerly explained that, in England, architecture has no connexion with the Government. State institutions, like our high schools for the education of technical men, do not there exist. On the other hand, the great technical societies step into the breach, and devote their energies to providing some portions of that higher instruction which, in other countries where self-government is less developed, it falls to the State to supply. Thus, the great London society above mentioned does what is in its power to make up for the deficiencies of the English system by providing a preparatory course of instruction for young architects after the Continental method.

How greatly assistance of this kind is needed appears from a remark of the president, Mr. J. Whichcord, in an address published in December last. He referred to a question mooted at the Institute in 1874, in a discussion respecting the defective preliminary training of English architects, when it was asked, "What measures should be taken by the Institute or otherwise in order to make certain that the young men who call themselves architects shall learn something more of architecture than they are in the habit of acquiring in the offices where they sit for a long time copying plans and drawings?" The reply to this question amounts to a strong condemnation of that English system of masters' schools so highly praised by Deputy Reichensperger. It will shortly be seen by the inauguration of a new practice in England. It is intended of institute that very system of examinations which Dr. Reichensperger so greatly despises. It has been resolved that from May, 1882, all students of architecture shall, before being admitted into the Institute, undergo an examination, the nature and extent of which the committee will prescribe.

In speaking of the position of architecture in England, we must, to our regret, once more refer to the results of the competition which took place in 1872 for plans for a new building for the German Parliament. In opposition to Dr. Reichensperger's statement, that "in every direction we (Germany) are beaten by Englishmen," we adduced this international competition to prove that in point of genuine and intrinsic worth German architecture was by no means inferior; and we showed that the English plan which gained the second prize showed various important defects. Herr Reichensperger is highly indignant at our remarks. He charges us not only with being untrustworthy in our facts, but also with casting "mean suspicions and contempt on the decision of the jury," and, indeed, with heaping coarse abuse on the design in question and on its authors. We confess that we are to some extent disconcerted at this want of caution on the part of Herr Reichensperger. We had given him credit for greater capacity for understanding architectural designs than he here seems to show, as the obvious defects of the plan in question are manifest to any non-professional observer. On the other hand, it is impossible to understand how a gentleman who himself belonged to the jury should know so little of the feeling in professional circles, and of their criticism upon the design, that he thinks our remarks are singular. We should hardly have trusted ourselves to utter such a judgment if we had been alone. But it is as we said. The award of a prize to the English project was publicly spoken of in professional circles as scandalous, but for this hard judgment substantial reasons were adduced. The *Deutsche Bau-Zeitung* made itself the vehicle for the prevailing feeling, and expressed itself to the following effect:—

"That the production of the two English architects, in regard to the first and most indispensable basis of every architectonic work,—the satisfaction of the practical requirements of the design,—leaves almost everything to be desired will have become clear to our readers even after a superficial study of the plan, and will have filled them with increasing astonishment. We do not say that all the apartments demanded in the programme are not there, with the dimensions required. But in what order are they arranged? The committee and sectional rooms, and the business apartments for the Federal Council, are scattered all about the house. The president's dwelling is distributed through four stories,—that of the director of the bureau through three. The refreshment department is in a story below the hall of session. The festival saloon and the offices lie isolated in the projecting wings, and are difficult of access from the rest of the building. Not a few of the corridors are dark or most scantily lighted. With still greater astonishment do we contemplate the way in which the plan fulfils the requirements of such a building, considered as a monumental edifice combining dignity with beauty. What is to be said when we find the transverse axis of the cupola in the front hall, which has required a gigantic expenditure of expedients to give it prominence in the external architecture, runs dead in the interior,—that is to say, debouches on the urinals? All the power of the architects, their entire thought and endeavour, have been exclusively directed to give external effect to their work,—to make it look as splendid and rich as possible; and the artistic feeling of us Germans turns away offended from so thoroughly hollow an effect, which, instead of suggesting sound thoughts, brings only a deluge of dazzling phrases, concealing behind them the most extreme poverty. If we may briefly state our judgment on the design, it is, that as a study in the decorative adaptation of the architectonic forms of the Transition style, and as a picturesque production, it is not uninteresting; but, on the other hand, it does not contribute a single element towards a real solution of the task,—the designing of a German Imperial House of Parliament."

So far the *Deutsche Bau-Zeitung*. The Cologne critic, in continuation, says that many persons wished to judge the plan less harshly, but they were influenced by the circumstance that the six architects who were on the jury participated in making the award, and concluded that they acquiesced in it as an act of international courtesy (!). The criticism above quoted, however, was the unvarnished opinion of German professional circles, and the journal in question, in afterwards discussing the competition, was able to state that it had heard not a single voice that had ventured to defend the award of a prize to this design. This has been left for Deputy Reichensperger to utter, and we beg him to inquire in professional circles and try to find a single professional man who would defend this defective project. Herr Reichensperger, in one of his glossee, says, "In my opinion it does not require a well-schooled so-called scientific education, in order to distinguish genuine splendour from a hypocritical tinsel gaudiness, and to judge whether a church or a public building answers its purpose, or whether a dwelling-house affords its occupiers, down to the servants, light, air, and as much comfort as possible." In the above case, however, he gives a very weak proof of the correctness of this "opinion" of his, and shows very clearly what happens without a "well-schooled education." He perhaps understands now why we have been silent about the names of the English authors of the plan, though, of course, as a purely matter-of-fact discussion about the superiority of English architects over German, names are altogether unimportant. Deputy Reichensperger has been decidedly unfortunate in his examples taken from England, and only shows the sort of thoroughness with which he has studied the state of things in that country. There is certainly no country in the world which sends so many technically-trained professional men, old and young, abroad as Germany, for the purpose of studying foreign productions; and every year a large number of such persons in pursuit of knowledge go to England,—the best proof of the esteem in which Germany holds the sister nation across the Channel in regard to certain departments of the technical arts. On the other hand, England is one of the last countries which is visited, whether by Germans or by other nations, for the purpose of studying architecture. Still less do people go there to learn what arrangements are deserving of imitation as models in reference to a preparatory training for this profession. In these two respects, however, the excellence of its architectural creations and the system of preparatory training for architects, Herr Reichensperger has unhesitatingly awarded the palm to England.

In conclusion, in order to obviate misconceptions, we wish to caution the reader against supposing that we considered our native system of architectural education, professional organisation, and productions as being all perfection. No one more than the professional man himself is convinced that in all these respects we are open to improvement, and that we ought to work hard to do away with the defects of the forced economy of past times, and to alter and perfect the organisations hitherto existing. This is not the place to pursue the present argument, or to suggest new ideas. We have here only to protest against the manner in which Herr Reichensperger criticises the architecture and architects of Germany, especially their relations to Government. His representations are calculated, unjustly, to spread the notion that there is "something rotten in the State" in regard to the profession in question. That against which we most particularly protest is his attempt to discredit the academical training of German architects and his advice "to throw the key of the Banakademie into the Spree." One who is capable of giving such advice ought to think ten times before venturing to utter a word about technical matters in a public assembly. For nothing evidences ignorance of the nature of modern technical art so clearly as such a want of appreciation of the daily increasing importance of science in every department of the arts.

SOME BILLS FOR THE WORKS AT BLENHEIM.

WE have printed the following bills for works done for the Duke of Marlborough at Blenheim Castle in the years 1709-10, under the direction of the architect, Sir John Vanbrugh, from the originals now in the possession of Mr. Stephen I. Tucker, Somerset Herald. Four of them are signed by Vanbrugh and receipted; the fifth is not signed by him, but is endorsed paid at London. In the third bill forty cards of kid's hair are priced at 6d. per card, but moneyed out as if at 6½d., viz., *li.* 1s. 8d. And in the last of the bills given it will be observed that a rod of brick work is described as containing 272 ft. *cube*. These bills will doubtless be interesting to some of our readers, as affording means of comparison in respect of prices. The troubles which befell Vanbrugh during the building of Blenheim through the inconsistency of Parliament, and the evil spirit of Sarah, Duchess of Marlborough, are well known. He says, in a letter to Jacob Tonson,—"I have the misfortune of losing, for I now see little hopes of ever getting it, near 2,000*l.*, due to me for many years' plague and trouble at Blenheim, which that *wicked woman* of Marlborough is so far from paying me, that the Duke, being sued by some of the workmen for work done there, she has tried to turn the due to them upon me, for which I think she ought to be hanged." The strange history of the building of Blenheim is told in D'Israeli's "Curiosities of Literature." A reason for Somerset Herald's regard for Vanbrugh's autograph may be found in the fact that he for a time held the office of Clarencieux King of Arms, an appointment which enabled Swift to insinuate that Vanbrugh's new title enabled him to "build houses" in more ways than one. Vanbrugh was always well abused, and Pope's spite has done as much to keep his name in memory as Blenheim or Castle Howard. He was a man of original genius, and even the bitter little poet of Twickenham admitted that he was "a man of wit and man of honour."

May, 1709.

To Robert Wetherilt, Plaisterer, for work done at the Maunor House in Woodstock park, for his Grace the Duke of Marlborough:—

	£.	s.	d.
ffor 401¼ yds. of Plain Ceiling.....at 6d. ℔ yd.	10	0	10
ffor 900 yds. of Rendering walls....at 4d. ℔ yd.	15	0	0
ffor 658 foot 7 in. Run of Small Molding 6 in. deep.....at 9d. ℔ ft. run	24	13	11
ffor 83 foot Run of Small Molding, 1½ in. deep .....at 2½d. ℔ ft. run	0	13	1
	£50	7	10

May, 1709.

To Mr Thos Joseph for Oak Timber, bought of him at New Ditch Quarter, in banger Walk, in Whittlewood forrest, Northampton Shire, for his Grace the Duke of Marlborough use at Blenheim Castle, Woodstock Parke:—

foot cubic	£.	s.	d.
For 570 of Oak Timber at 8d. per foot cubic.....	19	0	0

Measured and cast up ℔

This Bill according to ye prise above agreed on amounts to the sum of Nineteen Pounds.

Allow'd ℔ me, J. VANBRUGH.

Sept. 15th, 1709. Rec'd. of Mr. Henry Joynes the sum of Nineteen Pounds in full of the above bill.
£19 0 0 ℔ me, Thomas Joseph.

June, 1709.

To Roh[t] Wetherilt, Plaister[r], for Daye Worke ℔form'd att Blenheim Castle; in Stoping of windows, after y[e] Masons, in Atick Story, in Kitchine wing; and Botome after y[e] floors were layd there; in Stoping of y[e] Breatchee in Attick Story, in y[e] Maine Howse, y[t] y[e] Joyners made in puting up their Wainscott; for Takeing Downe y[e] Lathing of y[e] ont Roome next to y[e] Servante Hall; and two Groins in y[e] same paeeage; and for Stoping and Mending eorveral Johbe at y[e] High Lodge, &c., for y[e] Service of his Grace y[e] Duke of Marlhorough, in Woodstock Park:—

	£.	s.	d.
ffor A plaisterer 49 Days at 3s. ℔ Diem	07	07	00
ffor A Labourr 26½ Days at 2s. ℔ do.	02	13	00
ffor 40 Cards of Kid's Hare at 6d. ℔ Card	01	01	08
ffor 8 thous[d] of Lath Nails at 18d. ℔ thous[d]...	00	12	00
	£11	13	08

The Ahove-mention'd Acc[t] is certifid ℔ y[e] Humble Serv[t], W. Jeffereon.
Allowed ℔ J. Vanbrugh.

Aug. 10, 1710. Recd. of Mr. Henry Joynes the sum of Eleven Pound Thirteen Shillings and Eight Pence in full of y[e] above bill.
£11 13 8 ℔ me Robt. Wetherilt.

Jany. 24, 1709.

Measur'd and cast up ℔ Henry Joynes.
Tilleman Bobart.

This Bill according to the sev[ll] prises agreed on ℔ contr. amounts to y[e] sum of fifty pound seven shillings and ten pence.
Allow'd ℔ J. Vanbrugh.
Henry Joynes.
Tille. Bobart.

July 29, 1710. Rec'd of Mr. Henry Joynes the sum of Fifty Pounds Seaven Shillings and Ten Pence for full of my above bill.
£50 7 10 I say rec'd ℔ me, Robt. Wetherilt.

July, 1709.

To Edw[d] Strong, sen[r] and Edw[d] Strong, jun[r] for Days works done att Blenheim Castle in Woodetock parke for his Grace y[e] Duke of Marlhorough:—

In cutting way for port[ld] steps and halfpaces in y[e] square staircase, N. Quadrant, from y[e] Celler etory up to y[e] firet floor, wedging in y[e] e[d] steps with Iron wedgee, also plngs of Iron Lett into y[e] Joynte of y[e] halfpacee and rnnn with Lead aleo Cutting with Iron drille and toolee made for that purpose holee in ends of steps as at A [section drawn] to fix y[e] iron work in in Lady dutchee back stayre and East ouall stayre from y[e] Celler floor up to y[e] stayrs that lande into y[e] towers stamping y[e] Lead into y[e] holee to make fast y[e] Iron work and triming of it of smooth with y[e] steps, &c.

Masons att 2s. 4d. ℔ diem.

	July y[e] 11	18	25	Aug[t] 1[st]	
Edw[d] Carver...	//////	//////	//////	//////	2 16 0
Jno. Carver ...	//////	//////	//////	//////	2 16 0
Jno. Ogle	//////	//////	//////	//////	2 16 0
Geo. Asley ...	//////	//////	—	—	1 08 0

	Aug[t] 8	15	22	29	
Edw[d] Carver...	//////	//////	//////	//////	2 16 0
Jno. Carver ...	//////	//////	//////	//////	2 16 0
Jno. Ogle	//////	//////	//////	//////	2 16 0
Geo. Ashley ...	//////	//////	//////	//////	2 16 0

	Sep. y[e] 5	12	19	26	
Edw[d] Carver...	//////	//////	//////	//////	2 16 0
Jno. Ogley.....	//////	//////	///	—	1 15 0

	Octor y[e] 3[d]	10	17	24	
Edw[d] Carver...	//////	//////	//////	//////	2 16 0
Jno. Ogle	//////	//////	//////	//////	2 16 0
					£31 03 0

This acc[t] was Examin'd that y[e] said Worke was done at Blenheim. Henry Joynes.
Tille. Bobart.
Allowd ℔ J. Vanbrugh.

Jany. 13[th], 171½. Recd of Mr. Henry Joynes the sum of thirty one pound three shillings In full of y[e] above bill for Mr. Edw. Strong.
£31 3 0 ℔ me Chr. Cass.

July, 1710.

To M[r] Tho[s] Churchill & M[r] Rich[d] Stacy, Bricklay[r] Worke done by them at Blenheim Castle, In Woodstock Parke, for y[e] Service of his Grace y[e] Duke of Marlhorough:—

A Remaining part of y[e] Back wall of the Greenhouse; the upper part of sev[ll] party Walls in y[e] Attick Storry next the Roofe in y[e] Grand Pile, and sev[ll] doreways etop'd up these and partioning filld up w[th] brick there, and in y[e] Attick Storry over y[e] North East Stable in the West Wing of Offices, &c., and Vaulting at y[e] foot of y[e] Staircases in y[e] East Wing of Offices, &c., and Vaulting in y[e] South and North Corridors upon Grand floor in y[e] Grand Pile:—

	£.	s.	d.
ffor 53¾ rods 63 foot of Brickworke, estimating 272 ft. cnb. to a Rod, at 25s. ℔ Rod	67	9	5
ffor 7½ rods 62 foot of ditto in Vaultings, at 28s. ℔ Rod	10	16	5
ffor 581 yds. 1 ft. of Partioning filld up with brick at 6d. ℔ yd. sup[ll]	14	0	6
ffor 210 foot 0 in. run of Splays, at 1½d. ℔ foot Run	1	6	3
ffor 50 foot 0 in. Run of Groining, at 4d. ℔ foot Run	0	16	8
	£94	9	3

Measur[d] and cast up ℔

Thie Bill according to y[e] sev[ll] prises Allow'd & agreed on ℔ Contr amounts to y[e] sum of Ninty four pounde nine shillings and three pence.

Allow'd ℔

THE ARCHITECTURE OF MADEIRA.

It would hardly be eupposed that anything architecturally interesting is to he found on an Atlantic ieland 380 milee from the nearest mainland, Mogador, and more than 500 miles from St. Vincent, tho neareet architecturally civilised coaet. The island, in trnth, owee little to man's interference. Ite interest centres in the eublime grandenr of the central axis and the northern side of the ieland, which is intersected hy deep cañon-like gorgee, whose dark walls riee almost vertically for thousands of feet. All ie massive hasalt, built up of euccessive overflowe from a mighty central crater, so new geologically that the plants here and there enclosed and petrified are of existing island speciee, and the only record of changed conditione they anywhere entomh is a tiny coral reef. Alternating with the lava flows are layers and layers of earth hurned to a bright cherry red, and sheete of pumice-stone and ash. The possession of every ledge and every fissure ie disputed hy numerous kinds of laurel, giant trees which "ripen, fall, and cease."

Ferne clothe the moist ravinee. Woodwardia fronds cut to ehade my hammook measnred 9ft., and in remote glene the hright feathery fronde of Dicksonia, 12 ft. long, curve to the grouud, and delicately translucent ferne, elsewhere rare, twine round every stump and rock. The hack-bone of the ieland riees 6,500 ft. in wildly jagged peaks, in climbing which the sea horizon risee with you as it does in Teneriffe, taking on the appearance of a high hlne wall, and melting into sky a hundred milee away, while at other timee a white hillowy expanse of cloud stretchee beneath you.

The island was discovered in the reign of Edward III. The etory ie a romantic one, and often told, discredited, and lastly proved heyond all doubt. Lost eight of, it was re-discovered in 1414 again through accident, hy Zarco, and Trietam Van Teixeyra, two squiree to Prince Henry, the navigator. The spiritualities of the island were made over in perpetuity to the Order of Christ hy Don John I., and the papal confirmation granted in 1442. The carliest existing edifice, once a small chapel, now a coal-store on the western ontskirte of Funchal, is low, with sqnare windowe, and none hut the plainest buildings appear to have heen erected until almost the close of the fifteenth century.

Funchal, the chief town, reminds one in its situation, of Naples. There ie no harhour; vessels lying in the roadetead simply trust that the prevailing northerly winde will continne to hlow. The hills elope rapidly, and are studded with villas to a height of 2,000 ft., where these and vineyards give place to pine woods. In 1508 it was made a city, posseesing equal privilegee with Lishon; in 1514 a bishopric, and in 1539 an archhishoprio. The cathedral, commenced in 1485, and opened in 1514 under the auspices of a Captain-General surnamed "O Magnifico," is anything hnt of archiepiecopal dignity. A plain Italian Gothic huilding, with square whitened tower and glazed-tile epire, is only curious as heing Gothio in form with no trace of Gothic eentiment. Moorish influence ie apparent in the capitals; and the juniper-wood roof, as in other churchee in Madeira of the same period, is an interlaced, purely Moorish design. The altars and their furniture are unusually tawdry, and everything is meretricions except a finely-executed, hnt poorly-designed, wrought-iron grille. The more ancient eastern part of the city has twice heen almost swept away hy floods, hut a good example of the ancient architecture is still standing close to the western gate. A courtyard is overlooked hy windows of two lights, with semicircular heade to each, and divided hy a slender pillar, with foliated capital of peculiar design. The general appearance ie Lombardic, hnt a closer inepection reveals a thoroughly Spanish Renaissance character. At one end is a paradoxical triple-lancet window, like thirteenth-century work; and the ceilings, rafters, &c., are of the same Moorish design as the cathedral, and horrowed apparently from the church of St. Francie d'Assiei. Another house, repnted erroneously to he that of Columbus, has just been removed to make way for a so-called improvement. The windows had the same Lombardic donble-lighte, with the striking peculiarity that the eill, instead of heing level, drops to the centre mullion at an angle of 60°, the mouldinge of the jambs heing continued down the elope and stopping against the hase. Setting back from the front, there is a stone filling-in with a horizontal line continued about a foot above the commencement of the slope. The capital of the centre mullion and the two terminations, for they can scarcely he called caps, to the side-jambs, are sculptured with considerable spirit. The whole appearance is perfectly unique, and there is probahly no similar window on the European continent. The Custom House, almost on the heach, has a vaulted basement with pillars of octagonal plan, and capitale with a quatrefoil leaf on each face, curious as a rough reminiscence of the Spanish late fifteenth-century carving, where capitale are composed of three or four vine-leaves, and depend for their light and shade on the foliations of the leaves. Thece pillars support round arches, while the doorways are pointed. Exteriorly, four large gurgoyles are interesting. These are apparently of lead, and of the seventeenth century, two being grotesque monsters pointing muzzles of cannon; a third, the head and front of a game-cock; and the fourth, a frog-like monster. The most intereeting huilding ie a convent, on high ground, in which is Zarco's tomb. It has the same vaulting and architectectural features as the cathedral; hut the walle are completely lined with Hispano-Moreeque tiles, richly arabeeqned in hlue and orange-yellow. The tomh is a rough sarcophagus huilt into the wall and resting on Lombardic lions, with decipherable legends. The recess is arched and moulded in the Early English style, with Decorated tracery and capitale. The nnne attend mase hehind wronght-iron grilles. The later churches, two of the town gates, and a few pnhlic buildings, are of heavy Spanish-Jesuit style. At Santa Cruz, tho second town in the ieland, the principal square ie entirely surrounded with buildings of the fifteenth century, similar to those described above, and including a cathedral, hoepital, prieon, &c.

The streets in overy town are narrow, and paved with cobbles worn smooth hy sledges and bullock-wagons. The houses are rectangular, more often one-storied than two, hnt frequently carried up three or four additional floore in a square tower, in order to command views over the bay. The material nsed is rnbble, with angles of dressed drab lava, cleanly white-washed or tinted huff or roee, the dressings being painted a different colour or left the natural stone. The windows are fairly large, protected hy green jaloneiee. The roofe, tiled red or bnff, slope from each face at 25°, and project several feet over the streets, the hnff tiles and white mortar in which they are eet forming pretty overhanging cornices, which never seem to soil, and cast an agreeahle shade. The better honees have wrought-iron balconies of excellent workmanship and great diversity of design, and it is lamentahle to notice that these, one of the chief features, are heing replaced to some extent with common cast-iron from England. The basement windows are invariably protected hy maeive grillee, in which the bars are threaded through each other in the old way with as many as 200 interlacings to a moderate-eized window.

Take it altogether, no style could be more suited to the climate and support more effectually the theory of evolution in architecture, for it can olaim to he ae much evolved from the insular and sub-tropical conditions as the zoological featnres undoubtedly are. The dwellings are rendered more pleasing and

characteristic by clumps of banana, occasional date-palms, and trellised vine, and some enclose inner courts full of gardenia, stephanotns, and heavily-scented flowers. Three castles frown over the city, one in its centre, one above it, and one on a rock rising from the bay in front. They have sloping sides, technically known as "battered," pierced all over with mock casemates, and battlemented, and are stagy in appearance, and, of course, utterly useless for defensive purposes.

The commerce and enterprise of the place are English. Every ship in the harbour seems consigned to Blandy Brothers. The wine trade lies almost entirely in the hands of the great house of Cossart, Gordon, & Co., and other almost historic English names. The beautiful and well-kept villas in the outskirts are owned and were built by Englishmen, and the native press laments that the island is not under English rule. The only flourishing Portuguese building, a splendid hospital, and the gift of royalty, is directed by an English gentleman. Purely Portuguese undertakings are often ridiculous failures. A short road from the Custom-house to a small landing-stage, the Pontinha, was breached by the sea, and abandoned before half completed. A huge mill, covering an immense area, with machinery, costing 100,000 dollars, from St. Quentin, of power enough to crush in a week all the sugar-cane grown in the island in a year, has never even been opened. The finest building, a Franciscan Convent full of inlaid marbles, was pulled down, and the tombs of the old families violated, to make way for a Palais de Justice. The foundations were so Titanic that before they rose above the ground the whole available money was absorbed, and the building abandoned. After a long interval, this stony desert of building material and massive walls is to be converted into a botanical garden. As a preliminary, some magnificent palms, previously spared because the finest in the island, were felled. A large Lazaretto, built in separate blocks in a picturesque little bay, has just been condemned on the eve of opening, because too near the town, and the port is still without quarantine accommodation. A water-course pierced for miles through the rock, and found to run uphill, and a sea-wall, knocked down by the military to permit the retreat of troops from the beach in case of invasion, are other monuments of folly. On the other hand, the Government system of irrigation is beyond praise, and has involved in many cases enormously difficult engineering works; while the Portuguese system, which is to return to the island part of the taxation if required for public works, offers a direct premium to the Madeirese to embark upon any work, however unproductive, which will cause their own money to return to their own country. J. Starkie Gardner.

ARCHITECTURE AS INFLUENCED BY CUSTOM.

BY W. PETTIT GRIFFITH, F.S.A.

"From all arts and sciences whatsoever, there are drawn certain principles, rules, or natural conclusions, which if we shall apply ourselves with all care and diligence to examine and make use of, we shall undoubtedly find the benefit of, by the perfect accomplishment of whatsoever we take in hand."—Ferabt.

In treating of architecture, there is an important distinguishing feature much overlooked in the present age. Wren, in the "Parentalia," very pointedly alludes to it; he says that "there are two causes of beauty, natural and customary. Natural is from geometry, consisting in uniformity [that is, equality] and proportion. Customary is begotten by the use of our senses to those objects which are usually pleasing to us for other causes; as familiarity or particular inclination breeds a love to things not in themselves lovely. Here lies the great occasion of errors, here is tried the architect's judgment; but always the true test is natural or geometrical beauty."

It is not surprising that architecture is influenced by custom, as it prevails over everything:—

> "Custom, that does still dispense
> An universal influence;
> And make things right or wrong appear,
> Just as they do her liv'ry wear."

Reynolds observes that the prejudices in favour of the fashions and customs we have been accustomed to, and which are justly called a second nature, make it too often difficult to distinguish that which is natural from that which is the result of education.

In a paper entitled "On the Influence of Fashion in Architecture," read before the Liverpool Architectural Society in 1863,* I directed attention to the styles of architecture as reproduced at various epochs to suit the ever-varying taste of the public; but the object of the present paper is to point out the abuses which have been introduced into regular architecture, sanctioned by custom, although contrary to common sense and the original intentions of the early architects. Fashion in architecture refers to the reuse of existing styles (the idea of a new style having been shipwrecked long ago), and has no bearing upon architecture as perverted by custom. The latter, consequently, is by far the graver question of the two, as the creation of architecture has to be considered and not simply its modern use.

> "Custom, the world's great idol we adore;
> And, knowing this, we seek to know no more.
> What education did at first receive,
> Our ripen'd age confirms us to believe."
> Pomfret.

Although custom often constitutes a moral rule in cases where no legal dictum prevails, it does not always do so. For instance, it was the custom when Classic architecture was the fashion, to denounce the Gothic; hence, in 1724, Tickell, in alluding to Queen's College, Oxford, says:—

> 'Mark that old ruin, Gothic and uncouth,
> Where the Black Edward pass'd his beardless youth.'

Custom has introduced many abuses, contrary to reason and ancient rules, which for years have been rules of architecture, because

> "Some lucky licence answer to the full,
> Th' intent proposed, that licence is a rule."
> Pope.

These abuses should be carefully considered by all who desire to produce correct architecture; the more so, as time cannot render irregularities legitimate, nor can authority justify abuses of taste; for

> "Custom does not reason overrule."
> Rochester.

No errors, however ancient, or however countenanced by long practice, are fit objects of imitation. If rules were laid down for determining with precision what ancient monuments are of the true standard principle of correctness, they would greatly contribute to accelerate the progress of architecture; but, to ascertain such rules would require the qualifications of the philosopher, united with those of the architect. He whose mind is enlightened by these reasoning powers knows how to stamp a just value upon works of real merit, and to reject any excrescence that "old Time," as Milton says, "with his huge drag-net, has conveyed down to us along the stream of ages."

Some of these abuses have been pointed out by Vitruvius, Palladio, Perrault, Chambers, and others. Among them may be named the swelling of columns. Freart blames the practice of making "pillars swell in the middle, as if they were sick of some lympany or dropsy," and he justly remarks that it is contrary to the original and natural type in trees.

A column with straight lines would appear concave to the eye, consequently curved lines are requisite; but whether the curve should have the greatest diameter at the base or at about one-third up the column is a point for consideration. Vitruvius says that it is made in the middle of the column. This is absurd, as he has no authority for it. The curve should start with the greatest diameter at the base, unless there be any truth in the assertion that bodies must diminish as they recede from the eye. In this case, the greatest swell would be a certain distance up the column. Vitruvius perhaps took the idea of fixing the greatest swell in the middle of the column from his composing the Doric column upon the model of a man, the centre of the latter being his navel: of course there is no authority for anything of the kind.

Sculpturing modillions and dentils of pediments perpendicular to the horizon, and not to the slope line of the pediment, is erroneous; but custom has adopted this innovation. So, too, putting modillions on the four sides of a building, and in the horizontal cornice of the pediment; modillions being proper on those sides only where the rafters are set, whose ends they represent, and not in the cornice that runs under the pediment.

Making several breaks in the horizontal entablature or cornice of a pediment.

Breaking entablatures over columns and pilasters, particularly if there do not appear to be the same occasion for it as may be perceived in the triumphal arches at Rome, or other structures of a symbolical description, where the breaking of the entablature indicates the characteristic intention for which the columns were so introduced; namely, that of supporting emblems expressive of commemorable events, and in that instance not unappropriate.

Perrault says, neither ought we to make statues placed above larger than those set below, when they are of the same kind, that is, when both stand each in its own story or order. But, on the contrary, they ought always to be diminished, as the orders are, which are necessarily less than those below.

It is not only important, but necessary, to judge of the sizes of objects to be placed on lofty erections. It was remarked in "Roma Illustrata," 1721, and in 1806, by an architect who visited France and Italy, that the figures high up in the bas-reliefs of Trajan's column are somewhat larger than those below; the perspective reducing them to an equal size to the eye. By referring to Taylor & Cresy's Rome, it will be found that this assertion is not correct: the twenty-three blocks of white marble are all of the same size, and also the figures upon them.

We are informed by Vasari that towards the close of his life Michelangelo began to study his compositions in sculpture with more care, making models, not only for statues, but also for architectural ornaments, of the full size, which he used even to place at their proper height in order to judge of the true effect of the future work.

When two or more orders are employed, one above the other, in a building, the laws of solidity require that the strongest should be placed lowermost; the Tuscan to support the Doric; the Doric, the Ionic; the Ionic, the Corinthian; and the Corinthian, the Composite.

In England there are few examples of more than two stories of columns; in Italy and other parts of Europe are to be seen three and sometimes more; yet it is a practice by no means to be imitated. Palladio attempted it at the Carita in Venice; Sangallo, in the Farnese at Rome; Ammannati, in the Cortile of the Pitti at Florence; but all unsuccessfully.

Breaking of pediments, and leaving them open in the middle; pediments being intended to throw off the rain, and not to let it in.

Breaking the entablature and making the cornice of a pediment rise from the top of a column, pilaster, or pier.

Placing two or three pediments, one within another. The ancients, observes Chambers, always avoided introducing pediments of different sizes in the same composition.

Raising pediments on circular bodies.

Employing other forms of pediments than the triangular and round. Placing balustrades on the inclined cornices of pediments, balustrades being intended to enclose terraces and other heights to prevent accidents. Also intermitting the horizontal entablature of a pediment to make room for a niche.

Putting triglyphs in any other part than over the column. Enlarging the metopes. Putting dentils below the mutules, because the feet of common rafters cannot be below those of principal rafters. Adding dentils under modillions.

Projecting the cornice too much, so as to exceed reasonable utility, and thus appear unsafe to passers by.

Adding rustics to columns and pilasters, scored like loins of pork; making columns and pilasters penetrate each other; coupling of columns, condemned by Blondel and vindicated by Perrault.

Triangular, circular, and polygonal pedestals are objected to.

Chambers objects to adorning the pedestals or pilasters of attics with moulded panels, which look like joiner's work, and should therefore be avoided; neither should they have capitals, as is always the custom in France, which give them the idea of a clumsy, ill-proportioned composition.

In France, and in Sir John Vanbrugh's works, the horizontal joints of rustics only are marked, the vertical ones being entirely omitted. This has a bad effect, and makes the building look as if it were "composed of planks" rather than of stones. Palladio's method is preferable, who, in imitation of the ancients, always marked both the perpendicular and the horizontal joints.

* See the *Builder*, vol. xxi., p. 38.

In the Ionic capital, forming one volute parallel and the other oblique.

Placing the Attic base under the Doric column. Using pilasters instead of columns. The Araeostyle disposition of columns suggested by Perrault, and opposed by Blondel. Piling two or three orders of detached columns one above the other. Setting the Composite column over the Corinthian was not approved by the judicious.

Using cartouches instead of columns or pilasters, as they appear deformed to the intelligent eye.

Putting the cyma or cavetto for supports instead of the ovolo and talon. It may be tolerable to omit a usual member of architecture, but it is insufferable to put it in the wrong place.

The cyma and cavetto were correctly used by the ancients for finishings, and never where strength is required; the ovolo and talon, on the contrary, were always employed as supporters.

Palladio erred in employing the cavetto under the corona in three of his orders, and using the cyma as a supporting member.

Vignola ignorantly finished his Tuscan cornice with an ovolo.

Using frets or guilloches, decorated with leaves, ribands, and flowers, instead of balusters.

Placing a sepulchral or funereal pediment (such as is found on ancient tombs, cippi, and obituary tablets), upon the houses of the living, in defiance of every principle of truth, and in subversion of every rule of architecture.

The French architects, who "do all novelties," have adopted all innovations. The fact is, the French were ambitious of forming a new school; they were to invent new orders, which were to be exclusively French; and their buildings in the age of Louis XIV. exhibit examples in which all kinds of incongruous ornament are collected together without principle or meaning. The buildings in Paris are neither Greek nor Gothic, and in the highest degree irregular and formless. Of course, there are exceptions.

These foregoing cautions of the ancient architects form good lessons to modern practitioners, which they would do well to keep in their memories, in all compositions.

The criticisms on the several parts of a stone building, by comparison with a wooden prototype, are somewhat absurd, as that which was suitable and constructively necessary in the latter had no reference to the former.

From a careful study of the ancient regular architecture, as represented and misrepresented by the Italian and other architects, and of the buildings themselves, there need be no more talking about copying; each architect, if he will but devote the time and attention to the works of antiquity, can himself adopt from them his own proportions and details. First, by pruning and rejecting all extravagances, and licentiousness, flatness, and insipidity, disagreeable to the eye, and strictly copying such things as appear to be perfect, and carefully correcting others that seem in any degree faulty; and, secondly, by not accepting apparent beauties when not founded in reason; thirdly, by not retaining any modifications dictated by custom alone; and, fourthly, by availing himself of all real improvements which are easily perceivable by a judicious eye. Sir Joshua Reynolds admits, it is true, that the beauties and defects of the works of our predecessors may be pointed out; the principles on which their works are conducted may be explained; the great examples of ancient art may be spread out before them; but the most sumptuous entertainment is prepared in vain if the guests will not take the trouble of helping themselves.

It will be well for architects to consider these alleged abuses, as many of them have been introduced with reason and judgment, and with approbation.

It will be the more necessary to do so, when we consider the vague foundation on which the more refined parts of the art are built; Chambers says that it has "given rise to such a multiplicity of contradictory opinions, all of them supported by plausible arguments, that it is difficult to make a choice, or to distinguish the real from that which is merely specious. The connexions are frequently very distant, and it is necessary to trace a precept through all the combinations, that can possibly exist in every branch of the art, before its truth or fallacy can be determined."

Although Sir W. Chambers's judgment is to be generally admired, he errs in rejecting the Corinthian capital as a support to an entablature. He says, "There are many things which, though beautiful in the highest degree, yet, in their application, carry with them an evident absurdity; one instance whereof is the Corinthian capital, a form composed of a slight basket surrounded with leaves and flowers. Can anything be more unfit to support a heavy load of entablature, and such other weights as are usually placed upon it?"

Now the Corinthian capital having originated from a nurse placing a basket on a young girl's tomb is doubted, as the temple of Solomon gave the idea for putting leaves on a capital; be this as it may, its origin does not bear on the case, as the bell off the Corinthian capital is a carved solid, and the leaves are in relief on it. If the bell were an open basket, Chambers's criticism would have displayed more sense.

The golden mean as applied to the measure of moral rectitude may have much truth in it; but surely there is no mental energy displayed in seeking a mean in architectural proportions and works. This childish plan is often had recourse to by juries and arbitrators, who in cases of compensation take the highest claim on the one side, and the lowest claim on the other side, then add them together, and divide by two. Now, although a mean is obtained, affording sometimes a correct decision, still there is no science or mental energy displayed. To the men who create the extremes by their calculations, must be awarded the credit, and not to those who without brainwork adjust the conclusions.

To judge of the precise proportion awarded to the first man, and to each of all other forms at the Creation, is difficult, unless the golden mean be appealed to for a decision; and I think that, as far as living objects are concerned, a tolerably correct conclusion may by this means be obtained. To apply a mean to art objects is absurd, as buildings and their component parts are separately created. Perrault with great labour reduced the proportions of the various orders of architecture to a mean, and Paley in recent times applied a mean to the varieties of fonts.

The course recommended by Sir W. Chambers is far more scientific and practical than the mean between extremes as suggested by Perrault. The former enters with more judgment into the subject, and endeavours to correct deviations from the antique originals.

In employing regular architecture, nothing betrays the ignorance of an architect more than a violation of the ancient rules, or to introduce in his compositions the abuses which custom, contrary to reason and confirmed by time, has imposed upon us. Chambers has justly pointed out some of these irregularities in St. Peter's at Rome, St. Paul's Cathedral, and the Banqueting-house at Whitehall. Many of our more recent public buildings abound with unmeaning novelties. In the architectural world as in the political world, there should be a liberty definitely established.

In 1728 ancient architecture was as much neglected as at the present period; an architect of taste complained of the continual spring and circulation of follies, which are in a series of false appearances connected together, and disguised by artful softness of definition, and varieties of incoherent parts, consisting of no foundation but the emptiness and shadow of appearance; and this, and this only, being the grounds and practice of most of the productions of our moderns in building, architects seem to forget that beauty is founded on reason, irregularity on fancy,—

"Can beauty from deformity arise?"
Rusden.

The folly of permitting custom and fashion to prevail over the ancient rules was much deplored by Freart, who says, "Honest Vitruvius in his time well foresaw the ill consequence which those of the profession would introduce out of their love of novelty, which already began, it seems, to incline them to libertinism, and the rules of that art which ought to remain most sacred and inviolable; so that we must look on this as on a grey-headed evil, which grows worse and worse daily, and is become now almost incurable."

Instead of teaching anything new, the public require treatises to explode the errors which have been introduced by the admirers of novelty.

It is absurd for an architect to attempt to design without materials on which the mind may work, and from which invention must originate. "From mere nothing, nothing can proceed."

We should ever bear in mind the injunctions of the great masters, whose advice is always grounded upon theory and practice, and well considered. Of course they have faults, and those should be studied as well as their beauties. Variety and novelty are always valuable, provided that they are not introduced in opposition to precepts of art, and are sanctioned by reason. The more the student inquires into ancient architecture, the less will he be pleased with the new. He will derive more knowledge than the ancients because he has the advantage both of theirs and his own.

The Scriptures say we ought to "make a stand upon the ancient way, and then look about us, and discover what is the straight and right way, and so to walk in it." The predominancy of custom, remarks Bacon, is everywhere visible, insomuch as a man would wonder to hear men profess, protest, engage, give great words, and then do just as they have done before, as if they were dead images and engines, moved only by the wheels of custom.

The English architect is much indebted to Wren for his good sense and judgment in awarding the true test of beauty to nature or geometry. Of course, our Continental neighbours differ in opinion. Let us listen to Perrault,—"Neither," says he, "the imitation of nature, nor reason, nor good sense, are then the foundation of those beauties, which we fancy we see in the proportion, order, and disposition of the parts of a column; and it is impossible to assign any other cause of their agreeableness than custom."

However, notwithstanding this assertion, it has been shown that custom is not a principle or cause of true beauty. What arises from the manners and customs of particular nations can at best be but adventitious and local; and what is local cannot form a universal rule or principle; and since the principles of true beauty must be acknowledged as such by all men, therefore local custom cannot be a principle of real beauty.

I cannot do better than conclude with an admonition handed down to us by the great architect of St. Paul's Cathedral:—"An architect," says he, "ought to be jealous of novelties, in which fancy blinds the judgment; and to think his judges, as well as those that are to live five centuries after him, as those of his own time. That which is commendable now for novelty will not be a new invention to posterity, when his works are often imitated, and when it is unknown which was the original."

THE ARCHITECTURAL TREATMENT OF SMALL STAIRCASES.

At the ordinary fortnightly meeting of the Architectural Association, held on Friday, the 17th inst., Mr. Aston Webb, A.R.I.B.A., read a paper on this subject, as elsewhere mentioned. The following is the substance of it:—

There is no house so small or unpretending but that the staircase offers an opportunity of architectural treatment, and by a little care and good arrangement, and without adding to the cost, may give a suggestion of artistic feeling, and break the spell of that oppressive monotony which is the curse of so much of the general small-house architecture of the present day. The difference, also, between a well and badly planned house often lies in the staircase. Our client's property may, therefore, be seriously damaged in point of value by any omission on our part to arrive at the best staircase the circumstances will permit. One more word before entering on my subject,—namely, that I have purposely steered clear, as far as possible, of style and design in detail; for style, after all, is only the language in which an artist's thoughts are expressed, and the same beauty and feeling may be seen and felt, treated in various styles, just as ideas may be conveyed in various languages, though one style or language may often be better suited and appropriate than another to express those thoughts.

The subject naturally divides itself into three divisions:—1st. The position; 2ndly. The arrangement; 3rdly. The details of a staircase in a small house.

I.—*The Position of the Staircase in Relation to the House.*—This may be external or internal; but as I propose to deal more especially with staircases suitable to small house in this country, in the latter part of the nineteenth century, external staircases need not long engage our attention. No notice, however, of small staircases

could be deemed complete without mention of a few of these. Most of the remains of old English houses up to the close of the thirteenth century show signs of external staircases, leading to living-rooms on the first floor, which were, also, usually approached by a second staircase from the great hall, which usually up to that date was the full height of the house. The very beautiful external Norman staircase to the buildings attached to the cathedral at Canterbury is well known; but Italy, *par excellence*, is famous for these features, great and small. A very well-known one, and illustrated in our Association Sketch-book, is one at Spoleto. The position of a staircase in relation to the internal arrangements of a house is a very interesting and important question. Professor Kerr, in his book on the "Arrangements of a Gentleman's House," says "A staircase ought to be so placed as to afford direct passage for the ladies, particularly from the public-rooms, to the bedrooms." Mr. Stevenson says, "No rule as to the position can be laid down. It is usually in a conspicuous position; but when the hall is used as a sitting-room, it is better adapted for the purpose if the stair is shut off from it, at least by an open screen." Now the position of the staircase is so radical a factor in the planning of a house, that it is very important that we should have a clear and right view as to what is desired by those who are to occupy the house. Mr. Stevenson says, "it must vary in each house, and no doubt it will to some extent, though the principle aimed at will probably be the same." The same author says it is usually in a conspicuous position, also the fact, as we all know; but the question then comes in as to whether, in our present habits of life, this is desirable or not. Let us look back for a moment to the planning of our old English houses, for though our habits are much changed, and what has been can never be again, there is generally something to be learnt either to follow or avoid, and it helps to show the growth and principle on which our intricate plans of the present day are based. We shall find that up to the time of Queen Elizabeth, the houses were more or less fortified, and the staircases of stone, placed principally in turrets, an arrangement not likely again to come into general use, though at West Deane Rectory as early as the end of the thirteenth century, a newel staircase is still to be seen placed, as will be found almost invariably the case, in the corner and occupying no conspicuous position, though their existence was duly emphasised on the elevation. During the time of Queen Elizabeth, however, newel staircases came largely into use, with their straight flights and square landings; and during this time some of the finest staircases we have were put up, and many of our most thoroughly English houses were erected, the arrangements being distinctly to make the hall an apartment for general use, with the stairs leading merely from some retired corner to the rooms above, in most cases being absolutely concealed by a door; and Palladio, in his description of staircases, assumes as a matter of course that it will be so enclosed, but advising that the door should be in a conspicuous position, and in the best part of the house. Sometimes we find the stairs placed just off the hall in a lobby between the hall and one of the living-rooms, as at Wrotham-place, or, even still further away, as at Severn-end, Worcestershire (this house, by the way, is shown to visitors, and though very little known, is well worth a visit). In all these cases there is a separate staircase for servants, and the usual plan shows the hall dividing the family apartments from the servants', and connected over by the gallery. This arrangement assumed, of course, that all the reception-rooms were on the ground-floor, and the stairs led only to private rooms, and were therefore planned as private as possible. In larger Elizabethan houses, some of the principal rooms began to be placed on the first floor; here the staircase naturally became grander, but were on a scale beyond the limits of this paper. After this date, the Italian model came into vogue, where the staircase was placed in a central hall or cortile, or immediately leading off it, and this plan, with more or less modification, has continued to be largely adopted down to the present day. The Italian plan also often required the reception-rooms on a first-floor, and therefore led to a grander staircase. The demand in the present day, where the space can possibly be obtained, is decidedly in favour of all the reception-rooms being placed on the ground-floor, when the staircase should, therefore, as I consider, return to a less conspicuous position, its only object being means of access to bedrooms. The question, therefore, has to be considered as to the best position of the stairs, in a modern house, taking note of what has been done before, but not copying it, without regard to the altered requirements of the day. What I wish to lay before you is that privacy rather than conspicuity is to be aimed at in a staircase of a house of ordinary dimensions leading to bedrooms, and that with the reception-rooms on the ground-floor, the staircase is put to no use but private and domestic ones, and that where this privacy is observed, it is of advantage to all who use it, and more especially to the ladies of the household. You probably all know the story of the amateur architect who designed his own house, his great idea being a large central hall and staircase, with a gallery round on the first-floor, off which all the bedrooms opened; the consequence being when any occupant of these rooms went for a bath in the morning he was seen by the servants downstairs; and later on, when the servants were removing the slops from the rooms, they were, in their turn, seen by the guests and others from the hall below. The hall and staircase arrangement, a very common one, appears to me both wasteful and inconvenient. The staircase spoils the hall, and the hall spoils the staircase; that is to say, the hall is of no other purpose than for effect and show, it being impossible to use it as a sitting-room, and in my view, the stairs, being placed in the hall or general thoroughfare, are too public for the purposes they are intended. Another great objection, also, to this arrangement, is, that the hall has to be lighted from above only, and the proper ventilation of it becomes a matter of great difficulty, if not absolute impossibility. You will understand that I am speaking strictly of small staircases, that is, such as you will find in gentlemen's houses generally, and these remarks do not apply to houses where a portion of the building is occupied by State apartments, and where, therefore, a larger hall and staircase may be necessary for architectural propriety and to befit the apartments to which they lead. Of late years, on the other hand, the demand for cheap houses with large accommodation has led to an undue reduction in some cases in the size of the hall, where, in fact, you enter the front door, and the stairs are at your feet, and an array of little doors all round you, too suggestive of cheeseparing to be pleasant or desirable. My own idea for a country-house is a vestibule, with passage from same to servants' department as means of access for waiting at the door. The vestibule to lead into a hall, with a fireplace, of course carpeted and furnished with comfortable chairs and side-tables, and with the staircase screened off from one corner of it. In town-houses and restricted sites, the *position* of the staircase is hardly a matter of choice, and must necessarily come in the hall; but the same idea of privacy can be aimed at here also.

II. By *Arrangement*, I mean the number of flights, the landings, and their disposition. And here privacy should again be aimed at,—privacy, that is to say, from strangers coming to the entrance-door, and the simplest way of obtaining this is by reversing the flights so that you go up in the direction of the door rather than come down opposite to it, as is the common rule; the practice of making the staircase rise immediately opposite the entrance-door is objectionable. I have usually turned the stairs round the other way myself, and the only objection I have ever had raised was in the case of a pair of semi-detached houses, where the tenant told me his wife's friends "chaffed" her about the staircase being turned round the *wrong way*, and supposed it was because she was ashamed of her stair-carpets; and this opportunity for the display of the stair-carpet seems to be really one of the reasons for the common arrangement. On the other hand, I have more frequently found the tenants soon appreciated the advantages of the arrangement. In a town house, indeed, this seems absolutely the only relief from the stereotyped plan. There is one other plan of placing the staircase, in the centre of the house between the front and back rooms; but this involves top lighting, and means semi-darkness on the ground-floor, and is not desirable. A favourite arrangement in Queen Anne houses, where the stairs have to be arranged in the entrance opposite the door, is to turn the last four steps at right angles to staircase. This breaks the straight ladder-like flight in front of the door, but requires a wider hall than can usually be obtained. Having settled the position of the staircase in regard to the house, and the point on the ground-floor most convenient to rise from, the next question is the arrangement of the flights and landings, the first point to be kept in view being, of course, the main landing on the first floor, the object to be aimed at being to place this landing so that all the rooms on this floor open on to it without, in small houses such as we are speaking of, any corridors or passages. In a skilful plan there may be a good roomy entrance-hall on the ground-floor, where it is of use, and a very economically-disposed first-floor landing, though with the central top-lighted hall and staircase already mentioned this is not possible. Every one knows that long straight flights are to be avoided, eleven treads being about the extreme number in one flight, and also that square landings are desirable, though these should only be used sparingly, for too many square landings and short flights are more tiring and cumbersome, even, than over-long flights; but where this is impossible winders have to be introduced, and these need not necessarily interfere with the comfort of the stairs. There are winders *and* winders, and everything depends on the way in which these are arranged. It is common to find writers on this subject give a wholesome condemnation to winders, and to speak of them as makeshifts hardly to be tolerated. The most usual way is to form the square quarter-space, and then cut it up into three treads, by the easy process of an angle set-square of 30 and 60 degrees; this involves that the treads partake each of a triangular form, terminating in a point, and so are as dangerous and prolific of accident as can be, even though the treading-line, which is about 18 in. from the handrail, may be equal throughout. A portion of the staircase in Conduit-street leading up to the offices of the Association is a choice example of this arrangement. I do not know whether you recognise it; it is an example very well known as leading from this entrance-hall up to "the only lending-library in the profession"; it has a peculiar "refinement" in the width of the tread between the winders, being 12 in. instead of 10 in., like the others, and this, coming between the very narrow winders, makes it singularly awkward; but you can all judge by experience whether it is easy "going" or not. Now, with a well-hole of 12 in., as this has, it would surely be better to divide this among the winders than to give it to the one central step, and if arranged as on the plan shown, the "going" would have been comparatively good, for the rise and tread are easy in themselves; it is only the arrangement of the winders that makes it otherwise. Viollet-le-Duc, in his "How to Build a House," shows a stair with winders,—a very general practice in France. A very good example of a staircase plan, practically composed entirely of winders, has very kindly been lent to me by Mr. Lawrence Harvey, by whom it was recently designed for a house in Queen's Anne's Gate. I have dealt on this question of winders somewhat at length, as our practice in England is contrary to that more generally adopted on the Continent, and, I think, inferior. The objection to it, certainly, is an absence of landings for the aged and infirm to rest during the ascent; but I doubt whether they cannot stop almost equally well on any part of the stair as on a quarter-space landing, and unless the rooms are very lofty, the question really seldom arises at all. A continuous handrail with this arrangement is, of course, necessary, and this of itself helps to lead one in the direction of the stair. Another very important point to be remembered in the designing of the staircase is that it naturally acts as an upcast shaft to the house, and is, as it should be, its great ventilator. It is very essential, therefore, that it should have at least one outside wall with windows, for ventilation. Without this a house is always liable to a close and stuffy smell, and it must be remembered that where a w.c. or kitchen stairs are placed, as is often the case, under the principal stairs, special care must be taken, or the least smell from either will at once pervade the whole of the house. The aspect of the staircase windows can hardly be considered, as the stairs will naturally be placed where the aspect is least suitable for rooms. If you can get a sunny aspect, however, it is preferable. The landings of a staircase, where space will permit, should be wider than the stairs themselves, in order to allow of a stand of flowers or some china jars, or of a window-seat, which really would offer rest to the old and infirm using the stairs.

III. *Details.* — The rule for proportion of treads and risers need hardly be mentioned; but the aggregate of the tread and riser should always be about the same. Thus take 17 in. to be the recognised standard, then a riser of 7 in. would require a tread of 10 in., a rise of 6 in. one of 11 in., and so on. With regard to the width, this should never be less than 3 ft. in the clear, and if any of the reception-rooms are on the first-floor, the stairs should not be less than 4 ft. wide in the clear. Staircases in modern houses may be generally divided into those with well-holes, and without; the former are either newel staircases in which the handrails stop against the newels, or else have a continuous handrail,—probably the most dangerous arrangement where children are concerned, affording every facility for sliding down them and toppling over; where the rake becomes steeper, stairs without well-holes are either dog-legged staircases, or of the character shown in the example from Viollet-le-Duc, and these are generally used where space is limited. For internal domestic staircases wood is undoubtedly the best material. Stone may be used for the principal flight, its advantage being the quiet which is obtained. In Italy, and warmer climates than ours, stone staircases seem more appropriate. The soffit of wooden stairs is usually plastered, but the material is not really suitable, as the spring, which a good staircase should have to a slight extent, sooner or later cracks it at the junction of the flights with the landings. A deal panelled soffit would add but little to the cost, and, at the same time, gives character to the stair. The inclosure of the stairs by handrail and balusters needs no remark, beyond the fact that 2-in. balusters will always look better than 1 in., and that three to a step, as they used to be, is immeasurably superior to the two poor little inch-balusters generally seen. If only two are used, they should be of such a substance that there is not more than their own thickness between them. The wreathed mahogany handrail, with its elaborate scroll on the ground-floor, is very expensive, and should be perpetrated no longer; it has called forth many elaborate treatises on its setting-out, and many "staircase-hands" have made its perfection the aim of their lives; but beyond this there is little reason for adhering to it, except in the case where winders are introduced, where it becomes a necessity. A close or open string is very much a matter of taste and design, though perhaps the balance is in favour of an open string, and ladies will certainly be found generally to favour it, as having less corners difficult to sweep than a close one. A staircase should always look solid, with no stint of material, and while elaborate workmanship would be out of place on a small staircase such as I am speaking of, care should be taken that all the mouldings should be full and rather more massive than those in any other part of the house. The ladder-look of many stairs is, above all things, to be avoided. An old oak staircase, which has weathered almost black, with its heavy newels, handrail, and balusters, its solid oak steps, covered in the centre with a white drugget, has a quiet, homely, and inviting look, very different to the general toilsome-looking and uninviting ladders of the present day. With regard to its decoration, little need be said except, probably, the less the better. It is needless now to inveigh against block-marble paper, as architects, at any rate, have given up its use. A wooden-panelled dado, or a plain varnished and painted one, with a severe patterned paper, of not too dark a colour, is all that is required. Cornices on the landings are better omitted; but if a panelled soffit is adopted, a small cornice would probably finish this, and run round the landings also. Generally we may say, plain, honest, good construction is all that is required in a staircase. Ornamentation likely to arrest the attention is out of place; the same applying to the carpet, which should be quiet and unobtrusive in design, and indeed, if you are so fortunate as to be able to make the stairs of solid oak, nothing looks better on these than a clean white drugget.

Fire at a Builder's.—Last week a serious fire occurred on the premises of Messrs. Staines & Son, builders, Great Eastern-street, Shoreditch. The building, consisting of three floors, about 40 ft. by 20 ft., and used as workshops and stories, was nearly burnt out; and the stock comprised in the open yard in the rear severely damaged by fire. The building and contents were insured in the Phoenix Office.

ARCHITECTURAL ASSOCIATION.

At the ordinary fortnightly meeting of this Association on Friday, the 17th inst., Mr. Ernest C. Lee, President, in the chair, the following gentlemen were elected members, viz., Messrs. J. W. Cockrill, S. H. Maile, J. K. Cole, E. V. Grove, W. C. Jones, A. North, L. Littlewood, C. W. Jackson, S. A. Pentecost, A. E. Kingwell, W. Hodson, H. E. Trivett, E. G. Dawber, E. A. Mann, W. F. Sutton, S. P. Rees, F. P. Telfer, F. Radkin, A. C. Wissenden, J. Clinnie, S. A. Edwards, W. Weir, C. Mayne, H. Gordon, E. J. Pine, J. L. Robinson, W. J. Lauder, P. E. Mantell, and G. W. Hatcher.

The announcement made from the chair that Mr. Quilter, past-president of the Association, had been elected District Surveyor for East Streatham, was received with applause.

Mr. Aston Webb then read a paper on "The Architectural Treatment of Small Staircases," the substance of which we print in preceding columns.

The Chairman, in opening the discussion, said that the paper was one of thorough practical interest; for houses could hardly be built without staircases, although he knew of an instance in which it had been done,—greatly to the inconvenience of the inmates, however. He agreed with almost everything that had been said by Mr. Aston Webb as to the planning, arrangement, and decoration of staircases, but he could not hold with him in the matter of the white drugget, which he thought had a very unsatisfactory appearance. He liked to see stairs carpeted, and carpeted for their whole width, instead of leaving the usual margins, which were generally of dirty paint. Mr. Webb had not made any special mention of the external staircases which were to be found in Caen, going up to the first floor of the buildings. On the road to Ardennes almost every other house had an external staircase, some of them dating from the sixteenth century, and others from the fourteenth. In these houses the entrance to the ground-floor rooms was beneath the external staircase. One very noted external staircase was the one at Syracuse, of which a sketch by Mr. Charles Eastlake had been published in the Architectural Association Sketch-book. Architectnrally, such staircases admitted of very charming treatment indeed. No doubt most of the members of the Association were well acquainted with M. Viollet-le-Duc's chapter on "Escaliers." Prior to the fifteenth century, as Mr. Webb had stated, all staircases were practically in turrets or towers, as in the one given by Viollet-le-Duc of the old Louvre. There were numerous large staircases of that kind at Blois, and he presumed that almost every young architect who had travelled had measured up several of the old turret staircases of Normandy and other districts. He himself had met with a very interesting one in an old house in Orleans: it was a newel staircase, measuring not more than 3 ft. across, and was noteworthy on account of the manner in which the handrail and the newel interpenetrated. Mr. Webb had not particularly remarked the very small staircases which were to be found in many of the largest and most important houses built in the time of the Georges. At that period, people seemed to live almost exclusively for show. They had very grand reception-rooms, but directly they went up to their bedrooms they seemed to live in a hugger-mugger style. The staircase to the first-floor was very grand indeed, but the staircase to the upper floors was so very mean and small that any architect would be ashamed of putting it into a parsonage-house. The houses in Brook-street afforded an illustration of this. In an old country mansion dating from the Georgian period, which had lately been pulled down, the drawing-room was 40 ft. by 30 ft. by 19 ft. high, the dining-room being of similar proportions. The hall was 30 ft. by 20 ft., but the staircase that went out of it was only 3 ft. wide, with treads of 7½ in., and risers of 10½ in. This was an illustration of the manner in which people lived for outside show instead of for comfort and convenience. The staircases in the houses at Lancaster-gate seemed to hear out the views enunciated by Mr. Webb as to central staircases; for, except on quite bright days, gas had to be kept burning continually. A very fair illustration of the inconvenience of too many landings was afforded by the stairs up to the Esplanade at Richmond Hill, which consisted of an arrangement of four steps and a landing alternately repeated about ten times. If a person was at all in a hurry in ascending, he was most likely to fall up, and if in a hurry when descending, he was quite sure to fall down. One feature often found in the treatment of the angles of landings of staircases in old houses was, he thought, worth noting. Mr. Webb had stated that landings should be made fairly broad,—broader than the stairs themselves,—but he (the President) thought it would be a mistake to put seats on such landings; for it was very questionable whether any one would ever sit upon them. Flowers might, however, very well be placed there, and one good means of filling up the corners was adopted in the Georgian period, viz., angle cupboards with glazed doors, and containing shelves on which china was arranged. The effect of these was very charming.

Mr. Thomas Porter (who was very indistinctly heard) was understood to say that the subject was one of such an extensive character that he hardly knew what points to discuss. The paper was one which suggested a variety of practical considerations, some of which he would proceed to refer to. He thought there could be no rule laid down for the position of the staircase. The planning of houses was generally subject to the shape of the site and to other circumstances of a varied character, so that the position of the stairs must be left to the architect to determine in each individual case. He could not agree with the author of the paper in the *dictum* laid down that in small houses the staircase should be in as retired a position as possible. His own view would be to make it as handsome and as conspicuous a feature of the house as possible, consistent with the fitness of its surroundings. There was another reason why the staircase of a house should be in a conspicuous position, viz., that inasmuch as it was one of the secrets of planning a good staircase that the bedrooms should be entered direct from the landings,—or at least from lobbies opening on to the landings (so that there should be no waste room),—it was highly important that the staircase should be well lighted and ventilated, and the more conspicuous its position the more likely was it to fulfil these conditions. Windows were the best means of getting at once good light and ample ventilation. As to landings, nothing could be worse than having one step on them: it was sure to be a source of continual stumbling. As to the stairs themselves, there should be no discrepancy in the heights of the risers. A staircase in which this occurred was most unpleasant to those who used it, particularly when the top riser of a flight was of less height than that of those below it. If a comfortable staircase were needed, the risers must not be made too high or the treads too narrow. He did not think that Mr. Aston Webb's formula on that point was infallible. For instance, if a 9 in. tread were used, he (Mr. Porter) saw no reason why the riser should be 7 in. On the contrary, he thought that the height of the riser should never exceed 6 in. nor the treads, even in large houses, 11 in. As to the embellishment of small staircases, he thought it was usually the case that the ornamentation was far too elaborate and on too large and heavy a scale. Small staircases would not look well if fussy and overdone in their details. A 6 in. newel was all very well when the stairs were 4 ft. or 5 ft. wide, but in small houses, with stairs only 3 ft. 3 in. wide at the outside, 6 in. newels and 2 in. balusters would have an extremely awkward and heavy appearance. He advised the younger members of the profession not to take for granted all that was set forward as models for imitation, for he had lately seen a "prize design" for a small staircase in which the stairs were only 3 ft. wide, with 6 in. newels of a most elaborate character, while the balusters were of such dimensions that they must have been made out of 3 in. stuff; the material in which they were proposed to be executed was wood, but their forms were such as were proper to stone. The handrail was no less than 6 in. deep and 4 in. wide, and instead of being designed so that it could be laid hold of, it partook of the character of the coping of a Gothic gable. In regard to the wood used for balusters and other parts of staircases, it should be borne in mind that oak was capable of treatment with far finer mouldings than was the case with commoner woods. The height of the balusters and handrails was another important point. The rule laid down in books was that of the old-fashioned standard of allowing a height of 2 ft. 7 in. above the nosing of the step to the top of the handrail, but he ventured to recommend in small staircases a

height not exceeding 2 ft. 5 in.,—a dimension which was much more comfortable, especially to ladies, for 2 ft. 7 in. was a rather uncomfortable height for a bandrail for even tallish men. A height of 2 ft. 5 in. was quite sufficient for safety. He had always adopted that rule except in the case of staircases where great grandeur was demanded. Balusters should be designed of such forms as were capable of being easily turned in a lathe. Any carving or other elaborate work on them was quite a mistake in small staircases. He did not quite see the objection to the plaster soffit, but he did think that a soffit of panelled woodwork to a small staircase would have a very "boxy" appearance. The difficulty of dealing with the cornices (if they must be had) of the ceilings of landings could easily be surmounted.

Mr. Cole A. Adams, in moving a vote of thanks to Mr. Aston Webb for his paper, illustrated on the blackboard some points touched upon in the paper, as did

Mr. S. Flint Clarkson, who, in seconding the motion, observed that one reason why a plaster soffit was objectionable in a staircase was that the latter was generally one of the most carefully-prepared pieces of woodwork in the house, being necessarily made out of seasoned material. The application of the wet plaster to it, however, had a tendency to dislocate the joinery. With regard to winders, he was generally disposed to agree with what had been said of them in the paper, and he might adduce, as an additional practical reason why winders were undesirable, the difficulty of covering them with stair-carpet. He did not go quite so far as Mr. Webb in disparaging the central position for the staircase; indeed, he thought that for a large town-house the central staircase was the one to be preferred, subject to the provision of a sufficiently large and adequately lighted well. Mr. Webb had given a very practical and useful paper on staircases, which very properly followed the excellent one on windows read by him two years ago.*

The motion having been carried,

Mr. Webb, in replying, said that the question of the drugget was a matter of taste, and with regard to it he still held to his own view as opposed to that of the President. With regard to the height of the handrail, he thought Mr. Porter was mistaken in advocating a height of only 2 ft. 5 in. A case had occurred (he thought at the Travellers' Club) where a man fell over a rather low handrail and was killed, whereupon there was serious talk of arraigning the architect for manslaughter.

The next meeting will be held on Friday, Jan. 7, 1881, when an account of the Association's last excursion will be read by Mr. C. R. Pink.

GARIBALDI ON THE DECLINE OF THE ITALIAN RACE.

WRITING a few days ago from Alessio, Garibaldi, in his usual plain and unvarnished style, expresses his opinion of the physical characteristics of his countrymen. The General's letter, which is addressed to the editor of the *Secolo*, of Milan, is as follows:—

"My dear Moneta,—I beg you to publish the following lines:—The *New York Herald*, speaking of Italian immigrants into the United States, says: 'Of all the emigrants coming here from Europe the most deformed, rickety, dirty, wretched, and thievish are the Italians.' Painful and humiliating assertions these, but true. Let us see what are the causes of such degradation. I will not refer to the excessive burdens of taxation which are ruining this poor nation, and driving it to despair. I will content myself with pointing to other blots which are less obvious, but which, like that just mentioned, disfigure our country. The Royal Cuirassiers must be picked men, the Royal Carabinieri must also be picked men, so must the soldiers of all arms of the service; so must the customs officers, the excisemen, the police, the municipal guards,—all these must be picked men. The monks, too, and the Jesuits receive no misshapen persons among them. What, then, remains to propagate the Italian race? The narrow-chested, the rickety, the scrofulous, the deformed, the lame, and all that sort of people. And now let those who rule the Italian nation tell me whether it is not inevitable that the Italian race should become degenerate.—Ever yours, G. GARIBALDI."

In drawing attention to this letter from Garibaldi, to be found in the daily papers, we desire to intimate that there are other reasons for the deformed, rickety, dirty, wretched, thievish inhabitants of Italy than those enumerated, namely, a total absence of proper sanitary arrangements in Italian towns and villages, from the palace to the hovel and roomtenement. Italy,—the land of sunshine, art, and song,—is a land of filth and vermin. There are marble palaces, art galleries, and blue skies, but neither sewers, drains, nor adequate scavenging. Hence, strangers who are tempted to visit the world-renowned cities pay a fearful penalty in risks from fever and certainty of mosquito stings, as also of punishment from other domestic torments. There is not one Italian city properly sewered, drained, and scavenged. The best hotels use cesspools, out of which pass foul gases and putrid fluids, to contaminate both air and water. Proper scavenging implies daily cleansing, not only of public streets and places, but of all back streets, lanes, alleys, yards, and tenement houses, with a removal of *excreta* and refuse at short intervals, never exceeding one week. As to proper sanitary works, a full supply of pure water is necessary, not merely for display in public fountains, but laid on by appropriate services to every occupied dwelling, however humble. The regulations of a Common Lodging House Act should be enforced in every slum and wretched room-tenement, and all the places unfit for human habitation should be sternly closed, and proper accommodation provided. When the improvements herein suggested have been adopted and are continuously carried out, there may be hope for the regeneration of Italy. Ironclads with 100-ton guns, Royal Cuirassiers, Royal Carabinieri, customs officers, excisemen, police, municipal guards, and Jesuits will avail Italy nothing in removing the fearful causes of disease and human distortion. When will statesmen learn that the greatness and strength of a nation are not alone in magnificent cities, palaces, ironclads, and standing armies, but in the health, comfort, and content of the people? The further lesson also requires to be learned, namely, that where the mass of the people are allowed to grovel in filth and misery, there can be no true security for property. A whiff of grape-shot will not cure such disease.

* See vol. xxxvi. (1878), pp. 1246, 1281.

THE MIDLAND RAILWAY AND ITS WORK.

OF our British railways, the Midland is the best known. It is not the largest, but it possibly penetrates into a wider reach of country than any other; and the boldness of its policy, the magnitude of its undertakings and extensions, and the substantial benefits it has conferred upon the travelling public, have given it the first place, possibly, in the estimation of the public. Springing from a very slight and small railway, it has become one of the four great lines in the kingdom. In its thirty-seventh year it has become so vast that its paid-up capital is over 67,000,000*l.*,—an immense sum to have been spent even in less than twoscore momentous years on railways, works, lines, and stock. But if a map of that great railway he looked at, it will be seen that it has a widely-reaching length of line. Its limbs are found far in the south-west, reaching down to Bournemouth, and stretching from Worcester to close upon the Welsh coast. St. Pancras is the central southern point, and direct north-west its line penetrates into the heart of the district whence it takes its name, gridironing it with branches, and sending out arteries to the east coast of Lincoln, to Manchester and Chester, and over to Liverpool, its trunk-line passing on to Normanton, and there severing, to make that wonderful extension to "merry Carlisle," which is justly ranked as one of the chief railway feats of the age, and again crossing to the west, to tap the great mineral resources of the rich Furness district. Except in the north-east, it may be said to have its lines spread in all parts of England, and it is the one railway which enters the six greatest towns and cities in the kingdom. Over 1,100 miles of line actually owned by itself its trains travel; and with lines leased, partly owned, and worked over, there is a total length over which Midland engines travel of 1,700 miles.

In these miles most varied scenery is enclosed. In its heart there is that of the well-wooded and undulating country from Buxton to Derby; the deep ravines, limestone rocks, and dense pine nooks round Matlock, with the rugged beauties of the Peak country, and its embowered halls; southward, it traverses Worcestershire, and down to the softer clime of Dorset; the waving wolds near Cheltenham, the ravines in Gloucester and Somerset, and the bleakness that bathes in the summer beauty of the south-west. No greater alternation with this could he found than that of the great northern extension to Carlisle up the Ribble valley, over and through Blea Moor into Garsdale, and over the great viaduct at Smardale, up the fine valley of the Eden, by castle-crowned Armathwaite, and on to Carlisle. Compared with this, the scenery round Carnforth and thence to the Lakes becomes tame; whilst that of the little Lune valley, and that around the most beautiful ruin of Kirkstall, and that in the Wharf valley, is as the river to the ocean. Alike through sylvan scenes, the dinginess of the "Black Country," the fat southern valleys, the homes of the worsted and woollen trades, the pleasure-grounds of the west, and the mountain fastnesses of the north, the Midland dashes; and whether it is the coalfields of Yorkshire, the ports of the west, the cotton and cloth districts, the lead-mining fields of Derbyshire, the hematite iron regions of Furness, or the multiform trades of the metropolis,—they are all tapped and toll taken of by this great company.

The Midland is now our chief coal-carrying railway, for every month it carries a million tons, a sixth part of which it conveys to the metropolis by rail; whilst of iron, lead, and other minerals there are proportionately large quantities taken over the line. From mineral traffic alone it has a monthly income of 150,000*l.*; from its vaster goods traffic, one of 249,000*l.*; from parcels, horses, &c., one of 23,500*l.*; and from live stock other than horses, one of 6,000*l.* Its passenger traffic is growing immense; every month it carries over two million passengers, of whom eleven-twelfths travel by its popular third-class, and from these two millions it receives 122,000*l.* monthly. In the total its monthly receipts are 540,000*l.*, the income of many a kingdom. Its working expenses are necessarily vast; for fuel for locomotive power alone it pays 14,000*l.* monthly; wages and salaries cost it in the same period 165,000*l.*; and for clothing for its officials it pays 2,000*l.* a month. Every month its trains travel two million miles; it owns 1,400 engines, a total rolling-stock of over 93,000, and it has the not inconsiderable stud of 2,735 horses. Its Parliamentary and law charges are from 1,000*l.* a month upwards; on the unsatisfactory item "compensation," in the same time, it expends 3,300*l.*; for rates and taxes it pays 14,000*l.* monthly, and finally it may be said that, after meeting all its working expenditure, it divides 250,000*l.* monthly amongst its 24,000 shareholders. This is the summary of what the Midland does, and it is no inconsiderable work; and when it is remembered that nominally the Midland Railway dates back only to 1844, and its earliest constituent branch only to six years earlier, it will be seen that the little branch from Derby has grown into a goodly line. It has not been all smooth-sailing, as those know who knew it in the dark days when "King" Hudson left the board of direction, or in those when the competition with the Great Northern was so severely felt that amalgamation with a greater company was thought of. Hence there is the greater credit to the Ellis and the Allports who have made the Midland; for it was not born great,—it has emphatically achieved greatness. The projection of the trunk-line from Bedford to London and from Settle to Carlisle are amongst the chief of the trophies it has won, and the works that have enfranchised it; and it is possible that in the future the Midland,—now the fourth in rank of British railways,—may in the north-east find a field to raise its status still higher.

BELFRY, SCHWABISCH GMÜND.

THE belfry of the Church of the Holy Cross at Schwabisch Gmünd is especially interesting, because it is a remarkable example of a cheap Mediæval structure, and shows us that it was not only in the costly and magnificent architectural building that the old architects excelled, but that they knew how to impart dignity to cheap and even temporary structures; for to the latter class this building undoubtedly belongs.

The magnificent Church of the Holy Cross occupies the site of an earlier building of the twelfth century. The present church was erected during the fourteenth and earlier part of the fifteenth century. An inscription on the doorway to the north choir aisle is as follows: "Anno Dom. 1351, ponebatur primus lapis pro fundamenta hujus chori XVI. kal. Augusti," and another inscription records the completion of the choir in 1370. The nave was commenced

ahout the same time that the choir was completed, and finished in the year 1410, when the whole was consecrated. The two towers of the former church were left standing between the nave and choir, hnt the arch which formerly connected them was removed in order to obtain a hetter view of the choir vaulting. This, however, weakened the towers, and on the night of Good Friday, in the year 1497, they fell to the gronnd with a crash, hut fortunately no one was injured by the accident, although there were several people in tho church at the time watching the Good Friday sepulchre.

The present helfry was erected immediately after this accident to hold the hells until a tower could he erected; but probably the events of the Reformation period, which shortly after intervened, prevented thie heing carried out, and thus, what was intended to he a mere temporary strncture, has now existed for nearly 400 years. The walls are of considerable thickness, and the whole of the npper portion of the tower is composed of timber covered with highly-glazed tiles, disposed in patterns red, green, and yellow in colour.

There are four hells, of which the earliest dates from the middle of the thirteenth century. The other three are all dated, and were cast in the following years,—1456, 1515, and 1595.

THE NORTH LONDON HOSPITAL FOR CONSUMPTION, MOUNT VERNON, HAMPSTEAD.

This new hospital, of which we illustrate the north-eastern or entrance front and the plan, is now in course of erection. It will stand in its own large and well-wooded grounds, near the highest part of Hampstead, and will front to Frogual Rise with a nearly north-east aspect. The garden front consequently looks sonth-west, and commande splendid views of Middlesex and the Surrey hills. All the windows will catch the sun at some part of the day, and the greater part of them will be in sunshine almost all day long. The situation has heen selected in order to carry ont the views of those who advocate a dry and pure air in preference to a mild climate for the treatment of pnlmouary coraplainte.

In plan the hospital is to he a compact rectangular structure, about 160 ft. long hy 55 ft. 6 in. deep. It is intended for 110 patients. It has a very ample and light corridor, of fire-proof construction, running from end to end on each floor. The principal entrance is to he at the centre of the uorth-east front, and here an open and roomy main staircase rises through the principal floors, and adjoining it a service-staircase is carried from the hasement to the attic floor, combined with which will be a lift for patients and general purposes.

The hospital is five stories high. The hasement floor, owing to a rapid fall of the ground, is almost entirely above gronnd at the western end, and here is placed the out-patients' department, with surgery, dispensary, and ample waiting-rooms, the remainder of the hasement heing chiefly devoted to storage, cellarage, and heating apparatns.

On the main or ground floor are provided the rooms for administration. Here, for example, are the hoard-room, committee-room, and rooms for the secretary, matron, chaplain, physician, assistant medical officer, and clinical clerks; a receiving-room, visitors' room, two day-rooms for male and female patients respectively, and one or two small warde for special cases, complete the accommodation provided. There will he direct access to the garden and grounde from this floor.

The next two floors are devoted to the wards for patients, — one floor for women, the other floor for men. In the size and disposition of these wards snch a hospital as this differs of necessity from a general hospital. The patients are here to be treated in wards of moderate size, as cheerful, airy, and pleasant as they can be made; and more home-like in their appearance than the great ward of an ordinary hospital. These will be heated hy open fires, and their warmth and dryness will he contributed to hy the fact that nearly all the external walls are built hollow. No ward is intended to receive more than eight beds and in some only four, and in others only two, hede will he placed. On each of these two floors a day-room, 35 ft. long, is provided, and here the patients will take their meals and may sit. On the sunny side of the building are also provided open arcades, communicating with the day-roome and with the greater number of the wards. These will provide large and sheltered hut airy haloonies, in which patients may sit and enjoy the air, the sunshine, and the almost matchless view. There will he eight of these in all, four on each floor, and they will prove, it is hoped, a comfort and a solace to many of the inmates of the hospital. Nurses' rooms, Sisters' rooms, as well as hath-rooms, and other such appliances, will he provided on each floor.

The kitchen-offices, servants' dormitories, rooms for nurses off duty, and eome of the household stores, will he provided for in the roomy attic story, which, thanks to the large space secured hy the high-pitched roofs, is lofty as well as spacious. It ie no novelty in modern buildings for the kitchen to occupy the attic story; but in many cases this arrangement could not he suitably attempted in a hospital. In the present instance, however, the convenience of the whole establishment will he best served by it, and the provisions will descend direct to the day-rooms of the patients, while the smell and heat of cooking will he kept entirely away from them.

In the sanitary arrangements, simplicity and thoronghness have heen aimed at, and the ventilation of draine and isolation of water-supply have not been forgotten. The ventilation of each ward ie carried on eeparately, an outlet-flue heing provided alongside the smoke-flue in every case, air being introdnced through one or more inlet ventilating-channels.

The huilding, which is of hrick with etone dressings, and with tiled roofs, is heing carried on in sections. The western section, the one first taken in hand, has been for some time complete in carcase, and the finishing of it ie now far advanced. This comprises rather more than one-third of the entire huilding. The foundation-stone of the central section was laid in Octoher hy H.R.H. the Duke of Connanght; but this work will not he proceeded with till after the patients have been removed from an old house, occupying the site, and in which they are at present accommodated, into the new huilding.

The architect is Mr. T. Roger Smith, F.R.I.B.A., and the general contractore are Messrs. Higgs & Hill, of Lambeth.

DERWENT HALL, DERBYSHIRE.

The works at Derwent Hall, now the seat of his Grace the Duke of Norfolk, with the exception of a few minor details, were sufficiently completed in time for his Grace and gnests to take up their residence there during the shooting season this year.

The old hall, situated near the interesting village of Derwent, was originally in the possession of the Balguy family, of Cheshire, and after eome changes of ownership eubseqnently became the property of the Newdigate family, from whom the present Duke of Norfolk hought it for the purpose of a shooting-hox. The accommodation afforded by the huilding proving, however, inadequate to the Duke's requirements, the old hall has made way for an almost entirely new hlock of huildings, of which the following description may prove of interest.

Entering hy the old doorway (with the Balguy arms and the date 1672), on either eide of the entrance-hall, which is hung with tapestry from Worksop Manor, two quaintly-carved doors open on the left to the Duke's etndy and servants' department respectively, two on the opposite side giving access to the old staircase and corridor in the right wing leading to the duchess's room and library, these rooms, with the entrance-hall and the duke's study hefore mentioned, heing that part of the old building utilised in the present arrangement.

We may here mention that these rooms have heen re-decorated and finished in a corresponding style with the rest of the work, in which every endeavour has heen made to unite the character of an old English country-house with modern requirements. The right wing also includes the new dining-room, and, further on, the drawing-room, of which we give an interior view, showing a fine oak chimney-piece from Norton Hall. The continuation of the corridor connecting these rooms forms for the family a means of approach to the comfortable private chapel, the servants heing provided with a separate entrance from the outside.

Ample bedroom accommodation also is provided, the rooms heing panelled from floor to ceiling, and otherwise finished in a eimilar etyle to the ground floor.

Leaving this part of the house, the left wing contains butler's and housekeeper'e rooms, kitchen and other offices, servants' hall, gamekeepers' mess-room, dairy, game and meat larders, and a new block of stables, with accommodation for eight horses in the stalls, two loose hoxes, trehle coach-house, and separate harness-rooms for his Grace and gnests.

The works, including the chapel, have exteuded over a period of nearly four years. Messrs. Dennett & Co., of Whitehall, were the contractors for the Early English chapel and a part of the house, the remainder of the work having been done without a contract, nnder the sole management of the architects, Messrs. J. A. Hansom & Son, of Alfred-place West, South Kensington, Mr. J. Firth being the clerk of works.

The stone, hoth for ordinary masonry and dressings, was at first obtained from Moscar, at considerable expenditure; hnt latterly a quarry on the estate has heen opened out.

Tbe house is fitted up throughout with electric hells, hy Messrs. Edmundson & Co., of Westminster. The general work, including most of the oak panelling, has heeu done by Messrs. Dealy & Horner, of Sheffield; the carving and the remainder of the panelling, including that in our view, heing hy Messrs. Farmer & Brindley. The cost of the works up to the present time is nearly 30,000*l.*

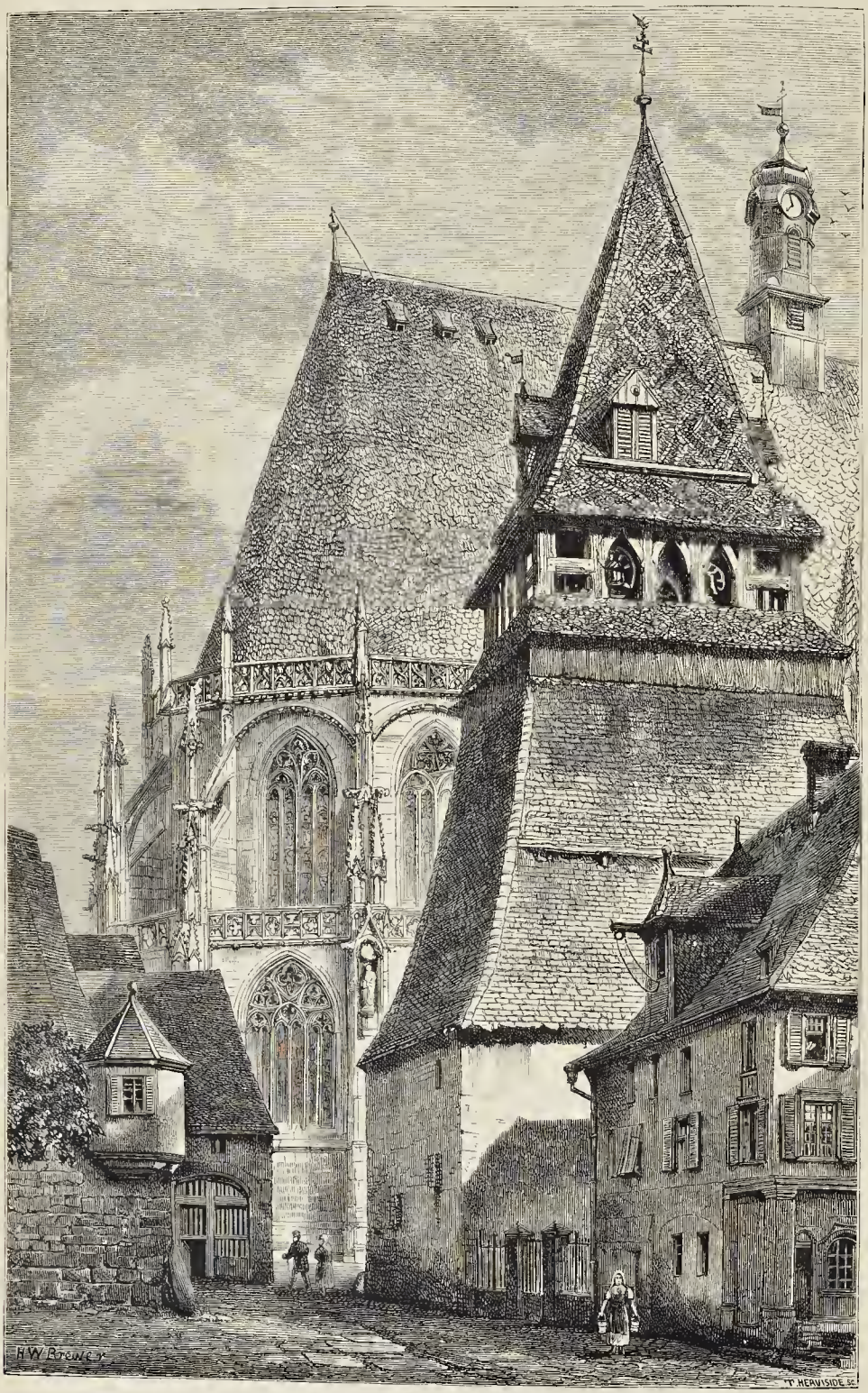
The old huilding has heen enlarged, altered, and pulled about a good deal at different times, to suit different tastes and requirements; but every effort has heen made to retain the genuine old parte wherever character was displayed and the etahility of the buildings allowed it. Unfortunately, however, the Hall had, under previous owners, heen dismantled of many quaint accessories, in the way of wainscot panelling inside and lead-work outside, while the plasterer had had only too free a run of the house.

Tbe stained glase in the chapel, and tbe door and shutter furniture, which is of iron treated with Professor Barff's process of oxidisation, were supplied hy Messrs. Hardman & Co. We believe this is the first time of Professor Barff'e treatment heing used for a similar purpose, and it harmonises admirably with the oak doore and panelling. We propose shortly to give a view of the exterior.

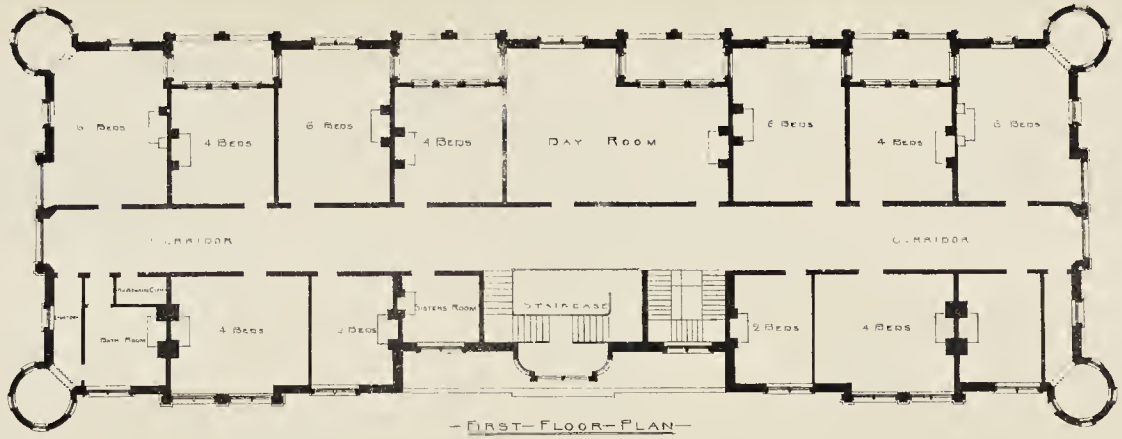
THE SCHUMANN MONUMENT, BONN.

When, in the August of 1873, the most eminent German and foreign artists met witbin the walls of the pleasant university town ou the Rhine to do honour to the memory of Robert Schumann hy a musical festival, this was done also with a desire to erect a snitable monnment to the composer in his last resting-place, the cemetery of Bonn, the proceeds of the meeting to supply the means for its erection. A local committee was appointed at the time, and this hody, after careful consideration, commissioned the sculptor, Herr A. Donndorf, to execute the work. Professor Donndorf is well known hy hie Luther Monnment at Worms, the equestrian statue of Karl August at Weimar, the Freiligrath Monument, and other equally meritorious creations. The monument, of which we give an illustration, and which has been erected in the Friedhof of Bonn, is entirely of white Carrara marble, and was executed at Carrara nnder the personal superintendence of the sculptor. It was unveiled last May.

In keeping with the place for which it was intended, the sculptor has imparted to his work a solemn, elevated character. On a hroad hase rises a powerful eqnare socle, which eupports the monumental stone, tapering eomewhat towards the top, and crowned hy a moulded coping with acroteria. Its front hears a faithful medallion portrait of Sohnmann, surrounded hy branches of oak, roses, and laurele, and snpported hy a rising swan with outspread wings; below, simply his name, Robert Sohmann. At the foot of the socle the master's muee is seated, to which the sculptor has given, with true poetio and historical instinct, the youthful featuree of Klara Wieck, the noble wife and congenial life-companion of the great composer. It is a charming, thoroughly German figure, this muse, a type of sweet, ideal womanhood, of poetic temperament and devoted inspiration. Draped in modest folds, the expressive face turned upwards to the right, she rests her left hand, the fingers of which enclose a partly-opened roll of music, npon the lyre, while the right, resting in her lap, holds a laurel wreath. The ideal

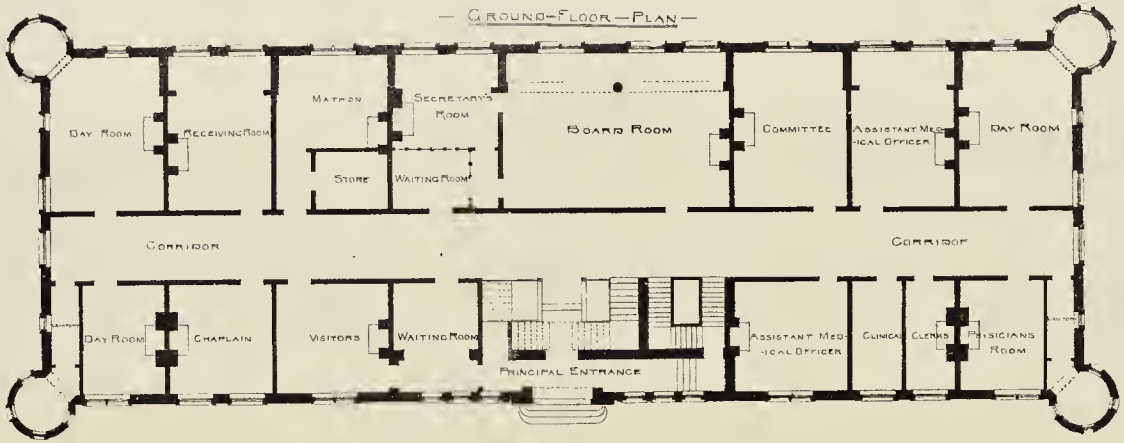


BELFRY, SCHWABISCH GMÜND.



— First-Floor-Plan —

Scale about 22 ft. to 1 in.

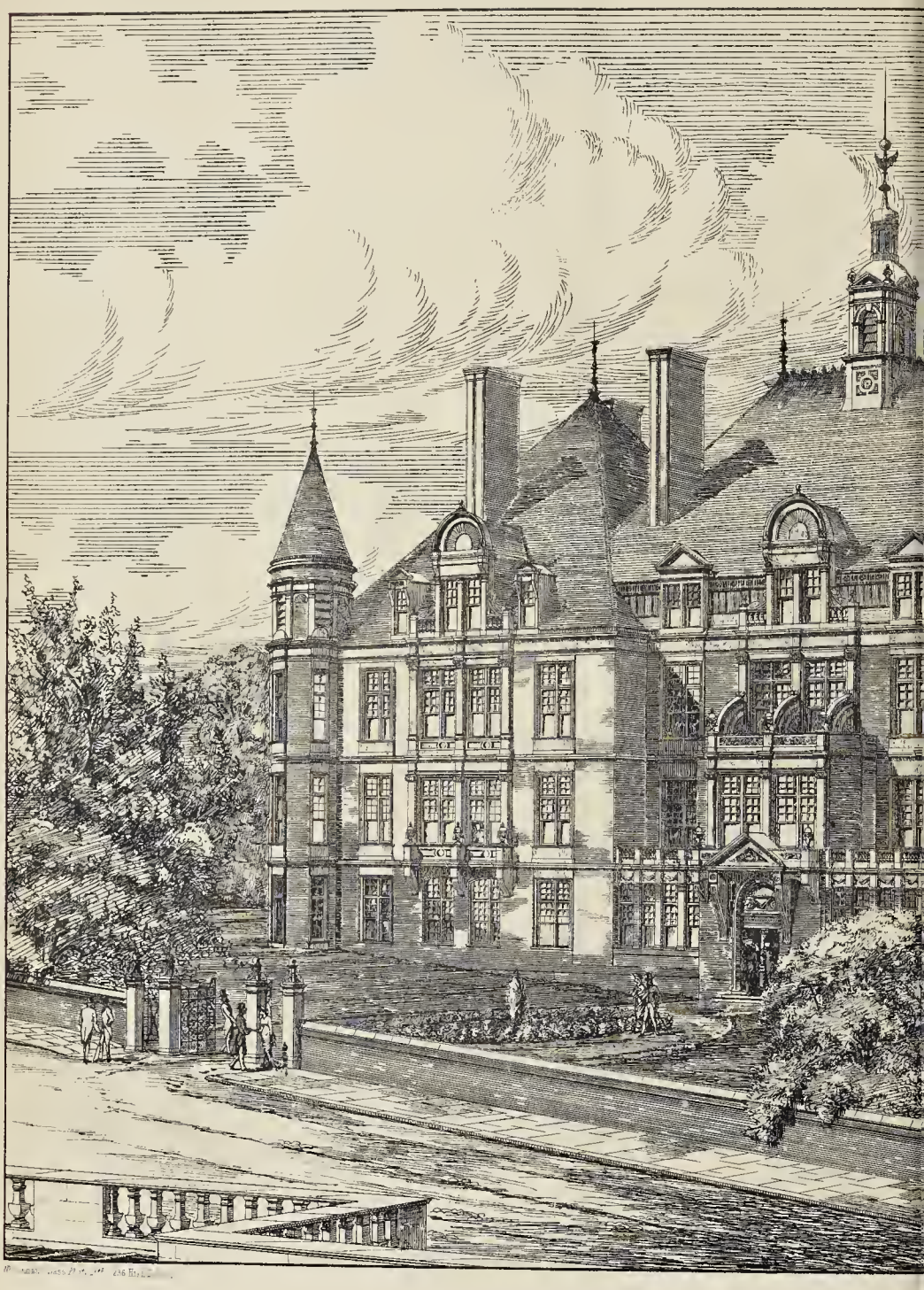


— Ground-Floor-Plan —

Whiteman & Bass *Photo-Litho* 236 High Holborn

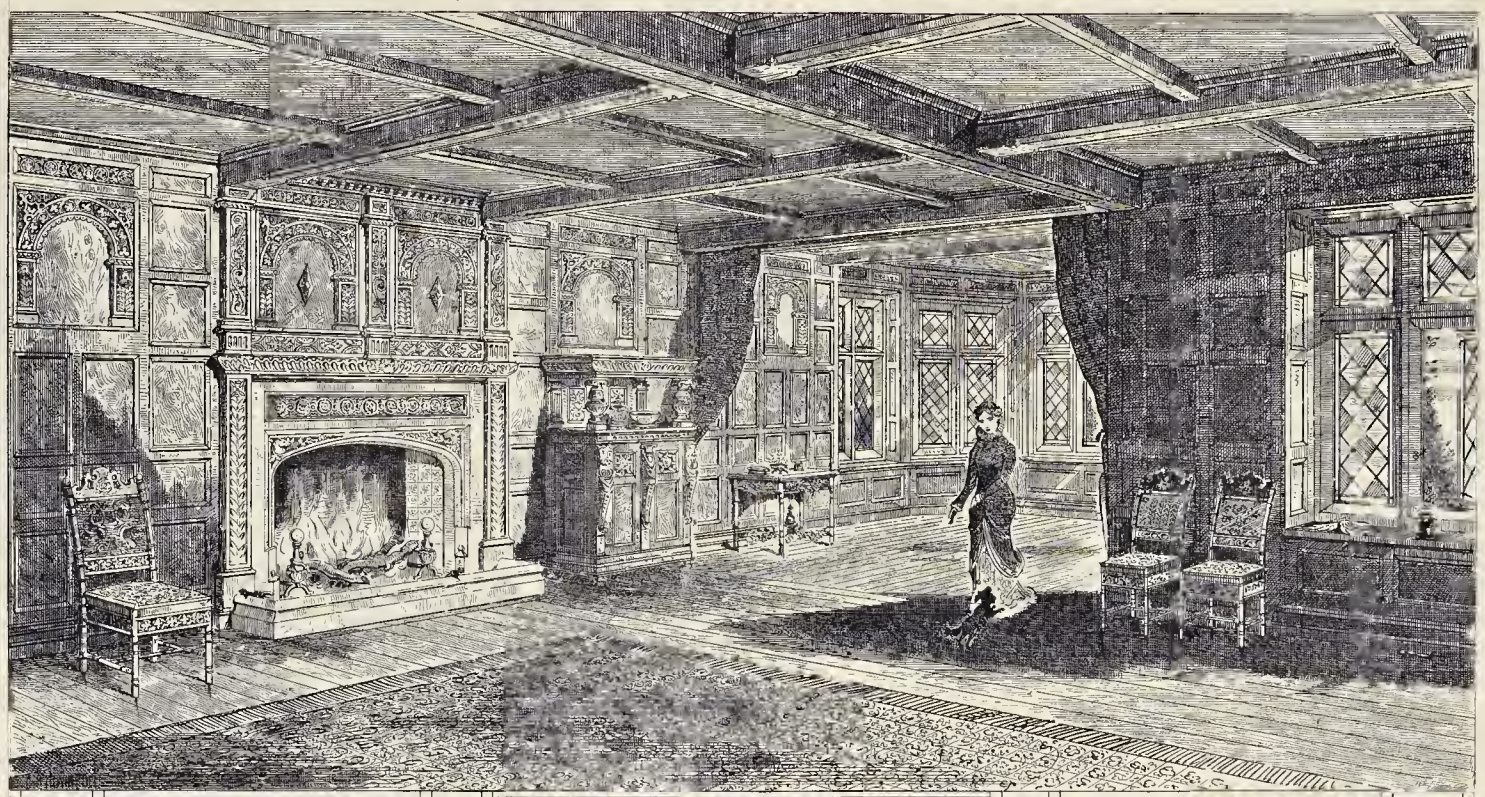
Wyman & Sons, Printers, Queen St.

CONSUMPTION HOSPITAL, HAMPSTEAD



THE NORTH LONDON HOSPITAL FOR CONSUMPTION, MOU

ERNON, HAMPSTEAD.——Mr. T. Roger Smith, Architect.



INTERIOR OF THE DRAWING ROOM

HARDWICK HALL, DERBYSHIRE, the seat of HIS GRACE the DUKE of DEVONSHIRE K.G.

MESSRS. J. M. TAYLOR & SON, ARCHITECTS

Whitman & Brass *Photo Litho* 236 High Holborn

Wyman & Sons, Printers, 74 Queen St

THE MONUMENT TO ROBERT SCHUMANN, BONN.—Professor A. Donndorf, Sculptor.

importance of the special muse of the composer could not have been more convincingly expressed. On either side of the muse are seated, on separate pedestals, two genii,—the singing Psyche and the fiddling Amor.

The monument is about 13 ft. high, and has a breadth of 6 ft. 6 in. All the figures are in a much lighter marble than the architectonic parts, and are somewhat above life-size, so that in the open they have the effect of natural proportions. The head of Schumann not only forms the centre of attraction, but also the lightest part of the monument, marble of the most excellent quality having been selected for it. The total cost of erecting the monument is 1,250*l.*

A PLEA FOR VENTILATION.

The discussion upon Mr. E. C. Robins's paper upon "Sanitary Science in its Relation to Civil Architecture," on the 29th ult., was adjourned, to be resumed on the 17th of January next. In the meantime, public attention will be absorbed by all-engrossing politics, and unless, Sir, your influence can be exerted, the good which might have resulted from Mr. Robins's comprehensive paper will to some extent be lost.

If you will allow me space to comment upon the observations of the several speakers at the discussion in question, I will conclude with an endeavour to fix the *onus* for neglected ventilation upon the right shoulders.

My remarks shall be strictly confined to ventilation combined with warming, since these should never be severed; and, moreover, my practical experience has been chiefly confined to these branches of sanitary science.

The observations made by Professor Corfield, who commenced the discussion, had reference chiefly to sites and drainage, the ventilation of sewers, &c., but did not touch upon the ventilation of dwelling-houses.

Mr. E. R. Robson, who followed, made several sound and practical observations, and rightly insisted that what the architect has to do is to follow natural laws in the main. He advocated the provision in all houses of efficient warmth and ventilation to the corridors and staircases; forming reservoirs, in fact, of fresh warm air outside the rooms.

It would be no valid objection to this view to suggest that, by so doing, in London houses especially, the heat and odours of the kitchens and basement offices would be attracted upwards. Such a result can and ought to be rendered impossible by the efficient ventilation of those departments of essential work.

I cannot, however, agree with Mr. Robson in his preference for the American steam-heating system, which, as pointed out by Capt. Douglas Galton, C.B., does not, like the low-pressure hot-water system, admit of easy regulation to meet the ever-varying temperature of our climate.

Neither can I endorse Mr. Robson's condemnation of the principle of warming the fresh air by contact with low-pressure hot-water pipes in basement chambers, and distributing it, in large quantity, moderately heated, to the several rooms of a school or other building. It may well be that many of the earlier constructions upon this principle with which Mr. Robson is acquainted have had their basement chambers too small to admit of periodical cleansing, or even for the reception of sufficient air to be warmed and passed on to the several rooms. That such fresh-air channels should speedily become foul and dirty, and affect the salubrity of the air, cannot be surprising, while others, sufficiently large for workmen to pass from end to end to cleanse and lime-white their interiors, may be referred to without hesitation as the very best means of warming and ventilating rooms designed for the reception of large numbers of persons. Such are those of the Museum of Comparative Anatomy and the Selwyn Divinity Schools at Cambridge.

The inequality of temperature in large rooms warmed by open fires, to which Mr. Robson adverted, ought not to arise where the best kind of warm-air ventilating-grates are used.

Of these it may be safely asserted that they maintain a temperature varying not more than 2° between the most opposite points, premising, of course, that the size of the grate (fire) has been judiciously chosen, and no extraordinary amount of cooling surface nor deep recess or bay occurs to make the spot in question altogether exceptional. It is to be hoped that the members of the Institute will accept Mr. Robson's invitation to inspect and judge of the two school buildings to which he referred, the one warmed by the "Hygiastic Grates," and the other by the "American Steam-heating System." If the latter, by radiation or convection, shall efficiently warm the air of the rooms, while the Whitehurst-Tobin principle of cold-air supply shall impart the needful freshness, without cold draughts, its success will make the deeper impression from the fact that theoretically it is in opposition to the views of our first authorities.*

Captain Douglas Galton, C.B., bore testimony to the greater success of American architects in dealing with ventilation than obtains in England, attributing this result to the greater scope allowed them for improvements. He referred especially to Dr. Hall's Presbyterian Church, and to the theatre in Madison-square, New York, but beyond the statement that the ventilation was effected partly by means of propulsion and partly by extraction, no practical suggestions were afforded. Mr. Ewan Christian cordially endorsed the eulogium of Captain Douglas Galton upon the admirable ventilation of Dr. Hall's Church, but if he brought away with him any definite conception of the mode of its accomplishment he failed to convey it to the anxious minds of the junior members of the profession, whose ears were open for its reception. Indeed, these young men, who doubtless made mental notes of the scientific works they were recommended to study by one of the earlier speakers, another F.R.I.B.A., must have felt their ardour in the pursuit of good ventilation considerably damped, when their highly-respected senior wound up his remarks by stating that "he had tried many plans [of ventilation], but always found all the holes stopped up within a month or so. Nothing was better than a roaring fire and an open window."

Would it be unfair to ask Mr. Christian whether the fact stated as to the "many plans" and the "stopped holes" proves anything more than that want of knowledge which hinders the use of inlets and outlets for air, where they would inevitably act as desired? I fancy too many architects would delight in ridding themselves of all enthusiastic advocates for scientific ventilation by placing them within the range of "open window" and "roaring fire."

Mr. G. J. Symons, F.M.S., drew attention to the system of a Glasgow firm for the ventilation of large rooms by means of two large iron vessels alternately rising and falling in the roof space for the extraction of vitiated air. This system would appear to require steam or other power. There are many efficient modes of extraction where power is available, but the remarks in the present paper chiefly refer to ordinary buildings where such is not the case.

Professor Ayrton's condemnation of the highly-heated American stoves accords with the established preferences of Englishmen. The statement that carbonic acid gas passes easily through heated wrought iron will be a surprise to many persons, and it would at least be useful to know to what temperature the iron may reach before attaining this objectionable result.

Lieut.-Colonel Prendergast, who last addressed the meeting, referred especially to the "brand new" barracks at Knightsbridge, where he appears to imply that the proverbial result has followed the employment of "too many cooks"! "The admirable grates devised by Captain Galton have been rendered nugatory by ventilating engineers on the one hand, and doctors on the other"!

But the remarks of Lieut.-Colonel Prendergast are not sufficiently precise or explicit to admit of criticism, while they indnce a strong desire for further information; and this we must hope to obtain.

And now, sir, for the promise, illustration, and reference, given in the second paragraph of this paper.

When, several years ago, the plans for the Foreign Offices were in course of preparation, I determined to induce, if possible, some consideration for poor, neglected "ventilation" at the hands of the distinguished architect, Mr. (afterwards Sir) George Gilbert Scott, and I approached him armed with a letter of introduction from his brother. I was courteously,—not to say kindly,—received; the subject was admitted to be an important one; and I was requested to obtain an interview with the then First Commissioner of Works, the Right Hon. Wm. Cowper.

My opening visit with the First Commissioner appeared, to my inexperience, a very promising one; and I returned to Mr. Gilbert Scott with the message that Mr. Cowper would be very pleased that Mr. Scott should go into the question with me in order that something might be done.

It was not easy for a mere "projector of ventilation" to command ready access to two such distinguished men, and I had a weary time of it, and several unproductive calls upon Mr. Gilbert Scott, before I was informed that the architect had no money for ventilation, and that the First Commissioner should start by providing a further 10,000*l.* (!) to enable the architect to entertain the question seriously. At length, when I succeeded in obtaining another interview with the First Commissioner, I was doomed to hear that more money was out of the question, and I was asked, "Could ventilation really be so essential for such large and lofty rooms?" It was in vain that I argued that large rooms were usually built for large numbers of persons, and that even when occupied by few persons only, stuffiness of atmosphere was merely a question of time, and inevitable, sooner or later, in the absence of means for exchanging the air. I next tried the "*argumentum ad hominem*," by reminding the Right Hon. First Commissioner of his own highly-interesting paper upon this very subject of ventilation at a recent popular Reading; and I was rewarded by a smile, and some allusion to autumnal leisure, and the duty of contributing to the edification of the people.

I have known it to be maintained by many architects that there is no desire for ventilation on the part of the public, their clients, and hence that they are unwilling to pay for it. But surely it should be the province of the architect to insist upon its provision, in view of the overwhelming evidence of its necessity afforded by the researches of scientific men. The principles which underlie the construction of chimneys which shall not smoke, of ventilating-flues which shall pass their currents as desired, of drains which shall not poison their surroundings, of damp walls and basements which shall be conspicuous by their absence, are very much of one order, and may be understood by any one who brings a very little science, experience, and common sense to bear upon them. They partake perhaps too much of the practical to be popular with the æsthetic; but architects who neglect them after all the aids afforded, as was well suggested by Professor Corfield, will assuredly be left in the rear of progress; for the time must come when they, and they alone, will be held responsible for the neglect of this and all other branches of sanitary science.

D. O. Boyd.

* Hood's "Treatise," 5th edition, 1879, page 377; Parkes's "Practical Hygiene," by De Chaumont, 5th edition, 1878, page 149.

A CHRISTMAS VISION.

One night I chanced to pass the time
With Christmas tales, in prose and rhyme,
Of ghosts and phantoms eerie,
And then to "shop" for change I turn'd
And read how limes should not be burn'd,
Till brain and eye grew weary.

I read how great the works of old,
How style did newer style unfold,
How Art from Nature grew;
How, first inspired by her grand skill,
Man needed, reason'd, built,—until
His earth was dress'd anew.

I read till past that "witching hour"
When spirits may assert their power
To visit earth again.
At length I laid the volume down,
I lit my pipe, put on my gown,
And fell in musing strain.

The wreathing smoke did upward curl
In many a circling, wavy twirl,
And from its shade there grew
A form impalpable, though near,
Whose shadowy presence grew more clear
The more the smoke I blew.

His lustrous eyes, his olive cheek,
His raven hair, his air, bespeak
Him born in foreign clime;
His massive head and lofty brow
Denote the intellect which now
Defies the power of Time.

Aghast I gazed in trembling awe,
When at his side arise I saw
A form far less imposing;
The latter's brow is more serene,
His dim eyes lack those glances keen,
The mind's own fire disclosing.

But yet they did engage, methought,
In wordy war, for oft I caught
The arms outstretch'd, and guess'd
That he who first appear'd did chide
His fellow's want of proper pride
In arts which he profess'd.

Whereat he of the modern school
With twitching mouth, demeanour cool,
Look'd as though he'd say,
With you *in toto* I agree,
At least—that is, in theory:
In practice 'twill not pay.

Ere long less stupefied I grew,
And seem'd to understand the two
Disputed as to Art;
The ancient's accents fluent roll'd,
Mellow, rapid, deep, and bold,
As pouring from his heart.

"O Friend," he cried, "art thou content
To copy merely what was lent
As precept and example?
Have minds become so barren now,
That e'en Invention's needy plough
But turns the ancient samples?"

"No," quoth the other; "but you see
The public are æsthetically
Inclined, and swear by you;
True art but lived in days of yore,
They say, and praise the copy more
The more the copy's true."

"The public—bah! And what know they?
Unletter'd, rude, and, sooth to say,
Aye clamouring for the moon!
We work'd for art, and when we caught
A Heaven-inspired notion sought
To give it life full soon,

All careless whether those around
Contemn'd or flatter'd, if we found
New beauties spring to life.
O Friend, our all was in our art,
'Twas of our very soul a part;
We knew not jealous strife."

"But, Sir," the Modern next replied,
"From then to now is period wide;
Permit me, too, to show
The public is to us what you
But found in patrons, though 'tis true
They both but little know.

You'd but to please a tyrant rude,
While we must please the multitude,
From pot-house to the Throne;
For, strange to say, 'midst all our cares,
We all of other men's affairs
Know more than of our own!

And had I follow'd when on earth
My art for art's intrinsic worth
I had been in a fix
When friendly Charon ask'd for toll
To row my disembodied soul
In comfort o'er the Styx."

"Unhappy man! and canst thou now
Scoff lightly at thy art? Didst thou
On earth so plainly mock it?"
"Nay," quoth the Modern; "then, I grant,
I used the necessary cant,
Nor wantonly did shock it;

For had I striven 'gainst the tide
Of taste my hobby-horse to ride,
Without it was the rage,
I had been call'd a dunce, a prig,
An ass, who, with conceit swell'd big,
Did strive to guide the age."

"Alas, alas!" the Ancient cried;
"Alas, alas! that thus the bride
And lover true should part!
That she should go to Mammon's bed!
That he should sacrifice for bread
His duty to his art!

While sciences and laws progress,
How is't the sister arts do less
Than keep their ancient lines?
To-day's are not the same demands
Which fired the brain and nerved the hands
That raised Athenian shrines!

Be not withheld,"——The spirit here
Stretch'd forth his arm. To plainer hear
I forward lean'd, and broke
The vapoury cloud which hung around,
When, lo! my vision had, I found,
Consisted all of smoke!

HERBERT.

The Liverpool Land and House Owners' Association held its twenty-first annual meeting on the 17th inst. The report stated that during the past year the council had sent a memorial to the Right Hon. R. A. Cross, M.P., suggesting that a Bill might be introduced into Parliament in favour of a national water supply, and against exceptional legislation for London; also a memorial to the City Council urging postponement in carrying out the Vyrnwy water scheme. The proposal of the City Council to erect 2,560 lamps in courts and passages, at an expense of 15,800*l*., to be paid by owners of property, was protested against. After referring to the opposition of the council to the second Nash-grove scheme for building artisans' dwellings, the report expressed the hope that the last had been heard of "four and five-decker houses" [dwellings in flats, we suppose], and that the land would be disposed of in the open market in the usual way. The council had suggested to the City Council that they should apply to Parliament for power to take down the whole property in the old parts of the city, that wide roads might be laid out for properties of every class to be built to the fronts of them. It was believed this would have the effect of reducing the high death-rate. The report was adopted.

ENGINEERING WORKS AT HOME AND ABROAD.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

MR. H. ELLIS HILL, A.-M. Inst. C.E., in the course of the address delivered by him as President of this Society at the opening meeting of Session 1880-81, commenced by referring with satisfaction to the fact that the Society, which has now been in existence for twenty years, has recently acquired offices and a meeting-room of its own in Westminster Chambers. He next proceeded to review the progress made in engineering works during the past year, specially mentioning and briefly describing the Royal Albert Docks at North Woolwich, recently opened, and which, it may be noted, consist of a main floating-dock of 75 acres area, with an entrance-basin of 9 acres. The entrance lock is 800 ft. long and 80 ft. wide, with 30 ft. depth of water over the cills. The main dock is a mile and a quarter long and 490 ft. wide, the total length of dock walling being three miles and a half. As we pointed out in our description of the works three years ago,* the dock-wall is of concrete (500,000 cubic yards being used, requiring 80,000 tons of Portland cement). This work, perhaps the most gigantic of its kind, was cited by Mr. Hill as affording evidence of the great value of concrete in such constructions, on account of its strength, cheapness, and adaptability, and as having almost revolutionised the practice of the civil engineer in such works. Another fine example of the use of concrete is to be seen in the Dock Extension works at Chatham. Amongst other works completed during the past year are the landing pier and breakwater at Douglas, Isle of Man, where, again, the material used was concrete, with the result that the works have been constructed at probably a less cost than any kindred works of similar magnitude in the country. The necessity for adequate dock accommodation for ocean-going steamers is making greater demands upon the engineer, in consequence of the continually increasing size of those vessels. Steamers of 5,000 tons burden, 500 ft. long and 26 ft. draught, are now traversing the ocean, and vessels of 8,000 tons and 10,000 tons seem likely to become common. Alluding to the proposed Panama Canal, Mr. Hill paid a warm tribute to the energy and genius of M. de Lesseps, and stated that in connexion with the works there would be constructed a flood storage reservoir having a capacity of 1,000,000,000 cubic mètres. The dam for forming this reservoir would be 147 ft. high and 787 ft. wide at the crest, and would require 26,000,000 cubic yards of material. The total amount of excavation for the canal was estimated at 100,000,000 cubic yards, about one-half being in rock. Owing to the peculiarity of tidal change, a basin with three lock chambers would be necessary at the Panama end, the rise of tide being from 7½ in. to 19 in. at one end, and from 8 ft. to 21 ft. 3 in. at the other end of the canal. As a maritime nation, it could not be said that England was yet well supplied with accommodation for shipping. Our shores were proverbially dangerous, and harbours of refuge were few and far between. The railway works completed during the year include the St. Gothard Tunnel, and, amongst those nearly completed is the Manchester Central Station, having a roof of 210 ft. span and 550 ft. long, and in which the weight of ironwork used is 2,400 tons. The lamentable failure of the Tay Bridge was referred to as showing the necessity, not only for careful consideration of the design and proportionment of parts to work to be done, but also, — and of not less importance, — the obtaining of good material and workmanship. With regard to the future prospects of the engineering profession, Mr. Hill said he did not share the gloomy view held by many, that in this country engineering is worked out. Of course, with regard to railways, not many (if any) large trunk lines would be required, but there was still much work to be done in the way of providing branch lines. As to street-tramways, there was no reason why they should not be very greatly extended, and horse draught-power largely if not entirely superseded by steam or other motive power. The problem of dispensing with animals for draught-power had not yet been entirely solved, however, for the crude expedient, now being tried in some of the Northern towns, of coupling an unwieldy and cumbersome engine and boiler to an ordinary tram-car could not be considered a success. There was much room for ingenuity in devising a simple and easily-managed mechanical motor for street tramways. With regard to sewerage and drainage works, Mr. Hill observed that fame and fortune had still to be won by sanitary engineers in devising a system of dealing with sewage which should be effectual and generally applicable. Gas and water engineers, electricians, and representatives of other branches of the engineering profession had also much work before them. Discussing the question of transferring the management of gas and water-works to municipalities instead of leaving such matters to private enterprise, Mr. Hill doubted the advisability of the change, on the grounds, amongst others adduced, that there would be a less direct incentive to the obtainment of commodities of good quality (whether water or gas) for the sake of the custom, or to the attainment of cheap distribution for the sake of the profit, and the consequence would be, in Mr. Hill's opinion, that the consumers would suffer. In considering the work of the Civil and Mechanical Engineers' Society as an aid to the education of the young engineers who constituted the bulk of its members, he touched upon the connexion subsisting between *civil* and *mechanical* engineering, and then summarised the qualifications required by the followers of these two main branches of the profession of engineering, adding what may be called a *précis* of some of the chief practical points arising in professional practice. While the two branches of the profession were to some extent divergent from each other, yet he was convinced that it was next to impossible to be a sound and successful civil engineer without a considerable acquaintance with the work of the mechanical branch of the profession. It might be, and was, argued by some that it was always possible to separate the work of the two branches, leaving the purely mechanical engineer to work out the practical details of construction after the broad outlines had been arranged, it being, it was urged, too much to expect one man to possess an intimate acquaintance with many and varied details. While that was true to a limited extent, it was none the less true that an engineer could more correctly design large works if, at the same time, he knew how the details of construction should be carried out. In these days of large public works and special appliances, it was not sufficient for an engineer to be able to design correctly the various parts of a structure; he should be capable, if called upon, of designing special plant for special requirements, in order to secure economy of construction. This might seem to be more directly the business of the contractor, but many works were constructed without the intervention of a contractor, and in such cases the engineer was responsible, not only for the design, but for the construction of the work; and even where a contractor was employed, the same knowledge was required from the engineer, because an acquaintance with the best means and appliances for construction under special circumstances might so modify the details of design as to cheapen a structure without impairing its efficacy. As an example of this, Mr. Hill cited the case of the Dublin river wall, where huge blocks of concrete, weighing each nearly 400 tons, had to be lifted, transported, and deposited in place; and much ingenuity was displayed by Mr. Bindon Stoney, the engineer, in designing the monster machinery for that work. A barge was employed carrying floating shears with an overhanging jib capable of suspending a large block over the end of the barge, and in that position transporting it to the required position in the work. Manifestly this system could only be employed in smooth water. A similar problem had presented itself in the works at Jersey, but under different conditions. There the blocks were from 70 tons to 100 tons in weight, and had to be deposited in the open sea. There, as at Dublin, a barge was employed, but instead of the overhanging shears,—which with a small wave movement would cause a great oscillation of the suspended block of concrete or stone,—the block was suspended underneath the barge from a strong framing on deck, and manipulated by a powerful winch arrangement. On the blocks so deposited at Jersey a superstructure of concrete blocks, each weighing 12 tons, was raised, the blocks being set in place by a specially-designed overhanging travelling-crane, called a "Hercules," having a traverse of over 50 ft. At a work now being carried out

* See vol. xxxv. (1877), p. 727.

in South Africa a similar machine was employed, with somewhat less overhang, but capable of dealing with blocks of 25 tons each, and also capable of being used for depositing from a box large bags of concrete to form the substructure to receive the blocks. In Ceylon, in connexion with other large works of the kind, a similar machine was being used for depositing blocks of between 30 tons and 40 tons weight. These machines had all been designed by Sir John Coode to suit the special requirements of each place, and they were all so contrived that the blocks could be brought from the block-yard and then picked up by the machine and set in the work, the machine moving forward as the work proceeded, thus obviating the necessity for temporary staging, which was not only a very expensive item in first cost, but was always liable to damage during stormy weather, whereas the machine could be run back to a place of shelter. Similar machines had been designed by Mr. Parkes for his works at Kurrachee and Madras, to deal with blocks of 27 tons weight. There was no doubt that in the future, where works of magnitude had to be constructed, special appliances would come in for much attention. As an evidence of this it was only necessary to mention that the estimated cost of plant in connexion with the harbour works at Batavia was 83,000*l.*, while within the last six years more than 85,000*l.* had been expended on plant at the Antwerp harbour works. With regard to mechanical engineers, Mr. Hill, in concluding his paper, insisted that they should be trained in engineers' workshops.

On the motion of Mr. A. T. Walmisley, seconded by Mr. R. Harkness Twigg, the thanks of the meeting were given to Mr. Ellis Hill for his address, of which the foregoing is but an abstract.

FROM ABROAD.

Those, and they are many, who fear the danger of a multitude of counsellors in questions relating to the fine arts, will have reason to be somewhat astonished at the extended and complete nature of the council which the French Government has called together to assist the Secretary of State for the Fine Arts in his arduous duties. A reconstitution of this council has recently been officially announced. Its composition offers some features of interest apart from the fact that we meet with most of the names familiar to us in the artistic world of Paris. Were it only to show the practical importance attached by our neighbours to the consideration of the numerous art questions that present themselves, and the desire of the Government to meet every contingency, an enumeration of the officials who form this council is of instructive value. Presided over naturally by the Minister of Fine Arts, are nominated members "by right," the Prefect of the Seine, the secretary of the Academy of Fine Arts, the Administrator of the National Museums, the Director of the "Bâtiments civils," the Inspector-General of Drawing, the Director of the National School of the Fine Arts, the Director of the Conservatoire of Music, the Vice-president of the Commission of Historic Monuments, the Director of the School of Decorative Art, the Curator of the Museum of the Luxembourg, the Commissary-General of the Fine Art Exhibition.* The council thus far constituted, a further addition is made by the annual election of twelve artists, members of the French Institute, who take the place of our own Academicians, and what may be termed "outsiders"; six painters, two sculptors, two architects, an engraver, a musician, a member of the French Academy, a member of the Academy of Inscriptions, two member of the Superior Council of Public Instruction, two senators, two deputies, a councillor of State, a member of the directing body of the Sèvres manufactory, as also of the Gobelins tapestry works, two representants of the arts applied to industry, an inspector of fine arts, and six persons distinguished for their literary acquaintance with art. The council thus constituted is to meet every three months, but it can at all times be convoked by the Minister of Fine Arts. Sub-committees will be formed for the preparation of special reports. The subjects for consideration of the council are numerous, the annual exhibitions, the various competitions, the national manufactures, the archæological or artistic missions to foreign countries, and a number of other questions relating to art, the Minister of Fine Arts will submit to the attention of the council. Thus formed, the council for this year gathers together a characteristic choice of names, many, if not most, familiar to the public. Among the painters, Henri Lehmann, Cabanel, Gerôme, Bonnat, Breton; sculptors, Barriae and Chapu; Boeswillwald, Inspector-General of the Historic Monuments, and an eminent architect, together with M. Garnier; Flameng the engraver; M. Renan, of the French Academy; M. Perrot, the archæologist; M. Galland, of the École des Beaux-Arts; M. H. Bouilhet, of the Union Centrale, a manufacturer who worthily represents the application of the arts to industry. Among the art critics, MM. Alexandre Dumas, Edmond About, Charles Clement of the *Débats*, Eugene Véron, director of the journal *L'Art*, and Charles Blanc. This assemblage of names, including so generously the most widely-differing opinions in a council intended to watch the artistic interests of the country, is characteristic of the method in which our neighbours treat the consideration of the fine arts in their bearing on the community. Mr. Mundella was right, the other day, in expressing his belief that without the efforts for the encouragement of art made of late years our trade would have suffered by millions.

That importance which is attached in all thinking minds in England to the proper education of the workmen, the manufacturers, the employers of labour in future, is no less felt abroad. Only a few days since M. Jules Simon, in reading before the Academy of Inscriptions and Belles Lettres a portion of his collection of Reports on the Exhibition of 1878, successfully showed how completely we may attribute the advance of industry in the present day to the progress made in science and intelligence, the work of our superior schools; to their still greater development he looks for the future of industry. "Let us give professional schools," the eminent statesman and Academician said, in concluding his address; "let us give professional schools to our miners, our blacksmiths, our decorators, to our weavers, our watchmakers, to our carvers, our cabinet-makers, to our cultivators. But let us remember to make of them men, because it is with men that workmen are made manufacturers and *savants*; primary and secondary schools to make men, schools of apprentices to make workmen, schools of application to make engineers and chemists, superior schools to make *savants* and professors. Let us make a crusade for education and science. In the situation in which the course of events has placed us, it is no longer possible to be ignorant,—to stop. We must advance, or fall."

The interesting Château de Blois, it may not be uninteresting to many to learn, is at present undergoing important repairs, in accordance with the determination of the Historic Monuments Commission. The works consist in the restoration of the roof and the upper portions of the château built in the time of Francis I., in which the chimney-stacks and the skylights are in a far from proper condition, although they by no means belong to the original building.

From Amiens we learn that at the cathedral have been terminated the series of casts which are to form part of the Museum of Comparative Sculpture to be installed at the Palace of the Trocadéro in conformance with the proposal of the late Viollet-le-Duc, as was announced in these columns at the time of the eminent architect's death. Successful casts have been taken of a number of the characteristic figures, the "Vierge Dorée" and two apostles from the great portal, that of St. Sauveur, with its pedestal and the various ornaments which form the general surrounding decorations; in the interior, a cast from the figure of the bronze tomb of Erarde de Foulloy and of Godefroid d'Eu. It is to be hoped that our Government may obtain duplicates of these delicate works. Is it not time, when we consider what is being done abroad, for our Government to bethink itself of again taking up a proposal which has been more than once put forward, the establishment of a special museum of casts?

The three so far promised exhibitions of next year are each, from all accounts, in admirable train. From the *Frankfort Gazette* we learn that owing to the activity displayed by the committee of the exhibition of "Patents and Trade Marks," which was announced in these pages, the number of exhibitors has already reached 1,200, while the site of the exhibition has had to be enlarged from 8,000 to 14,000 square yards. We may look forward, therefore, to an interesting show.

The Paris Exhibition of Electricity is also now completely decided on, and a recent official announcement states that the bureau of the exhibition and the commission of the International Congress of Electricians are now installed at the Palais de l'Industrie in the Champs Elysées, where all information can be obtained. The arrangements of the exhibition were definitely agreed upon only a few days since. The exhibition opens on the 1st of August next, to close on the 15th of November. Foreign exhibitors will be represented by a special commissioner for each nation; by a wise arrangement the exhibitors will not be called upon to pay for the space they occupy. The principal classes to be represented are telegraphy, telephony, the production and distribution of light, light-houses and signals, electric motors applied to industry, wires and cables, galvano-plastic, and the various applications of electricity to the fine arts. A lithographic collection and an historical museum will complete the show. It has wisely been determined to distribute among the workshops a large number of free tickets.

As for the Milan Exhibition, the Milan papers duly record the progress being made. The Italian Government has recently determined that an important feature of the show is to consist of an industrial museum formed of a complete collection of specimens, each to be price-marked, of all Italian manufactures or products which are capable of being made staples of an export trade. Should this collection be really completed we may look for some curious and interesting results.

The mention of Milan may, perhaps, be considered sufficient excuse for the introduction here of a charming artistic anecdote related of Garibaldi by a correspondent of one of the French papers during the recent visit of the popular Italian hero to Milan. Among the numerous persons presented to him, Garibaldi received the representant of one of the Paris illustrated papers. "Be welcome, dear sir," said the old soldier to the artist, "you are one of my friends; for I am like the children,—I like picture-books, and I love those who make them."

THE FOG QUESTION.

In the paper read at the Society of Arts the other evening, Dr. Alfred Carpenter, after demonstrating the nature of the black fogs of modern times, proceeded thus:—It is much easier to point to a nuisance than to get it removed; I always object to criticism, unless it shows a better way of doing things. I object to overthrow an institution without being provided with something better to put into its place, even if that institution is a nuisance. The overthrow of the domain of fuel-smoke might be purchased too dearly. There is something so endearing and so national about our domestic hearth, so captivating about the ability to poke a fire, that I should never expect to remove these comforts from our midst; neither is entire removal necessary. The ability to poke a fire is the one thing which preserves many a mind from downright insanity, and to take away the power would consign many an unstable mind to a madhouse. The thing is not to be done, therefore, without due consideration. Thousands of fires, nay tens of thousands, would not produce a London fog, spread about, as they might be, over the 300 square miles which constitute the metropolitan district. A few such fires would do harm, and if such fires, being a luxury, were made to assist in performing a duty towards those who could not afford the luxury, good might come out of evil; though I would not support the notion that it is right to do evil that good may come. The question is, How are smoking chimneys to be got rid of? It is a process which the Society of Arts, with all its array of powerful names, will not be able to effect. An appeal must be made to the Legislature upon the point, and I suggest that the Society be foremost in making that appeal. Let us ask them to pass such laws as will help forward the object which we have in view, for public opinion, public spirit, and philanthropy will not alone be able to effect it. I believe that a short Act would be sufficient. That if local authorities had the power to levy a tax upon every fireplace so constructed as not to consume its own smoke, the smoke nuisance would then disappear in a very few years. They should have the power to use the proceeds of

* By a decree, published only within the last few days, the professor of Archæology of the Ecole des Beaux Arts is added to the Council.

roof, in addition to which each shop has its own independent lights. The necessary sanitary accommodation is provided at the south-west corner.

The architects of the new building are Messrs. J. & T. Tillman, and the contractor for the mason's work is Mr. Mark Howarth, and for the joiner's work, Mr. Davidson Taylor, all of Sunderland.

THE CITY CLUB, LUDGATE CIRCUS.

"Cook's Tourists" have been and still are sneered at occasionally by writers and talkers who forget that travel does a great deal to broaden people's views of men and things, and who fail to recognise that the man who makes travelling easy and cheap is a real benefactor to his race. The firm of Thomas Cook & Sons led the way in providing well-organised facilities of travel, and still maintain the lead; and it is to the managing partner of the firm, Mr. John M. Cook, that credit must be given for having met, with characteristic enterprise and foresight, a want that has long been felt in the City, particularly in that part of it where journalists of all grades most abound, viz., Fleet-street and its vicinity. That want is supplied in the establishment of the City Club, which is located in the four upper floors of the handsome and extensive stone building which was erected some five or six years ago at a cost of some 60,000*l.*, for Messrs. Cook, at the corner of Fleet-street and Ludgate Circus, and which has return frontages to Farringdon-street and St. Bride-street. The position is excellent. Messrs. Cook's tourist offices and the Ludgate Circus Branch Post Office occupy the ground floor, the proprietors also retaining the *mezzanine* for their own use. The upper floors have until lately been sub-divided and let out as numerous offices, mostly those of press agencies and provincial journals which need (and all daily provincial journals do need) offices in London. Recently, representations were made to Mr. Cook that he would be well supported if he were to devote the four upper floors of the building to the purposes of a club for clerks and others engaged in the City in mercantile or other pursuits, with special provision for the accommodation of members of the Press. Mr. Cook happily seized the idea, and has put it into execution in a manner that has elicited the warmest encomiums from all who have seen the premises. Mr. Horace Gandry, the architect from whose designs the building was erected, has (as we stated a few weeks ago*) been employed to superintend what slight structural alterations were needed, which have consisted for the most part in here and there removing partition-walls so as to make two or three rooms into one, and in making doors of communication in the partition-walls that remain, so as to throw all the rooms on a floor into direct communication with each other, besides having separate means of access from the staircase landings. The rooms are tastefully decorated and furnished. The decorative work has been done by Mr. Laing, of Duke-street, Adelphi, and the furniture, which is good throughout, has been supplied by Messrs. Maple & Co., of Tottenham Court-road. The entrance to the club is in Fleet-street by a lobby, from which stairs run up above the *mezzanine* to the spacious entrance-hall, where members can leave their hats, coats, umbrellas, &c., in the care of the hall-porter. On the left of the hall is the "Press Writing Room," a handsome apartment, provided on either side with a row of specially-designed desks, partitioned off into spacious compartments, and provided with seats. These desks have good window-light by day, and are provided with Sugg's London argand burners with opal glass reflectors for use by night. In the centre of the room is a large writing-table for those who do not seek the privacy of the side desks. Altogether, comfortable accommodation is provided for twenty Press men to work at one time. This room is exclusively devoted to the use of members of the Press, and is open all night up to six o'clock in the morning, for the convenience of the reporters connected with the daily newspapers, although three o'clock a.m. would probably be late enough to keep it open. This feature of the club is much appreciated by Press men, who have already joined the club to the number of about 150, almost every one of whom is showing his appreciation of Mr. Cook's enterprise by bringing in new members. Well may they be grateful to Mr. Cook, for many of them (particularly reporters) are often compelled by the exigencies of their calling to write out matter for the Press under most disadvantageous conditions, cooped up in dirty corners of printing and publishing offices, in the midst of distracting noises, and not seldom in an atmosphere as warm at night, though very far from being as pure, as that of a Turkish bath. Again, reporters, attached as well as unattached to the staffs of the different journals, have frequently in one day to attend meetings held at intervals of several hours apart, and hitherto many of them have had no more improving waiting-place to resort to than the public-house. Here, again, the City Club meets a great want. On the right of the entrance-hall access is gained to the large reading-room, where no conversation is allowed, and opening out of this is a smaller, but still large, reading-room, in which conversation is permitted. These rooms are fully provided with all the London newspapers, periodicals, and magazines, and with a large and good representative collection of provincial, American, and colonial journals. Ingress or egress to or from all these three rooms is also obtainable by doors opening direct on to the landing of the capacious and well-lighted staircase, as is the case with the rooms above. On the floor next above the reading-rooms are the restaurant and dining-rooms, where members can dine or get a chop or steak and light refreshments as cheaply and as well served as at the more ambitious restaurants which have been established in London of late years. To some people one thing only will be lacking, and that is alcoholic beverages, for Mr. Cook is an earnest and consistent teetotaller, and has managed to exist for nearly half a century without using those beverages. He says boldly in his prospectus that "if the City Club cannot be conducted without the sale or use of intoxicating drinks on the premises, it will have to be given up." We imagine that few people to whom such a club is valuable will let their desire for a glass of beer prevent them from availing themselves of the other advantages which are offered to them by a public-spirited teetotaller. Mr. Cook, however, is no Puritan, for on the same floor as that containing the dining-rooms are two well-appointed billiard-rooms, while on the floor above are rooms appropriated to chess, draughts, cards, &c., besides smoking and conversation rooms. It is stated in the prospectus that many well-intentioned people had remonstrated with Mr. Cook as to the provision of opportunities for these games, but regarding such amusements as innocent and harmless in themselves, he expresses his firm determination to be watchful and to check and repress any abuses, should they arise,—and he is a man of his word. The fourth floor is devoted to the kitchen and service of the club. The whole of the club is open from ten in the morning until midnight, and on Sundays the reading-rooms, Press writing-room, and dining-rooms are open from two p.m. to ten p.m. Mr. Cook has spent more than 2,000*l.* in furniture and fittings, and states that his annual liability in respect of the establishment will be about 1,500*l.* On the present low basis of subscription (1*l.* per annum), to which the proprietor desires to adhere if possible, he will need about 1,500 members, and seeing that the club opened on the 13th inst. with 450, a number which has since increased to very nearly 600, there appears to be no reason to doubt that the venture will be a great success, and afford another illustration of the power of co-operation in such matters. The rich and titled classes of the community have long since availed themselves of this means, as the palatial buildings of Pall Mall testify; and Mr. Cook, in taking the initiative in the matter of providing somewhat humbler though still good club accommodation for business men and journalists, is making an important social experiment, in which he eminently deserves to succeed and to be imitated, even as he has been imitated in other matters.

* See p. 556, *ante*.

Smoke Prevention.—The Commissioners of 1851 having placed their testing-houses at South Kensington at the disposal of the Committee of the National Health and Kyrle Societies, it is proposed to hold an exhibition of smoke-consuming and preventing appliances, and to undertake the testing of various kinds of fuel.

PRIZES FOR ART WORKMANSHIP.

The Council of the Society of Arts have issued the following important notice:—

1. The Society's Medals in Gold, Silver, and Bronze, and Certificates of Merit, will be awarded for specimens of Fine Art applied to Industry, exhibited in 1881, by manufacturers, designers, art-workmen, or possessors of such works.

2. The works may consist of illustrations of any or all of the following processes, in combination or singly:—

1. Carving in marble, stone, or wood.
2. *Repoussé* work in any metal.
3. Hammered work in iron, brass, or copper.
4. Carving in ivory.
5. Chasing in bronze.
6. Etching and engraving on metal,—Niello work.
7. Enamel-painting on copper or gold.
8. Painting and modelling in pottery.
9. Decorative painting.
10. Inlays in wood (marquetry or buhl), ivory, or metal.
11. Cameo-cutting.
12. Engraving on glass.
13. Wall mosaics.
14. Gem-engraving.
15. Die-sinking.
16. Glass-blowing.
17. Bookbinding and leather work.
18. Embroidery.

3. To all works the name of the designer and art-workman must be affixed. Further detailed rules will be issued later.

4. It is arranged with the Council of the Royal Albert Hall that the place of exhibition for the above-mentioned works will be at the Royal Albert Hall. The time for sending in the works will be published hereafter.

5. The above regulations are issued subject to modification.

SALE OF CEMENT WORKS AT NORTHFLEET.

Extensive cement works at Northfleet, in Kent, which have for several years past been carried on by Messrs. Goreham & Son, were sold at the Auction Mart last week, by Messrs. Fuller, Horsey, & Co. The premises, which cover an area of about six acres, having a frontage to the river Thames of 350 ft. in length, were offered, with the whole of the buildings and the fixed plant and machinery on the ground. The property is held under lease for a term of sixty years from September, 1872, determinable by the lessees at six months' notice, in case of chalk not being supplied by the lessors according to the provisions of the lease, at a rent of 200*l.* per annum. The original lease contained a covenant under which the lessors bound themselves to supply the lessees with chalk at the rate of one shilling per loose cubic yard, until the 29th of September, 1894, the minimum quantity to be 20,000 cubic yards per year, but this contract has since been modified by waiving the stipulation as to quantity, and increasing the rate to 1s. 1d. per yard. There were several competitors for the property, which was sold for 3,850*l.*

Club House, Darwen.—The new Conservative Club at Darwen was opened on the 9th inst. by Colonel F. A. Stanley, M.P. The building is in the Gothic style, and has been erected from the designs of Mr. W. Perry, architect, Darwen. The principal façade in Church-street is faced with parpoints, which, together with the dressings and other stone work, have been obtained from local quarries. The elevation to Church Bank-street is built of brick, with stone heads and sills similar to those of the chief front. The building is oblong on plan. There are two main entrances in Church-street. To the right of the hall on entering is a private billiard-room (32 ft. by 24 ft. for two tables), with lavatory attached. From the hall access is also gained to the ordinary billiard-room (50 ft. by 24 ft. for three tables); and on the left to the reading, conversation, manager and secretary's, and committee rooms. A private staircase leads from the secretary's room to the lecture-hall and anterooms on the first floor. The public entrance to the lecture-hall is in Church-street. Another means of access to the ordinary billiard-room is afforded to the right of this entrance. The hall is 75 ft. long, 48 ft. 9 in. wide, 22 ft. from floor to ceiling, and 34 ft. from floor-line to top of ridge. A gallery is provided at the west end, having a storeroom and refreshment-bar underneath; the platform and anterooms are at the east end. The general contractor was Mr. J. Pilkington, Darwen.

DIGGINGS IN BŒOTIA.

Dr. Schliemann and his wife have been staying for some time past in Bœotia, at the village of Skripa, near which they have been energetically pushing on excavations with a view to discover any remains of the pre-historical city of Orchomenos, the wealthy capital of the once famous kingdom of the Minyæ. Several shafts which Dr. Schliemann has sunk have afforded little result beyond a few relics of tombs, some vessels similar to those found in Mycenæ, and several inscriptions in the Æolic-Bœotian dialect. These Dr. Schliemann regards as of great value for Greek philologists.

While Dr. Schliemann has been comparatively unsuccessful in the excavations under his own special superintendence, his wife, who has been conducting researches in another portion of the ground, has been fortunate enough to find what are believed to be the remains of the "Treasury of Minyas." In a letter to the *Ephemeris*, dated November 23, Frau Schliemann says, "About noon to-day we came on a door and passage lying to the right of the Treasury. At the end of the passage was a second door, leading apparently to a tomb or chamber, and barred by a stone tablet covered with beautiful reliefs." The Government Commissioner who is attached to the excavating party, writing of Frau Schliemann's discovery, says "The door opens into a fine passage running in another direction from the Treasury. At a distance of 3 mètres, however, lies a large stone which had fallen down from the roof and completely blocked up the passage. This stone is adorned with sculptured flowers, which may be taken as indicating that the decorated portion of the interior commenced here. The stone is rather more than 4 mètres in length, and 2 mètres in breadth. The height of the door is not yet known: it is 1·3 mètres in breadth." The remains of the Treasury of Minyas lie at the foot of Mount Acontion, on the north bank of the Cephissus. The real nature and purpose of the monument are not known. Frau Schliemann thinks that the door now discovered leads to a second chamber, which was not known to ancient excavators, and which, she thinks, may still contain treasures of very ancient date. The excavations which Dr. Schliemann and his wife are prosecuting with great eagerness will soon set this question at rest.

THE ORIGIN OF THE ARCHITECTURAL ASSOCIATION.

Sir,—It may possibly he a distinction without a difference, but I cannot see myself how Mr. Kerr, in speaking of the "Association of Architectural Draughtsmen," can say "*they joined us; we did not join them.*" If the object is simply the origin of the present Association, this would give any one reading it a wrong impression. The fact is that a certain number of young men, wishing to found an architectural society for their mutual instruction and improvement, finding the A.A.D., having very similar objects, already in existence, came to us in 1847, and we willingly at once amalgamated. We were a very limited number, it is true, but there was no question as to which body joined the other. We received them with open arms; they met for a time in our rooms; we at once altered such of our rules as they objected to, and we omitted the word "draughtsmen" from our title, which they did not like. But with these exceptions it has been one and the same Association from the beginning, and the honour of its formation is still due to James Wylson. I think I am not wrong in saying that this has always been the general feeling,—and the Architectural Association still put after their title, "Instituted A.D. 1842."

I do not for a moment wish to detract from the important part Mr. Kerr took in revivifying the body, but it is wrong to say that the A. A. D. was a mere "benefit club." We met week after week, although only a few of us, for our mutual instruction, and read papers on professional matters, and contributed drawings and sketches. These we discussed and criticised in a friendly spirit, and we instituted the very first of the Architectural Exhibitions, the permanent formation of which was for years afterwards an important object of the present Association. This original Exhibition was held at our rooms in Southampton-street, and was opened *free* to the public, and a very good show it was for so small a body. This, at least, shows that we were willing to benefit others besides ourselves. James K. Colling.

P.S.—I was not a "middle-aged married man" when the A. A. D. was formed. I was twenty-six, and most of the other members were younger. Not one of us could be called middle-aged, even in 1847.

WORKS BY THE BROTHERS ADAM.

Sir,—In reference to the notice which appeared in your last number of Mr. Batsford's valuable publication "The Architecture, Decoration, and Furniture of Robert and James Adam, Architects," it may be interesting to many of your readers to know that in the library of Sir John Soane's Museum are upwards of fifty folio volumes of original drawings made by the Brothers Adam.*

Many of these folios are filled with highly-finished designs for ceilings and wall decoration, drawn to a large scale and coloured with details given to a still larger scale. There are also some volumes of designs for chimney-pieces, mirrors and furniture, besides the more strictly architectural plans, elevations, and sections, etc.

Permit me to add that every facility is given at this Museum to students who may wish to refer to or copy from these works. Curator.

RADIATION AND CONDUCTION.

Sir,—I cannot understand the reason for the broad distinction which it is attempted to draw between radiated and conducted heat. A fire radiates heat into the room. The metal portions of a grate or close stove become heated by radiation and conduction, and they radiate that heat in the room, on the ceiling, floor, walls, furniture, and on our own bodies, and these in their turn radiate heat. The air is, undoubtedly, not heated immediately to a great extent by radiation, but that it is heated to some extent is proved by the fact that there is an ascending current of warm air in front of every fireplace. We shall never understand how air really becomes warm till we are conscious of the incessant motion which takes place in every apartment that is not almost hermetically sealed, and which causes that air to come into contact with the solid bodies that are really heated by radiation. We are conscious of the constant movement of air which we call a draught or wind, because we feel it, but we are utterly unconscious of the movement of air which is occasioned by our walking across a room; and even such delicate organs as our eyes give us no information whatever. Hence it is that no instrument which man has yet devised can indicate to us more than can be observed by the movements of the lightest of substances. Hence also it is that poisonous germs are so dangerous; not that they pervade the whole atmosphere, but because of the incessant motion of air which we only are thoroughly assured of inferentially, and by which the germs may at any moment be brought in contact with our lungs and other organs. The whole subject requires investigation by our ablest philosophers; but, in the absence of the most delicate experiments, it is easy to understand a great deal about the matter. The distinction drawn between radiated and conducted heat appears to me to be hardly worth consideration. An open fire is valuable from its cheerfulness and the change of air it occasions. This is the only distinction I can draw between that system of warming and the system of warming by stoves or hot-water pipes. We depend both on radiation and conduction in all the appliances in use.

Fredk. Edwards, Jun.

CAUTION.

Sir,—I desire to warn architects against a person who is going about seeking help under the plea of obtaining employment. He told me a most pitiful tale, and, believing him, I gave him money. Feeling desirous of helping him still further, I made inquiries respecting him from eminent London architects (whose names he freely used) only to learn that he was an impostor.

Provincial Architect.

Appointments.—At a monthly meeting of the Town Council, held on the 8th inst., Mr. F. A. Kemp was appointed assistant borough surveyor of Sheffield, and Mr. T. Tinker was appointed junior assistant.

* We mentioned and commented on these not very long ago.—Ed.

HOW THEY MANAGE THINGS AT BILSTON.

At the last meeting of the Bilston Township Commissioners and Local Board of Health, held on the 15th inst., a letter was read from the Local Government Board asking for information as to the prevalence of zymotic diseases in the town, and it is to be regretted that the Board, instead of replying to the central authority in a straightforward and dignified manner, instructed the clerk to write and refer them to the late medical officer. The population of Bilston is 25,000, and they pay their medical officer 20*l.* a year!—a salary which the London Board has refused to sanction. As a resident in Bilston, I cannot but feel humiliated at the conduct of our local Parliament in proceeding in such a manner.

They have reports both from the late medical officer of health and the surveyor setting forth the unsanitary condition of several parts of the district, and there are several houses in the following streets whose cellars are contaminated with sewage, viz., Queen-street and Bilston-street, Bradley; John-street, Tame-street, and Caledonia-street, Bilston; and John-street and Pump-street, New Village; all of which districts are under the sanitary, or, rather, unsanitary, control of the commissioners, who, I believe, desire to do their duty, but are not sufficiently educated to understand the increasing importance of sanitary administration.

Now, the sewers in the streets referred to above are literally full with black, stinking, sewage matter. There are plans in the surveyor's office, prepared by that official, showing how this state of things can be remedied. The medical officer and surveyor have called the attention of the Board to it, yet there is nothing being done! How do they excuse themselves from executing the necessary structural works? "We have not much money, and the people living in those streets do not complain." Unfortunately, the people who are in a good social position at Bilston take very little interest in its government, and they regard membership of the Board derogatory; and, however much this is to be regretted, the natural consequence is that the class of people who compose the Board is not, as a rule, what is to be desired.

Probably such a high standing paper as the *Builder* will not be read by any member of the Bilston Board, but let us hope, for decency's sake, it will be read by some of its more influential residents, and so move them to action on behalf of their benighted town. If the *Builder* were to send one of its staff to test the accuracy of this communication, I should expect to see such a description as I shall,—in the absence of such a report,—hope for in vain. A. F. G.

THE MYSTERIES OF FIGURES.

Sir,—Your correspondent "J. H.," in a letter published on the 11th inst., asked the "whys and wherefores" of a clever arithmetical puzzle, and wished to know if there were any "deep signification" in the occurrence of the numeral 9.

"H. L.," in the *Builder* of the 18th inst., gives an algebraical explanation in the case where the number is one of eight digits, and Mr. J. G. Vine, in the first part of his letter, gives a general demonstration. This seems very satisfactory, but for his slip in writing n instead of $n-1$ as the exponent of r in the last term of his equations.

With regard to the occurrence of the numeral 9, both in this puzzle and in the case demonstrated in the second part of Mr. Vine's letter, it will be found that this occurs because 9 is one less than 10, the radix of our common notation. If we try 9 as a radix, we find the numeral 8 possessed of the qualities the 9 now enjoys; and a similar case occurs with any other number as radix. Delta.

Multiply 9 by itself, or by any other of the digits, and the figures of the product added together amount to 9. The component figures of the amount of the multiplier (viz., 45) when added together make 9.

The amount of the several products or multiples of 9 (viz., 405) when divided by 9 gives a quotient of 45, and the component figures of either the dividend or quotient added together make 9.

Multiply any row of figures either by 9 or by any one of the products of 9 multiplied by

one of the digits, as by 18, 27, 36, 45, 54, 63, 72, or 81, and the sum of the figures of the product added together will be divisible by 9.

Multiply the nine digits in the following order:—1, 2, 3, 4, 5, 6, 7, 8, 9, by 9, or by any one of the products of 9 mentioned in the last paragraph, and the product will come out all in one figure, except the place of tens, which will be a 0, and that figure will be the one which multiplied into 9 supplies the multiplier; that is, if you select 9 as the multiplier, the product will be (except the place of tens) all ones; if you select 18, all twos; if 27, all threes; and so on. Omit the 8 in the multiplicand and the 0 will also vanish from the product, leaving it all ones, twos, threes, &c., as the case may be.

A. B.

COMPETITIONS.

CROYDON BOARD SCHOOLS.

The School Board for Croydon recently invited plans, in limited competition, for a new school in the Sydenham-road, and from the ten designs submitted, that hy Mr. Charles Bell, of Dashwood House, New Broad-street, has been selected for execution. The new schools will accommodate 750 children, at a cost of about 5,400*l.*

LIVERPOOL SCHOOL OF ART.

Sir,—In reply to what has appeared in the *Builder* respecting the Liverpool School of Art Competition, I shall be glad to state the following facts:—

1. The Committee of Selection consisted of ten members, several of whom have considerable knowledge of plans and elevations, and all of whom had previous experience of building competitions.

2. No competitor was informed by me that the directors would appoint a professional referee. To such as asked the question, I handed the enclosed copy of the resolution adopted by the Board.* To those asking personally for information, I gave what I could, without hint; but always with an understanding that my opinion was but an opinion, and not an "instruction."

3. The competitor who was once a member of the Board took every care to keep his identity unknown. His design was not included in the final selection.

4. I know of only one effort at "touting," and that was nipped in the bud, the design sent in being rejected at an early stage.

5. Until the moment after the awards had been made, not a member of the Selecting Committee was aware of the identity of any of the authors of the designs.

The appointment of a professional referee, and the exhibition of the designs are matters upon which the Board had a perfect right to form their own conclusion; and the competitors an equal right to differ from them thereon. That difference they are freely expressing.

To such as care to place faith in the assurance of one who has equal interest in the Committee and the Competitors, I can only say what I have before stated, that the award of premiums has, in every sense, been justly and fairly conducted; and that every step of the careful inspection which led up to the final selection has been taken without prejudice to a single person concerned.

Charles Sharp, Secretary.

"SANITARY SCIENCE IN ITS RELATION TO CIVIL ARCHITECTURE."

Sir,—As you were good enough to print some remarks of mine on small-bore drains in the *Builder*, p. 311, *ante* (Oct. 23), and which remarks were supported by Mr. Buchan in the same journal (Nov. 13), I make bold to trouble you again on a very important question raised by "A.R.I.B.A.," in your issue of the 11th inst.

Before I proceed to give an opinion as to many of the scientific dogmas with which some of our *dilettanti* seem exceedingly fond of surrounding sanitary matters, I would like to tell "A.R.I.B.A." that his ℧-trap, which has bothered him, is not a trap at all. The 10 ft. vertical lead pipe is on many occasions the long leg of a syphon, and draws the water from the trap, leaving no water seal there at all. I say on many occasions; for if only small quantities of water are thrown into the sink, the syphon is not forced into activity, there being air-space in the waste-pipe; or, in other words, the water does not descend at full bore. The very fact of it being a well-made trap and a sound piece of work is an argument in favour of its being a good syphon. Not only ℧-traps, but S-traps, performing these same antics, have come under my notice, and I have no hesitation in declaring that hundreds of traps are lied, and nobody ever gives the slightest thought as to their functional performances, or whether they have a water seal or not.

Let any one who wishes to see what can be done in that way simply dash a pail of water into a common pan-closet, which has a vertical soil-pipe, and then note carefully how much water-seal there is. He will find, as I have found, that the descending water has actually sucked away the very efficiency of the trap. Further, he will find that if this experiment is made on the ground-floor or first-floor, traps on every floor above which are connected to the same soil-pipe,—unless the soil-pipe is carried up into the open air,—will be more or less affected in proportion as the work has been well done or the contrary. I have gone into houses where the inmates have over and over again complained of the presence of the drains, torn down good work, but with no effect, until I accidentally discovered the offending cause: so I can quite sympathise with "A. R. I. B. A." in this case. Another cause of unwholesomeness about sinks is the damp, and that also may have something to do with making that particular room "*noisome*." With regard to trapping sink-wastes, I would trap the end of every waste-pipe, and the branch of every soil-pipe which should or may pass within the walls of any domicile, and also see that they were efficient ones too. The difference between the old-fashioned open drain and the modern ventilated one seems to me to depend on the swifter removal of the latter in contradistinction to the sluggishness of the former, and in this difference must lie the success of the new idea; for, if it merely depended on the abundant supply of air into close drains, the sooner we get back to open drains with plenty of fall the better.

Ventilation of drains is a very dangerous business, and instead of being a safety-valve, may indeed be a conductor of sewer gas (or sewer "air," if it be more fashionable) into our very sleeping-rooms.

For example, a fire is lighted in a bed-room. A person may possibly be lying there sick; a door is opened into an adjoining room, where there is an open fireplace, but no fire. Most assuredly the air which may happen at the moment to be around that chimney-top, where there is no fire, will descend that flue and enter the room where the fire is; and just as likely as not, a ventilator from some drain would be close to it, and the rest is easily divined. Let us imagine what kind of an atmosphere is going to be created over our heads when thousands of so-called ventilators or extractors are night and day belching forth their destroying effluvium, and saturating it with pestilential vapours. No, the last word is not said upon these things, and the *Builder*, opening its columns to a discussion of such matters, is undoubtedly conferring a real good not only on sanitarians, but on the world at large. I believe there may be sewer air, but I also believe there is sewer gas, or, at any rate, a compound which is generated in no other laboratory on earth excepting in a sewer. Anybody knows, who has to do with gas mains, that, in almost every one there is a per centage of leakage. In various ways part of this gets into sewers, and then, sweltering there in contact with sewage, becomes mixed with other vapours producing what is, no doubt, as good a name as we can give it,—sewer gas.

I do not wish to be understood as objecting to ventilation of drains, but I do contend it ought not to be carried out in the haphazard manner which is at this time being practised in many parts of London. We have something more to learn yet, and some results of this reckless jumping at pet theories may give us a startling surprise some of these days.

Practical Sanitarian.

STATUES.

The late Prince Consort.—The statue of the late Prince Consort which has been presented by Mrs. Richardson-Gardner to the Windsor Albert Institute, and placed in a niche in the façade of the building facing Sheet-street, has been unveiled by H.R.H. Princess Christian. The Prince is represented in a standing position, and attired in the robes of a Knight of the Garter.

Lord Lawrence.—The executive committee of the Lawrence Memorial, at a meeting held last week, adopted the principle of the design submitted by Mr. Boehm, who, to indicate Lord Lawrence's character, has seized on an incident related of his earlier career in the Punjab. He exhibits a sword and a pen to the Sikh chieftains, and demands to know by which they choose to be governed. Mr. Boehm will now proceed with the work. The statue is to be placed in the south-east corner of Waterloo-place, opposite that of Sir John Burgoyne.

Books.

The Sculptor Caught Napping; a Book for the Children's Hour. Designs by Jane E. Cook. The Autotype Fine Art Company, 531, Oxford-street.

This is a second edition, much elaborated, of a set of designs originally published to aid the fund for enlarging the buildings of King Alfred's School, Wantage, Mrs. Cook, the very clever author of them, being the wife of the principal of that school. The nursery rhymes, before in cameo, are given again, but are supplemented by a series of one dozen extra designs treated in the genuine silhouette style, but with the artistic touch and exquisitely graceful design peculiar to her original fancy and fertility of quaintly humorous design. The silhouettes carry on the story told in cameo, and the combination of the two is a happy way of showing the differences of the two processes, the former being, so far as we know, a novelty. Of the artistic ability of Mrs. Cook, who is the sister of a well-known architect, we have before had occasion to speak warmly. We cordially recommend her new book.

VARIORUM.

"The Architect's Legal Handbook," by Edward Jenkins and John Raymond, barristers-at-Law (C. Kegan Paul & Co.), has reached a third edition, and has been enlarged and improved. Full reports of several important cases are given in an appendix, and the Metropolitan Building Act Amendment Act, 1878, and the Bye-laws made under it, are added. A large number of our readers will find the book indispensable.——"Engine-driving Life," by Michael Reynolds (Croshy Lockwood & Co., 1881), gives stirring adventures and incidents in the lives of locomotive-engine drivers. It is pleasant reading and, moreover, calculated to give the public an insight into struggles and labours of which they know little or nothing, and induce sympathy for a deserving set of men.——Amongst the many "Christmas numbers" announced must be included, as of a somewhat interesting nature, that of the *Gardener's Magazine*. A profusion of pictures is, of course, to be expected, but the peculiar features of these special issues are the papers on plant history.——The "Railway Almanack" for 1881 contains, besides the calendar, an official list of the chairmen and executive officers of the independent lines of railway in the United Kingdom, and the dividends paid for the four previous half-years.

Miscellanea.

The Birmingham Art Gallery and Museum.—It is announced that the fund for providing works of art for exhibition in these proposed buildings has already reached the sum of 6,542*l.* 9*s.* In an appeal which the Mayor, who is treasurer, and Mr. Allen Edwards, the secretary to the fund, publish in the Birmingham papers, they state incidentally that the building of the gallery will probably occupy three years. They point out to local manufacturers how closely the prosperity of the town is associated with the knowledge and practice of art by those who are engaged in many of its staple trades. Already the ground for the proposed building is being cleared for the commencement of the works, and the plans are rapidly approaching completion in the office of Mr. Yeoville Thomason, architect. It is designed that the Art Gallery shall be built fronting upon Congreve-street and Edmund-street, and that the basement-floor shall be occupied by the offices of the Gas Department of the Corporation. The plans, so far as they are at present elaborated, include a handsome entrance vestibule, capable of being used for sculpture, of the dimensions of 57 ft. by 18 ft.; two picture-galleries, each about 60 ft. by 28 ft.; a magnificent hall for the display of objects of industrial art, 129 ft. by 53 ft., with light galleries on both sides; another room for pictures measuring 53 ft. by 26 ft.; and a principal picture-gallery, 80 ft. by 53 ft.,—all arranged in a way to facilitate the inspection of the contents of the rooms by visitors.

Æsthetics in Scotch Schools.—The *Inverness Advertiser* reports that, on the 11th inst., a meeting of the "Æsthetic Committee" of the Inverness and Ross Educational Institute was held in Farraline Institution. Mr. Jolly, H.M. Inspector of Schools, presided, and gave a short address, indicating the nature of the work proposed to be carried out by the committee, and asking that any of the teachers who had anything to report, by way of showing what had already been done, might kindly furnish him with some facts thereanent. He intended, he said, shortly to lecture at Arbroath as to the æsthetic adornment of schools, and a few tangible illustrations supplied from the Inverness and Ross districts would be very useful. Some conversation followed the address, and Mr. Jolly mentioned that perhaps the most outstanding proof in the Inverness and Ross districts of the good effects of the committee's work was to be seen in the Drumnadrochit School, which had been most tastefully decorated, owing, in great measure, to the heartiness with which the local School Board had entered into the proposals of the committee. Miss Millais, daughter of the celebrated painter, had paid a visit lately to Drumnadrochit, had gone to see the school, and had said that she had never believed a school could be made so tasteful, sweet, and attractive as it was.

Coming Exhibitions at York.—At a recent meeting of the Council of the Fine Art Institution, York, it was agreed that the summer exhibition of 1881 of works of art should be opened at the same time as the Prince of Wales's Indian presents are ready for public inspection. Simultaneously with this exhibition one will also be held of scientific appliances intended to illustrate the progress of science during the last fifty years, and in addition there will be an exhibition of art manufactures and of such mechanical operations as may be found consistent with the space at the disposal of the committee.

* "I am requested by the directors to inform you that while they do not bind themselves to appoint a professional referee, they think it probable that they will avail themselves of his advice in coming to a decision upon the designs sent in."

A "Society of Chemical Engineers."—A meeting was held on the 14th inst. at Owens College, Manchester, to consider proposals for forming a society of chemical engineers. Mr. G. E. Davies (hon. secretary) read a report which stated that at the last general meeting, in April, it was suggested that a society of chemical engineers should be formed, and that a committee was then appointed to consider that proposal. That committee had held four meetings, one in Liverpool and three in Manchester; and a circular letter had been sent out by its chairman (Professor Roscoe) to persons well known for their attainments in chemical science and chemical industry. The circular contained the following passages:—

"A committee of gentlemen interested in the progress of chemical industry, and resident in this district, has met several times during this year for the purpose of considering the advisability of establishing a society to be called 'The Institute of Chemical Engineers,' or 'The Institute of Chemical Industry.' The proposed society would be a national one, and would seek to bring into contact a large class of persons interested in the very various branches of trade and manufacture which are specially connected with chemical science. Periodical meetings like those of the Mechanical Engineers or of the Iron and steel Institute would be held for promoting scientific, industrial, and social intercourse amongst the members of the society. Possibly the publication of a journal specially devoted to the subject might form part of the scheme."

From the number and nature of the responses made to the circular, the committee advised the formation of a society without delay; and recommended that a small sub-committee should be appointed to make the necessary arrangements for an inaugural meeting in London, to draw up regulations and to take other steps which might conduce to the welfare of the proposed society. The recommendations were agreed to, and Professor Roscoe, Mr. Ludwig Mond, Dr. Campbell Brown, Dr. Hewett, Mr. E. K. Muspratt, Mr. E. Carey, Mr. E. Gossage, and Mr. G. E. Davies, were nominated members of the sub-committee, with power to add to their number. It was resolved that the new body should be called the Society of Chemical Engineers.

Proposed New Park for Hull.—At a meeting of the Town Improvement Committee of the Hull Corporation, held at the Town-hall on the 10th inst., Alderman Waller presiding, Mr. Fryer brought under the notice of the committee the desirability of securing Jalland's Hall and estate, situate in Holderness-road, for the purposes of a public park. The property was, he said, in every way suitable for the purpose, and, seeing that Hull possessed no public park of dimensions such as those at Leeds, Bradford, and other places, he thought this a good opportunity for the Corporation to open negotiations for the purchase of the estate. The new railway and dock would be in close contiguity, and there would consequently be a large increase of house property in that neighbourhood.

Sanitary Condition of Willenhall.—The sanitary authorities of Willenhall have received a communication from the Local Government Board on the exceptional mortality in that township from diarrhœa and scarlatina. As to what the causes of the exceptional prevalence of these diseases are, the *Staffordshire Advertiser* does not hazard any conjecture, but remembers that the brook which flows through Willenhall was a few years since described by the medical officer as an "elongated sewer." It is, moreover, an "open secret" that the greater part of Willenhall is still unsewered. Under such conditions, a clean bill of health is well-nigh an impossibility. The whole subject of underground drainage is, it is satisfactory to learn, under the consideration of the local authorities.

Horse and Cattle Troughs.—It has been asserted that glanders and other diseases amongst horses have of late been on the increase in London, and it is alleged that this disease has been communicated to healthy horses through drinking of the water in troughs at which unhealthy animals had previously drunk. At the last meeting of the Metropolitan Board of Works, it was resolved, on the recommendation of the Special Purposes and Sanitary Committee, "That it be suggested to the Metropolitan Drinking Fountain and Cattle Trough Association, and other bodies and persons who provide public drinking-troughs in the metropolis, that such drinking-troughs should be so constructed and used as to have a constant flow of water passing through them and running off, by means of a tumbling bay, direct to a gully; and that measures should be taken to ensure the troughs being thoroughly cleansed every morning."

The Electric Light of Dr. Siemens.—Hydraulic lifts for large hotels and depôts are very costly, and Dr. Werner Siemens is trying to lessen this by the application of electricity to the movement of the cage, according to the *Electrician*. It is as safe as the hydraulic lift, and far less costly and inconvenient. It operates through the transmission of power by the dynamo-electric machine, and the first one was put in operation recently at the Industrial Exhibition of Mannheim, where, during the few weeks it was exhibited, it lifted over 8,000 persons, the speed of the cage or chariot being half a mètre per second. The apparatus consists of a stationary dynamo-electric machine, which is intended to generate the current, and a second or receiving dynamo-electric machine, which is carried in a box below the platform of the lift. The lift is suspended by two wire ropes passing over a drum, and it is counterpoised by a weight, so that the work to be done by the current in raising it is very little compared with the whole weight of the lift. These wires act also as conductors of the current connecting the two machines. They form, in fact, the return wires. The lifting of the carriage is effected by means of a central ladder or rack, with its rungs or teeth very close together, and two toothed wheels connected to the bottom of the carriage gear with this rack. These wheels are driven by the receiving dynamo machine through the intermediary of an endless screw on the axle of the armature. The sides of the ladder act also as a conductor conveying the current from the generator, and two revolving wheels carried by the frame of the carriage make contact with the sides of the ladder, and tap the current in order to lead it to the coils of the dynamo machine. The lift is started or stopped, raised or lowered, by means of a communicator handle. This is not the first time Dr. Siemens has given a lift to electricity.

Mr. Mechi.—It is generally felt that a case for universal sympathy arises out of the complete collapse of the worldly fortune of Mr. Mechi. The *City Press* gives some particulars of Mr. Mechi's career. In early days renowned for his "magic" razor-strop, and in latter days much more renowned for his scientific farming, the unfortunate gentleman may even yet gain renown of a painful kind as a martyr to high principles and punctilious honour. In the high tide of his civic prosperity as a member of the Court of Aldermen, Mr. Mechi became connected with a bank which, at a critical moment, was found to be unequal to its engagements, and he sacrificed much of his possessions to meet its demands. Speaking generally, his career has been chequered by successes due to spirited enterprise, and disasters resulting from enthusiasm and generosity. It will probably shock public feeling to hear that the ex-sheriff and alderman, when nearing his eightieth year, is actually in want.

The Nelson Coffee-house at Salisbury.—This coffee-house, which has been in course of erection for some time in Fisherton-street, was opened on the 16th inst. by Earl Nelson. The building is well planned, and contains about thirty rooms, including a very large club-room. A lift and a tramway have been made to minimise labour, and ventilating apparatus of a very perfect character has been provided. The exterior is of a deep red tone, almost Pompeiian in its style; full-coloured bricks with dark chocolate pointing have been employed, and the dressings (window-arches, medallions, finials, &c.) are of terra-cotta, supplied by Messrs. Doulton, of Lambeth. The contractor for the whole of the works was Mr. Arthur Foley, of Fisherton, who also provided all the fittings and furniture. Mr. F. Bath, of Crown Chambers, Bridge-street, designed the building, and both architect and builder have received great credit for their work.

Royal Albert Hall.—The Albert Hall Choral Society will give the "Messiah," Monday evening, the 27th inst., with Miss Anna Williams, Madame Patey, Mr. Sims Reeves, Mr. W. H. Cummings, and Mr. Ludwig, under the *bâton* of Mr. Barnby.

Messrs. Jones & Willis have just completed a polished brass lectern for the Rev. Mr. Biggs, Malacca chaplaincy, Straits Settlement; and an oak reredos for St. John the Baptist Chapel, Hulme, Manchester.

The Heat, Light, and Ventilation Exhibition has been postponed for a few weeks, at the request of a number of manufacturers, and will be held from January 26 to February 12, at the Alexandra Palace.

Crystal Palace Company's School of Practical Engineering.—On Saturday last the certificates awarded to the successful students of this school for the winter term were distributed. Mr. Shenton, the secretary of the Crystal Palace School of Art, Science, and Literature, read the report of the examiners (Messrs. W. J. Kingshury and J. E. Lowe), who stated that they regarded the work done by the students as very creditable, and testified to the success of the system of teaching of the principal, Mr. J. W. Wilson, and of the vice-principal, Mr. J. W. Wilson, jun. Mr. E. A. Cowper, C.E., president of the Institution of Mechanical Engineers, prior to distributing the certificates, spoke of the advantage of the studies at the school. He regretted the objection of some of our manufacturers to entertain any improvements merely on account of temporary inconvenience, and stated that in America it was quite the reverse, new things being there regarded favourably, and in many cases tried and brought to perfection. After speaking of the present attempts of the City Guilds and others to advance technical education, he observed, as to new fields into which their energies might in future be directed, that the manufacture of rolled steel sleepers for railways would probably be a question of the future.

The Builders' and Manufacturers' Exchange and Subscription Rooms.—To provide these premises, Nos. 205-6, High Holborn, have been taken, and will be opened to members on the 1st of January. Particulars of the project will be found in our advertising columns. The object is to provide a convenient and central place of meeting for the conduct of business. It is intended by the proprietors to afford all the facilities offered by such establishments as the Baltic, Lloyds', Commercial Sale Rooms, Corn Exchange, Jerusalem Coffee House, &c., with the additional advantages of separate reading and writing rooms, consultation and smoking rooms, distinct from the "Exchange." An exhibition, moreover, will be opened on the ground-floor, for the display of all manufactures connected with the building trade, the admission to which will be free on presentation of an address or business card.

The Sunday Society announce the opening of the Winter Exhibition of Oil Paintings at the Hanover Gallery, New Bond-street, by permission of the proprietor, Mr. Weil, on Sunday, December 26, and on the two following Sundays.

New Cemetery for Carlisle.—Plans prepared by Messrs. Hetherington & Oliver, of Carlisle, have been adopted by the Burial Board of that city for laying out the new cemetery at Upperby.

TENDERS

For the restoration of the Parish Church, at Grendon near Northampton, for the Building Committee, including new stained-glass window to chancel. Mr. H. M. Townsend, architect. Quantities supplied:—

Ireson, Northampton	£215	0	0
Rands & Son, Wisbech	231	0	0

For the erection of a pair of semi-detached villas, at Bexley, Kent, for Mr. Jas. Carter. Mr. Richard Peters, architect. No quantities:—

Watson & Bennett, Dulwich*	£1,285	0	0

* Accepted.

For additions and alterations to the Vicarage, Lewisham, for the Hon. and Rev. Canon Legge. Messrs. E. & W. H. Nash, architects. Quantities supplied by Messrs. Franklin & Andrews:—

J. & C. Bowyer	£1,829	0	0
Banks	1,683	0	0
Jarrett	1,810	0	0
J. & J. Greenwood	1,831	0	0
Jerrard (accepted)	1,483	0	0

For alterations and additions to the Anglo-Bavarian Brewery, Shepton Mallett, for Messrs. Hill & Garton. Mr. W. H. Clark, architect. Quantities supplied by Mr. A. Deane:—

	Contract No. 1. £ s. d.	Contract No. 2. £ s. d.	Contract No. 3. £ s. d.
Davis	2,990 0 0	350 0 0	285 0 0
Humphreys	2,893 10 0	383 0 0	310 0 0
Lewis & Edbrooke	2,873 0 0	386 10 0	346 0 0
Stephens & Bastow	2,899 0 0	349 0 0	319 0 0
Forse & Ashley	2,846 16 0	365 5 0	350 0 0
Church	2,775 0 0	367 0 0	320 0 0
Ashman	2,790 0 0	305 0 0	275 0 0
Beaven	2,790 0 0	396 0 0	288 0 0
Veals	2,794 0 0	289 0 0	314 0 0
Gay	2,700 0 0	281 0 0	385 0 0
J. & S. Emery	2,479 1 4	301 12 6	276 12 2
E. & J. Hatherley	2,387 0 0	353 7 6	237 0 0
Pullen*	2,394 18 0	307 15 6	207 16 7
R. J. Crokert	2,219 10 0	296 0 0	335 0 0

Girders, Rolled Joists, and other Ironwork.

A. D. Dawnay, London (accepted)	£619	0	0

* Accepted for No. 3.
† Accepted for Nos. 1 and 2, subject to No. 2 being cut down.

For fittings for Vegetarian Restaurant, Market-place, Manchester, for Mr. F. Smallman. Mr. T. Hartar, architect. Quantities by Mr. L. Campbell:—

Contract No. 1.—*Partitions and Fixtures.*

Wood	£530	0	0
Brown	517	0	0
Hibbert	498	10	0
McFarlan	487	0	0
Napier	485	0	0
Maben & Fairnington (accepted)	440	0	0

Contract No. 2.—*Seating and Mirrors.*

Gaddes	£341	0	0
Brown	339	0	0
Wood	323	0	0
Todd	318	0	0
Hibbert	260	0	0
Maben & Fairnington (accepted)	250	0	0
Napier	228	0	0

For the erection of Glebe Farm at Kingsthorpe, near Northampton, for the Rev. J. H. Glover. Mr. G. T. Vickers, architect. Quantities supplied:—

Tew & Baldwin	£1,464	0	0
Shakeshaft	1,253	0	0
Mason	1,220	0	0
Heath	1,177	0	0
Wadham	1,110	0	0
Underwood	1,025	0	0
Ireson	998	0	0
Wareing	990	0	0
Stageman	969	0	0
Benges	965	0	0
Woodford & Son	965	0	0
Wingrove	936	0	0
White	907	0	0
Basford	897	0	0
Fisher Bros.	891	0	0
Clayton & Sharman (accepted)	881	0	0

For the erection of the Lycett Memorial Chapel, schools, and class-rooms, Mile-end-road. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove:—

Jones	£6,765	0	0
Bowyer	6,680	0	0
Holloway	6,440	0	0
Toms	6,441	0	0
Staines & Sons	6,386	0	0
F. F. Wood	6,253	0	0
Smith & Son	6,098	0	0
D. T. Wood	5,989	0	0
Stepheus & Bastow	5,999	0	0
Nightingale	5,981	0	0
F. Higgs	5,974	0	0
Hobson	5,974	0	0
Julian & Co.	5,700	0	0
Charlwood	5,785	0	0
White	5,779	0	0
Judd	5,698	0	0
Castle	5,690	0	0
Johnston	5,493	0	0
Harris & Wardroper	5,456	0	0
Drake	5,287	0	0
Gregar (accepted)	5,200	0	0

For Gloucestershire (2nd) County Lunatic Asylum. Messrs. John Giles & Gough, architects. Quantities supplied by Mr. C. H. Goode:—

King, Gloucester	£27,000	0	0
Groome, London	25,800	0	0
Garlick, Birmingham	25,555	0	0
Trevena, Plymouth	24,950	0	0
Lissaman, Leamington	24,432	0	0
Howell & Son, Bristol	24,000	0	0
Rigby, Worksop	23,962	2	10
Welsh, Hereford	23,950	0	0
Thomas, Pembroke	23,341	0	0
Vernon & Ewens, Cheltenham	23,229	0	0
Meredith, Gloucester	23,057	0	0
Jones & Co., Gloucester	22,960	0	0
Brock & Bruce, Bristol	22,700	0	0
Krauss, Bristol	22,689	0	0
Ashbee & Sons, Gloucester	22,500	0	0
Clutterbuck, Gloucester	22,500	0	0
Smith, Birmingham	22,478	0	0
Neill & Son, Manchester	22,360	0	0
Cousins, Cardiff	22,350	0	0
Appleby & Lawton, Milford Haven	22,200	0	0
Lovatt, Wolverhampton	22,137	0	0
S. & W. Pattinson, Sleaford	21,990	0	0
Drew, Chalford	21,519	0	0
Church, Bristol	21,474	0	0
Forse & Ashley, Bristol	21,927	0	0
Veals, Bristol	20,920	0	0
Sharman, London	20,580	0	0

For new building in Little Park-street, Westminster. Mr. Henry S. Legg (Christ's Hospital), architect:—

	Portland Stone.	Less if in Bath Stone.
Longmire & Burge	£2,530	£120
Kirk & Randall	2,461	101
Patman & Co.	2,439	80
Macey & Son	2,350	100
Outhwaite	2,265	121
Morter	2,183	82
Nightingale	2,162	78

For works at Central-street, Goswell-street, St. Luke's. Mr. W. Smith, architect:—

Lester	£615	0	0
Oliver	495	0	0
Larke	470	0	0
Jones	460	0	0
Shurmur	454	0	0
Harper	449	0	0
Gruver	419	0	0
Huckett	357	0	0

For fire-engine house and cottage, &c., for the Sevenoaks Local Board. Mr. Geo. W. Brumell, architect. Quantities by Mr. Thos. Potter:—

Bowyer	£684	0	0
Balaam Bros.	675	0	0
Hodges	665	0	0
Beale	647	10	0
Morris	630	0	0
Wiltshire	625	0	0
Seal	620	0	0
Durtnall	615	0	0
Julian & Co.	610	0	0
Warr	583	0	0
Higgs	576	0	0
Timewell	570	14	0
Willicombe & Oakley (accepted)	565	0	0
Owen	496	0	0

TO CORRESPONDENTS.

E. L. T. (the matter needs further consideration. Builders have, before now, recovered, under certain circumstances, the cost of preparing an estimate)—"Can a Builder Charge for an Estimate" (several letters on this subject shall have consideration).—Do Surveyors ("necessary extras omitted in the specifications through the neglect of the architect" could *not* "be deducted from the architect's commission." A different course must be pursued if the charge be correct).—H. H. G.—T.—S P—J S.—M. & L.—E E.—R. P.—E. C. S.—E. P.—W. L.—H. L.—T. H.—W. C. E.—J. T. B—J. W. W.—J. S.—W. S.—C. W.—S. N.—W B.—W. D. D.—W. S & Son.—G. S.—H. & K.—L.—W. B P.—R. F.—F. B—P. P—J. S H.—H. S. L.—H & O—J. D.—D. P—E. A. H.—C. B—B. I.—R. F H.—Dr. F.—N (no).—S. F. C. (next week).—A pile of letters too late for present week.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

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